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Social and Economic Evaluation of NSW Coastal Professional Wild-Catch Fisheries

VALUING COASTAL FISHERIES

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September 2016
FRDC Project 2014/301

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ISBN: 978-0-9953662-0-6
Social and Economic Evaluation of NSW Coastal Professional Wild-Catch Fisheries:
Valuing Coastal Fisheries
FRDC 2014-301
2016

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The Fisheries Research and Development Corporation plans, invests in and manages fisheries research and development throughout Australia. It is a statutory authority within the portfolio of the federal Minister for Agriculture, Fisheries and Forestry, jointly funded by the Australian Government and the fishing industry.

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In submitting this report, the researcher has agreed to FRDC publishing this material in its edited form.

FOREWORD

This report results from a two year research project funded by the FRDC and its research partners: the University of Technology Sydney, the University of Wollongong, ENVision Consulting and Western Research Institute, aimed at evaluating the wide-ranging social and economic contributions that the commercial wild-catch fishing industry makes to NSW coastal communities. One reason for the evaluation is to help to inform the NSW Government of the likely impacts on coastal communities of its resource management decisions. Another equally important reason is to provide information for the general public about the benefits that flow from the commercial fishing industry. Specifically, the research aims to answer the question: What do communities lose if the industry continues to decline at current rates?

For the past 25 years, at least, there have been many attempts at quantifying the respective contributions that the fishing sectors, primarily commercial and recreational, make to the Australian, state and NT economies in order to assist in the allocation of fisheries resources. Unfortunately, such quantifications have rarely been useful as they have varied in their methodologies and, hence, not led to 'like-for-like' comparisons of the contribution one sector makes against another. In amongst these allocation debates, little regard has been given to the greater economic and social well-being contribution that commercial fishing makes to communities.

Over past decades NSW Government resource access policies have resulted in significant reductions in commercial fishing effort with the objective of achieving biodiversity conservation and economic sustainability targets, and with most of the impacts felt by industry participants and less obvious impacts felt by coastal communities. Now, with even greater effort by Government to restructure the industry for its long term good, there is a stronger likelihood of such restructuring impacting adversely on coastal communities.

For this reason the NSW Fisheries Research Advisory Committee supported this industry initiated project to provide the comprehensive understanding of industry induced community benefits to accurately determine whether proposed or existing management changes might inadvertently impact these benefits. Further, such understanding will inform decision makers, industry and the local community on how they can capitalise on these benefits by developing strategies that protect or enhance industry contributions in ways that grow overall community wellbeing.

The report makes 17 recommendations, the principal (Recommendation 1) of which involves greater consideration of community wellbeing in NSW Government reporting and socio-economic impact assessment processes. On behalf of the NSW Fisheries Research Advisory Committee I strongly support all recommendations that, were they to be successfully implemented by all stakeholders, would result in the enhanced wellbeing of coastal communities and the strengthened economic sustainability of the industry.

This has been a large and complex project. I thank the researchers for their commitment and efforts over the last couple of years to seeing it through to a

successful conclusion: project leader Associate Professor Kate Barclay; social scientist Dr Michelle Voyer; economist Professor Alistair McIlgorm; social scientist Dr Nicole Mazur; and research assistant Dr Shashi Sharma. I thank also the members of the project Steering Committee, who have given substantial time and effort to help make sure the project meets the industry's needs: Tricia Beatty; Bryan Skepper; Mark Boulter; Phil Hilliard; Esmay Hropic; Danielle Adams; Robert Gauta; Mary Howard; Michael Beasley; Greg Golby; Noel Gogerly; John Alessi; Drew Mudaliar; Troy Billin; Ana Rubio; and Stephan Schnierer.

Peter Dundas-Smith AM

Chair, NSW Fisheries Research Advisory Committee

2 August 2016

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The Project team would like to acknowledge the assistance and advice of the project steering committee Tricia Beatty, Bryan Skepper, Mark Boulter, Phil Hilliard, Esmay Hropic, Danielle Adams, Robert Gauta, Mary Howard, Michael Beasley, Noel Gogerly, John Alessi, Drew Mudaliar, Troy Billin, Ana Rubio and Stephan Schnierer. Thanks also go to NSW DPI and Sydney Fish Market for allowing us access to catch and price data. Thanks to the FRDC SSRCP for their invaluable comments on the preliminary draft and to Stephanie Williams, Melinda Ham, Terry Fitzgerald, Helena Woo, Sophie Lau, and Michael Wooden for assisting with the development of the communications materials and final draft. Invaluable assistance was also provided by Shashi Sharma, Heather Goodall, Allan Curtis, Hayley Egan, Robert Button, Peter Horvat and Crispian Ashby. Finally, this Project owes an enormous debt of gratitude to the many people that gave up their time to be interviewed, participate in workshops, complete questionnaires and provide feedback on our findings.

ABBREVIATIONS

DPI	NSW Department of Primary Industries
EG	Estuary General fishery
EPT	Estuary Prawn Trawl fishery
GVP	Gross Value of Production
ITQ	Individual Transferable Quota
NSW	New South Wales
OH	Ocean Haul fishery
OT	Ocean Trawl fishery
OTL	Ocean Trap and Line fishery
PFA	Professional Fishermen's Association
SFM	Sydney Fish Market
SUTS	Sea Urchin and Turban Shell fishery
TAC	Total Allowable Catch

EXECUTIVE SUMMARY

What the report is about

The professional wild-catch fishing industry contributes to the viability of rural and regional areas in coastal NSW. This Project addresses two key information gaps about the role of professional fishing in coastal communities. First, the wild-catch industry in NSW feels that their role has not been correctly valued, and this has made them vulnerable in resource allocation decisions. Second, although NSW Government agencies are under legislative obligation to adhere to the principles of Ecologically Sustainable Development, policy prioritises biodiversity conservation and economic sustainability and lacks the processes and tools to include social aspects, such as the wellbeing of communities in regional areas where fishing is an important industry. These gaps in valuation are of concern not just in NSW, but also around the country.

In 2014–2016 a collaboration of social scientists and economists from the University of Technology Sydney, the University of Wollongong, ENVision Consulting and Western Research Institute addressed these information gaps. Understanding the role of wild-catch fishing in the social and economic lives of NSW coastal communities is vital for 'getting it right' in resource management and allocation. What do communities lose if the industry continues to decline at current rates? Using social and economic questionnaires of NSW fishers, the general public and businesses related to the industry, coupled with in-depth interviews of over 160 people with connections to the industry, we uncovered the significant roles that professional fishing plays in helping to sustain the vitality of NSW coastal areas. This Project represents the first known example in Australia of combining qualitative social science and economic methods to develop an integrated and holistic picture of the wild-catch fishing industry's contributions to community wellbeing.

Background

Studies into the NSW professional fishing industry in the past have concentrated largely on environmental aspects of fisheries, or the economic profitability of fishing businesses, but have not systematically identified the full range of benefits that the wild-catch industry provides. Without a full understanding of these benefits it is impossible to determine accurately whether proposed or existing management changes might inadvertently impact these benefits, or to compare the benefits with those arising from other resource uses. It is also impossible to determine how decision makers, industry or the local community can capitalise on these benefits, by developing strategies that protect or enhance industry contributions in ways that grow overall community wellbeing. It is envisaged that the data presented in this report will form an important baseline upon which future research can build to allow regular monitoring of contributions over time. It will also provide a framework which other jurisdictions can use to evaluate social and economic contributions of fisheries.

Aims and objectives

The aims and objectives of the Project are outlined in Section 2, and include a wide-ranging social and economic evaluation of contributions of professional wild-catch fisheries for eight regions covering the whole NSW coast (Section 4), the establishment of a methodology to be used for ongoing social and economic evaluations (Section 7.1), and the creation of flyers for a general audience on the role of professional fisheries in coastal communities (see Section 8).

Methodology

The methodological framework for the Project was provided through a wellbeing approach, which combines an objective evaluation of circumstances in which a community finds itself (material wellbeing) with a subjective evaluation of those circumstances (subjective wellbeing), whilst also giving emphasis to the social context in which the other forms of wellbeing arise and by which these meanings are framed (relational wellbeing). A literature review of key 'quality of life' indicators used around the world to measure community wellbeing was coupled with preliminary interviews of fishers and others related to the fishing industry. This process identified seven 'dimensions of community wellbeing' that were considered relevant to this Project. The Project then sought to determine how the wild-catch industry contributes to each of these 'dimensions of community wellbeing'. Material, subjective and relational aspects of these contributions were explored using interviews, social and economic questionnaires and analysis of existing data sets.

Results and key findings

The following results are grouped under each of the seven identified 'dimensions of community wellbeing'.

A resilient local economy

- The Project indicates that professional fishing has a Gross Value of Production (GVP) of $81.7m; total direct and indirect impacts of $219.1m; $104.8m of added value; household income of $50.8m; and provides 1,403 full-time jobs, of which 403 are fishing industry suppliers. The fishing and the secondary sector in 2012–13 had a likely direct and indirect output of $436m–$501m; added value of $215–$248m; household income of $117–$137m; and provided between 3,291 and 3,857 full-time jobs across NSW.
- Nine out of ten NSW coastal residents agree that professional fishing is an important industry for NSW. The same number believe the industry provides important employment opportunities in NSW towns and eight out of ten were concerned about potential job losses that might occur if further restrictions were placed on the industry. These results varied slightly between regions but remained consistently high across the state.

- The professional fishing industry has highly complementary and interdependent social and economic relationships with a number of other industries that are important to local economies in regional areas. In particular, regional tourism and recreational fishing are both supported by, and in turn support, professional fishing.
  - Regional tourism: 89% of NSW residents expect to eat local seafood when they visit the coast, 76% feel that eating local seafood is an important part of their coastal holiday experience and 64% indicated they would be interested in watching professional fishers at work while on holidays.
  - Recreational fishers: Recreational fishers are more engaged with seafood quality and provenance issues than non-fishers. They are more likely to support their local industry, especially their local co-operatives, when purchasing seafood products. They were also significantly more likely to be interested in purchasing local seafood and watching professional fishers at work than non-fishers when on holidays.
  - Recreational bait: The professional fishing industry and the NSW recreational fishing industry directly support and sustain each other through the bait market, especially Sardines (Pilchards) and School prawns. The available data indicates that the local bait caught by the NSW professional wild-catch industry accounts for up to a quarter of the $39 million spent on bait and burley by recreational fishers each year.
- NSW professional fishers tend to fall into two categories with quite different needs, aspirations and fishing practices, which is of relevance to both fisheries and business management. 'Group A' are larger-scale, specialist fishers. 'Group B' fishers are smaller-scale, largely inshore, multi-method, multi-species fishers who seek to maintain non-commercial aspects of fishing in preference to business growth or expansion. Fishers across both groups are increasingly using vertical integration and direct marketing to sell their products to local consumers, rather than the Sydney Fish Market (SFM) and co-operative systems of marketing.

Community health and safety

- Locally sourced seafood is an important source of food and nutrition within local communities, especially in regional areas where preferences and purchasing patterns indicate moderate to strong consumer demand for these products. Further growth of this market is inhibited by a lack of awareness amongst the public as to whether the products they are buying are locally caught. While supermarkets are the primary market for seafood sales in most areas, the results indicate a strong reliance on local co-operatives for those seeking out local seafood. It is likely that consumers are less aware of the provenance of the seafood they are buying when they purchase from other popular outlets such as supermarkets, fish shops, restaurants and takeaway food shops.
- The NSW general public believes the NSW industry is important for local food security – 94% agree that it is important we produce our own seafood in NSW. It also wants to know where its seafood comes from – 37% were 'extremely interested' and 35% 'very interested'.

- Ninety-six percent of NSW coastal residents indicated that the desire to support their local community was a major motivation in purchasing local product.
- Professional fishing contributes to the health and wellbeing of Indigenous communities in a range of ways. A small group of Indigenous fishers are active within the industry and play a significant role in their communities through the provision of culturally and materially important food, involvement in traditional practices, and providing employment opportunities. The project results suggest that compartmentalising cultural fishing from other components of Indigenous health and wellbeing is leading to a failure to adequately understand and address the complexity of the social determinants of Indigenous health, with fishing and seafood consumption intricately linked with improved health outcomes through improved nutrition, as well as the strengthening of social connections and cultural bonds.
- Professional fishers play an important role in on-water safety and have undoubtedly saved many lives. Over 60% of the fishers we interviewed had been involved in search and rescue activities; for inshore fishers this was often on a regular basis.

Education and knowledge generation

- There is an overwhelming reliance on informal modes of teaching within the NSW industry. Knowledge passed on within families, between mentor and trainee, or between Indigenous fishers and their communities is integral to the process of learning to be a fisher. This in turn influences the success and extent of all other contributions to community wellbeing, including economic contributions, the ability to provide seafood products to the community, and the development of environmental knowledge.
- Fishers exchange information about the local environment, fish movements and weather patterns in formal and informal ways with the wider community, including regulators, researchers and recreational fishers.
- The reliance on unwritten, accumulated knowledge is highly vulnerable to any disruptions in the relationships that facilitate its transfer, such as regulations which restrict the ability for unlicenced crew to assist in fishing operations. This vulnerability is especially relevant to Indigenous communities, where restrictions on community participation in ocean haul activities has impacted cultural teaching and learning. In addition, the transfer of knowledge is threatened by an ageing industry with few new entrants, and little or no succession planning.

A healthy environment

- Fishers can and do contribute to overall environmental health by practicing sustainable fishing methods, monitoring environmental changes and sharing environmental knowledge with researchers, decision makers and the wider community, and by participating in stewardship activities such as cleaning up rubbish and rescuing injured wildlife.

- Sixty-seven percent of the NSW public in coastal communities believe that the industry can be trusted to act in a sustainable manner. Seventy-two percent support the continuation of the industry. These levels of trust were consistent across the state and amongst recreational fishers and non-fishers.

Integrated, culturally diverse and vibrant communities

- The professional fishing industry has historically played an important role in migration of Italian, Vietnamese and Croatian families into a number of NSW coastal communities, contributing to the cultural diversity of regional NSW. Today the industry continues to contribute seafood products and job opportunities to an ethnically and culturally diverse marketplace. The industry also contributes to socio-economic diversity by providing opportunities to a range of people, including those with limited levels of education or from socially disadvantaged backgrounds.
- Industry contributions to an integrated community are influenced by the relationships the industry has internally, with the wider community, and with decision makers (referred to as bonding, bridging and linking forms of social capital). All forms of social capital present challenges as well as opportunities for the industry. Bonding social capital is an area in which there are currently considerable challenges, with evidence of an industry 'turning on itself' in the face of external pressures, including a current reform process. Despite this, the industry plays an active role in community life and in supporting local communities through sponsorships, donations (especially of ice) and involvement in community events.

Cultural heritage and community identity

- Professional fishing has played a crucial role in the development of many NSW coastal communities A large number of NSW coastal residents (76%) indicated that they would be concerned about a loss of character or identity in NSW communities from further reductions in professional fishing. Professional fishing also assured the survival of many Indigenous families in NSW by providing income and food to supplement Government rations in reserve and mission communities.

Leisure and recreation

- Material contributions to recreational activities provided by the wild-catch industry include the provision and maintenance of public infrastructure, such as wharfs, slipways, moorings and fuel supplies associated with fish merchant businesses (largely co-operatives). In particular, ice is one of the most significant in-kind contributions made to local community events and groups by fish merchant businesses.
- Our questionnaires revealed that recreational fishers put a high value on access to local bait supplies, with 78% of recreational fishers across the state agreeing or strongly agreeing that they preferred local bait, even if it is more expensive. This is an under-recognised connection between professional and recreational fishing.

Implications for relevant stakeholders

The Project results have implications relevant to industry, local communities, managers or policy makers and other sectoral interest groups, including tourism bodies and recreational fishing groups. They highlight areas where networks could enhance industry contributions to wellbeing, especially by building on the tourism potential of the seafood industry. They also suggest that management responses to resource allocation disputes that seek to exclude professional fishing in favour of recreational fishing or other tourism uses may be counterproductive, given the interdependence and complementary elements of the two sectors. Finally, the report suggests approaches that the NSW Government could take to remove hurdles which currently restrict or inhibit community contributions from industry reaching their full potential. Workshops held with Industry and Government participants identified concerns around succession planning and the loss of knowledge from an ageing industry as the highest priority area for action in this regard.

Recommendations

The principal recommendation (Recommendation 1) for this project involves greater consideration of community wellbeing in Government reporting and socio-economic impact assessment processes. Subsequent recommendations are grouped under thematic areas.

- **Recommendation 1.** Integrate the wellbeing framework into the management and industry reporting process by conducting annual or biannual reporting against each dimension of community wellbeing, and by formalising consideration of each dimension of community wellbeing in regulatory and socio-economic impact assessment processes.

Further research

- **Recommendation 2.** Conduct market research into value chains and interactions with the post-harvest sector, outlining the alternative marketing options available to fishers and tourism operators, including advice on accessing local markets and building connections with the tourism and hospitality industry.
- **Recommendation 3.** Conduct psychological, anthropological and/or social research into fisher motivations, values, networks, communication preferences and business management approaches and how they might be better considered in the development of fisheries management models and effective engagement strategies (e.g. through a peak body or regional economic bodies), building on the findings of Plowman and MacDonald (2013).
- **Recommendation 4.** Research and collate the environmental and social history of professional fishing in NSW with special focus on the environmental knowledge and oral histories of current and past members of the industry.
- **Recommendation 5.** Conduct a social and economic impact assessment of existing fisheries regulations with a view to revising restrictions that have disproportionately impacted on the wellbeing of NSW fishers and their ability

to contribute to community wellbeing, especially in relation to impacts on Indigenous communities. This impact assessment should investigate how much and to what extent restriction or removal of restriction would impact on the wellbeing of NSW fishers and their ability to contribute to community wellbeing.

Strategy Development

- **Recommendation 6.** Develop strategies to build and enhance bonding social capital, in order to build industry resilience and cohesion. These would be most effective if built on existing activities which facilitate bonding social capital (e.g. the annual Mullet haul and co-operative board meetings).
- **Recommendation 7.** Develop strategies to build and enhance bridging social capital between industry and local communities, especially local environmental groups or recreational fishing clubs where there is mutual benefit in working together on issues of concern (e.g. habitat destruction, impediments to fish passage or water quality issues).
- **Recommendation 8.** Develop strategies to build and enhance linking social capital between all layers of government and other sectoral groups. Consideration should be given to organising industry representation through regional economic networks, rather than only through fishing industry associations. These should include enhancing industry networks with environmental, regional development and tourism authorities to facilitate the development of mutually beneficial relationships aimed at improving environmental health of waterways and the growth of 'seafood' tourism. This tourism should include promoting seafood industry experiences as well as meals, for example, experiencing a Mullet haul or watching vessels unload at commercial wharves.
- **Recommendation 9.** Develop strategies aimed at maintaining Indigenous participation in the industry, to promote positive change for coastal Indigenous communities, considering the role that participation in professional fishing plays in cultural, social and economic activities of those communities.
- **Recommendation 10.** Support the ongoing delivery of the OceanWatch Master Fishermen program to develop and recognise the range of skills required to be a professional fisher in NSW, including small business management, regulatory knowledge and environmentally friendly fishing practices.
- **Recommendation 11.** Develop opportunities for new entrants to enter the industry, within the relevant regulatory constraints on licence numbers and required share-holdings. These opportunities should aim at industry renewal as ageing fishers retire, for example, through trainee licences, a loans scheme or discounted licencing period to encourage new entrants to take up licences as they become available.
- **Recommendation 12.** Develop a long-term strategy for ongoing training and mentoring of new entrants, including opportunities for informal learning with established fishers.

Communication

- **Recommendation 13.** Develop a communication and engagement plan to address concerns around social licence, including providing targeted information to recreational fishers highlighting the results of this Project and the areas of mutual interest that exist between the professional and recreational sectors. In addition, develop general information about inshore fishing methods, statistics on environmental performance (including levels of bycatch), the value of the industry to local communities and the stories of local fishers to coastal residents, especially those residing in areas where fishing is a visible presence.
- **Recommendation 14.** Develop and promote materials from trusted, independent bodies that clearly explain the environmental sustainability credentials of NSW fisheries, including the scale of the threats they pose in context with other environmental threats and challenges to address community confusion about the sustainability of the local industry (as per the current NSW Marine Estate Threat and Risk Assessment process).
- **Recommendation 15.** Develop local branding strategies and traceability protocols and procedures to improve consumer awareness of seafood provenance, especially in wholesale, supermarket and hospitality (restaurant/takeaway) sectors, particularly in metropolitan areas.
- **Recommendation 16.** Develop a promotional campaign for locally caught seafood targeted at residents and visitors, including from non-English speaking backgrounds, promoting culturally important or popular species such as Sardines, Mullet, Mud crabs and Octopus.

Support Services

- **Recommendation 17.** Deliver targeted counselling and mental and physical health support services tailored to the needs of the professional fishing community, as per King et al. (2014), to address the impacts of industry marginalisation and regulatory uncertainty.

Keywords: *Community wellbeing, social contributions, economic contributions, social licence*

1. INTRODUCTION

This Project was borne out of a strong desire from the NSW industry to accurately capture the contributions of professional fisheries to coastal communities in NSW (see Box 1 for definitions of key concepts). Over the past 30 years the NSW wild-catch professional fishing industry has experienced significant decline, partly in response to a need to improve the economic and environmental performance of the industry and partly as a resource re-allocation exercise in response to requests from recreational fishing group leaders. The ongoing nature of industry capacity reforms over several decades has resulted in an industry that feels under siege with an uncertain future. In the prevailing policy environment, the importance of ecological protection and the contributions of recreational fishers are well recognised, while professional fishers are often seen as 'the bad guys' and bear the brunt of the trade-offs made in resource management decisions. The Project generates information about the value of professional industries that fishers can use to improve: a) their position as stakeholders in resource management negotiations; and b) public attitudes about professional fisheries.

Managing the NSW coastal zone is a complex task involving a range of often competing uses and user groups. In NSW there has been protracted debate over resource allocation of fish stocks between the recreational, professional and cultural fishing sectors which has at times caused conflict and division within the wider community. Decision making around the future of all these sectors in NSW must be informed by rigorous and detailed information that can guide decision makers and allow input from community members. Sound evidence about the contributions of professional fisheries will enable triple bottom line (social-economic-environmental) policies for sustainability in coastal NSW, by adding social and economic knowledge to the ecological knowledge already developed. A complete understanding of the social and economic benefits provided by these sectors and their interconnectedness with other sectors is essential in order to predict, mitigate or avoid potential impacts that may be experienced through their loss or decline. For example, this broad valuation will help identify the types of social costs likely to be experienced with adjustment and the resilience of communities with economically challenged fisheries, and indicate how restructuring may be made less difficult. It will also remedy the lack of understanding about the unique contributions from particular sections of professional fishing, such as Indigenous professional fishers.

The two primary objectives of the Project relate to an accurate assessment of the economic and social contributions the NSW wild-catch professional fishing industry to coastal communities. Prior to this study the only existing data about the economic benefits of professional fisheries to NSW as a whole was the landed value of the catch recorded by the NSW Department of Primary Industries (DPI), and numbers of people who record themselves as business owners or employees in professional fisheries in the Australian Bureau of Statistics (ABS) Census. This gives inadequate information about professional fisheries' position in economic networks within coastal communities. In addition, the primary value of the industry, measured through landed value of the catch, is often compared unfavourably with recreational fishing contributions, measured as expenditure that includes a

range of secondary and tertiary contributions. Given these figures are often used as an argument towards prioritising recreational fishing in resource allocation decisions, industry considered it important to have a more accurate estimation of their value to local communities. For example, they require a range of goods and services provided from the local community and from larger centres in NSW, all with associated employment. A small percentage of the general population is directly engaged in professional fishing. Existing evidence indicates, however, that when professional fishing declines the negative impacts may spread throughout the supply chain, threatening the 'glue' holding towns together through social contributions of fishing families.

BOX 1. DEFINING KEY TERMS

Professional fishing: also referred to as *commercial fishing*, or *wild-catch fishing*. This sector catches different species of fish and seafood in marine, estuarine and inland fresh and salt waters. These catches are sold in Australian and overseas markets for income. The professional fishing industry is mostly managed by the NSW State governments, or the Australian Government in Commonwealth waters. We have chosen to use the term 'professional' fishing in response to industry feedback. The term professional fishing is felt to be a better reflection of the skills and motivations of those that make a living out of fishing, as described by one of our research participants:

> It's a difference in the mindset for the community, if you describe somebody as a professional, acting professionally or acting commercially: totally different connotation.
>
> *(Interviewee 110315_1c)*

Recreational fishing: individuals fishing for fun or for their own consumption, not for sale or profit.

Indigenous cultural fishing: fishing activities and practices carried out by Indigenous Australians for the purpose of personal, domestic or community needs, or for educational or ceremonial or other traditional purposes. Indigenous people do not distinguish between cultural, commercial or recreational use. All forms of fishing have cultural significance.

Community: The term 'Community' can be used in a variety of ways. 'Communities of place' are typically considered as residents of geographic locations or physical spaces within particular boundaries. 'Communities of interest' are formal and informal groups with common and shared interests, values or concerns which may not be geographically defined (Harrington et al. 2008). This project primarily looked at communities of place, specifically coastal regions and towns in NSW with an active professional fishing industry. Within the research, however, a number of communities of interest were also identified and studied, specifically Indigenous communities, fishing communities (ie the individuals and families directly involved in the industry) and recreational fishers.

Coastal: For the purposes of this research coastal regions were considered to be any ABS statistical area which bordered ocean or estuarine areas.

There is also a range of social contributions of the fishing industry to NSW communities, and these have never been systematically evaluated in NSW until now. Information on the social contributions of professional fisheries is important because it dovetails with the economic contributions and assists in building a

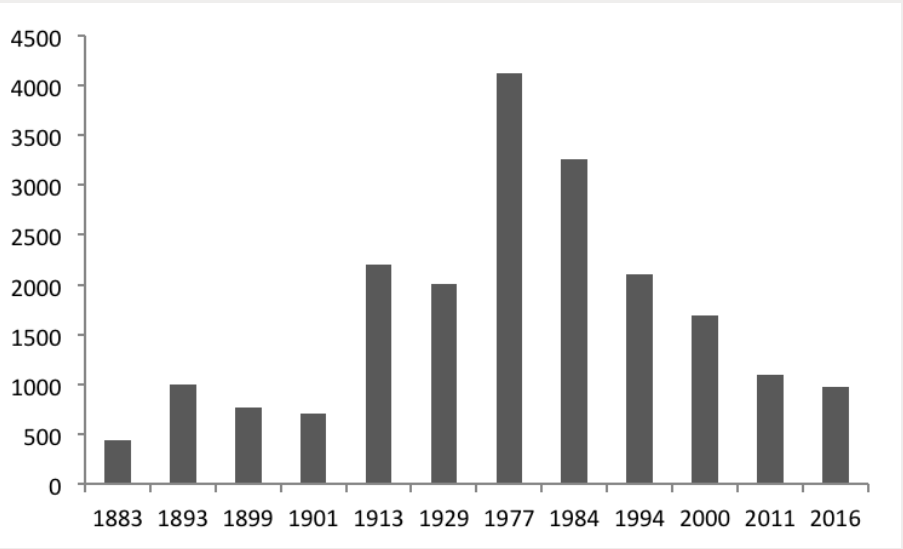
complete picture of the overall contributions professional fisheries make to coastal regions. For example, the professional industry may have experienced significant reductions in its economic contributions associated with an overall decline in fishing activity, however social aspects may have become more valued – such as the importance the community places on the heritage aspects of the industry, or its contributions to local seafood markets.

The Project used a social wellbeing framework as a tool for systematically exploring a wide array of contributions of the wild-catch industry to the NSW community. This allowed for an exploration of the material, or tangible, contributions of the Industry to local economies and community life. It also allowed for an examination of a range of less easily quantified contributions to social networks and other aspects of community life, as well as to subjective notions of wellbeing – that is, how the community feels about the role of the industry in their area.

1.1 Background to the NSW professional wild-catch fishing industry

The NSW fishing industry, like many other fishing industries around Australia, has been in an almost constant state of reform and restructure for close to 150 years, with significant changes to fishing methods, gear and vessels since its beginnings not long after colonisation. Figure 1 illustrates the way in which participation in the Industry has fluctuated over time, peaking at over 4000 licences in the 1970s and more recently declining to under 1000.

FIGURE 1. Estimated fishing licence holders 1881-2016 (from Wilkinson, 2013, Wilkinson, 1997)



A defining characteristic of the NSW industry has been the relatively large numbers of small, often family-run businesses working a variety of methods to catch a diversity of species. This is a direct response to the unique environmental conditions of NSW. NSW fisheries are not highly productive fisheries due to the state's largely

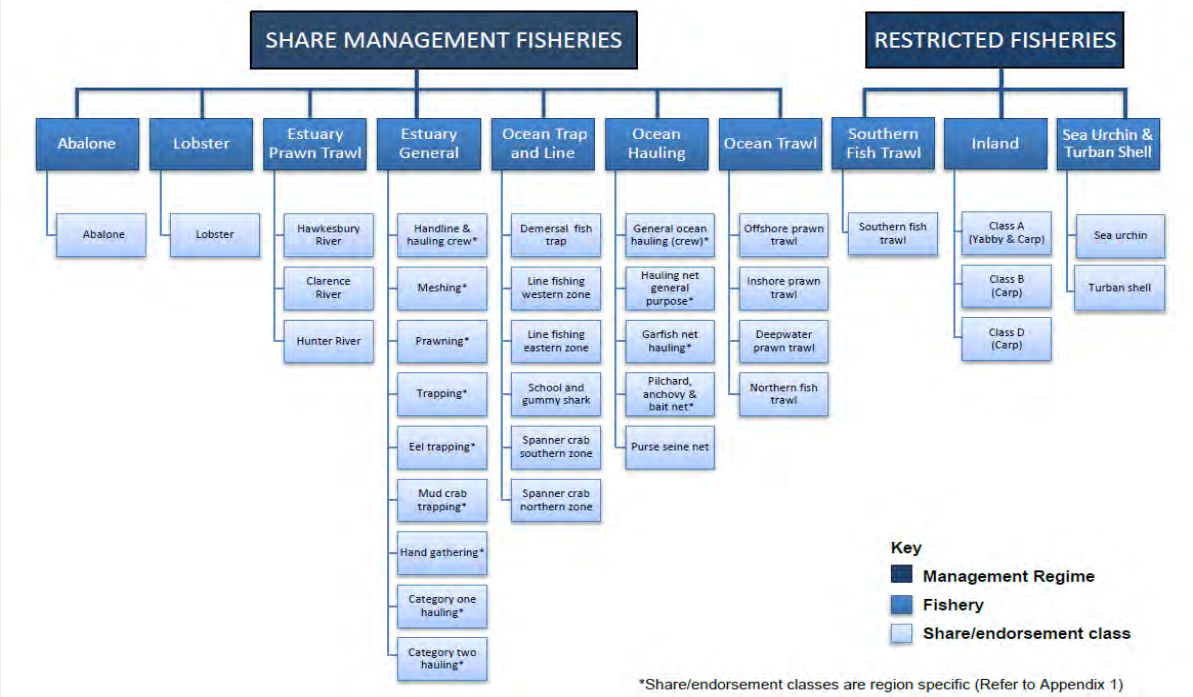
temperate waters having relatively low nutrient levels. These environmental restrictions have meant that there is limited opportunity for larger, industrial-scale fishing operations such as those seen in more productive areas like New Zealand and Japan (Wilkinson, 1997). While industrial fishing operations tend to target a small number of species in large numbers, the NSW industry has historically focused on targeting a wide diversity of species in small numbers (Wilkinson, 1997).

Fishing effort in NSW has historically concentrated most heavily on the large number of relatively nutrient-rich coastal lakes and estuaries. There have, however, been several attempts throughout the history of the NSW industry to increase the scale and profitability of its fleet. In the first century of its existence these attempts were driven by both government and industry and focused on expansion into new areas, new species and new forms of fishing (Leadbitter, 2011, Wilkinson, 1997). In the last 25 to 30 years the focus has shifted towards rationalisation, with a long-term objective of successive state Governments to reduce licence numbers and improve the environmental and economic sustainability of the industry. These changes have focused on reducing the number of small-scale fishers as well as latent licences in order to improve profitability and security for larger-scale or more active operators. Changes implemented since the late 1980s have included a shift from open access to restricted fisheries, a freeze on new licences, the introduction of share management (including quotas for Lobster and Abalone), and significant increases in licence fees and charges (Schnierer and Egan, 2012, Stevens et al., 2012, Wilkinson, 2013). In addition, there has been a substantial reduction in professional fishing access through the expansion of the marine park network across the state and the establishment of recreational fishing havens (where all professional fishing is banned) in 30 NSW estuaries. The industry has also been subject to increased scrutiny of its operations by both Government and the wider public. In the early 2002, for example, Environmental Impact Assessments (and an associated fishery management strategy) were prepared for each fishery in NSW (NSW Department of Primary Industries, 2012).

Today the NSW fishing industry remains dominated by small, family-run businesses, often operating at low levels of profitability. These businesses usually involve relatively low catch volumes in multi-species, multi-method fishing, focusing largely in the more productive estuarine areas.

The NSW professional wild-catch industry is made up of ten main fisheries under two management regimes – share managed and restricted fisheries. Within a fishery there may also be additional endorsements required to be able to operate in different aspects and/or regions within the fishery (Figure 1). For the seven share managed fisheries, endorsements are obtained by securing a minimum number of shares for that endorsement. Shares can be traded on the market. For Lobster and Abalone fisheries, these shares are linked with quota. In these two fisheries the amount of Total Allowable Catch (TAC) is set every year by an independent body. This quota is then distributed proportionally to all shareholders (NSW Department of Primary Industries, 2012, NSW Department of Primary Industries, 2015a).

FIGURE 2. Administrative arrangements for the management of NSW wild-catch professional fishing industry (Source NSW Department of Primary Industries, 2015a p3)



Further rationalisation of the industry is currently occurring through an ongoing reform process aimed at removing some of the smaller, less profitable businesses and latent licences in the NSW industry. In addition, the reform aims to move all the share managed fisheries into a system in which shares are linked with effort or quota (Stevens et al., 2012, Wilkinson, 2013). There is no stated 'ideal' number of licences for the state, however it is clear the NSW Government (and some within the industry) currently considers the fishing capacity as reflected in numbers of licences and fishing businesses as still too high to enable the industry to be profitable in both the short and long term. This view has led to industry adjustment through the reforms taking place in parallel to this project. Inevitably the uncertainty surrounding an industry in transition has impacted the undertaking of this research. However we recognise the research was requested by industry to address key information gaps.

1.2 Existing social and economic data on the NSW Professional wild-catch fishing industry

There has been very little formal investigation of the social and economic aspects of the NSW professional fishing industry. The main economic studies have included a number of analyses conducted as part of the Environmental Impact Assessment (EIA) of Fishery Management Strategies (FMS) process between 2000 and 2004. These were separate studies of each professional fishery and included: Estuary General (Dominion Consulting, 2001a); Estuary Prawn Trawl (Dominion Consulting, 2001b); Ocean Hauling (Dominion Consulting, 2002); Ocean Trap and Line (Dominion Consulting, 2004a); Ocean Trawl (Dominion Consulting, 2004b); and Abalone (Dominion Consulting, 2005).

Each of these studies had an initial section that reviewed the existing available information coming from licence and logbook data held by the Department of Fisheries and was supplemented by the results of an economic survey of operators. They then went on to analyse the potential impacts of the proposed Fisheries Management Strategies (FMS).

The economic survey presented information on the fishing activity, revenues, and profitability of each fishery for the financial year 1999–2000. The results showed the high degree of part-time fishing, and latent effort, reflecting the diversity of strategies used by fishing businesses endorsed to fish in several of the managed fisheries. Unlike the current Project, the analysis of activity in each fishery required for the EIA did not give one overall state-wide fishing business perspective for all NSW. For example there were an estimated 1,350 fishing businesses in the state in 1999–2000, reducing to 989 by 2012–2013. This reduction of business numbers will have altered the endorsement holdings and levels of effort in different managed fisheries.

The survey results of the EIA process indicated generally low economic returns in the estuary fisheries with only a minority of fishers making economic profits. In the period surveyed there were a considerable number of latent or low-activity fishers for whom the apparent benefits received were less than the costs expended in taking a fish. The ocean fisheries made just under a normal economic return to capital[1], with some fishers exceeding this. It was not possible to determine from the survey if the levels of returns were sustainable, this being examined in the biological areas of the EIA mentioned above.

The FMS for each fishery focused on containment of fishing effort levels due to the need to increase sustainable economic returns in the fisheries. These studies also included some indicative regional economic impact analysis indicating that the output from industry had significant community impacts providing regional employment. The studies also found that information on those producing the fish was available, but that information of fish wholesaling and retailing was not readily available.

[1] That is, a level of return to their capital that could have been made elsewhere for the same risk.

The EIA studies by Dominion (references above), also presented a descriptive analysis of the social information available on fishers in each professional fishery being assessed. In the 1999–2000 period, ABS and DPI statistics had between 1,615 and 1,751 fishers involved in fishing in NSW. A social survey of each licence holder was undertaken by Roy Morgan (2000). This provided information on the ages, residence and time spent in fishing and other industries. Education levels in the industry were low, with 15% of fishers having TAFE or higher education after Year 12. The survey results indicated the strong identity among fishers with fishing, with a high percentage indicating either an unwillingness to seek work outside fishing or a belief they would not be able to get such work – "Fishing is all I know." Given the seasonal nature of fishing, the importance of employment outside of fishing was noted to enable fishers to live in their home communities. The EIA process also considered the social impacts of the proposed FMS. The regional social information also indicated that some areas of coastal NSW are adjacent to Sydney and prosperous, while others rural communities have high unemployment and record a low socio-economic index. Fishers are found across all areas.

In addition, two studies were commissioned by the NSW Professional Fishermen's Association (PFA) in the mid-1990s and again in 2010, which looked at value/flow-on benefits of professional fishing in the Clarence, Ballina and Coffs Harbour Regions. The second study had an expanded geographical coverage and investigated seven fisheries in total (all share managed) (Harrison, 2010). It quantified economic contribution through output, income and employment generated and found that two thirds of income generated by professional fishers was spent in local and regional economies. In total the report concluded that the combined harvesting and processing sectors of the industry in the North Coast of NSW provided total flow-on effects of $216 million derived from output, $36.1 million in income, 933 employment positions and $75.5 million in value added. In addition, it found that the majority of employment opportunities created by the industry were filled by local communities and that the region supplied a third of the wild-catch seafood landed in the whole of NSW (Harrison, 2010). The study also highlighted the relative importance of the fishing industry in regions such as the Clarence, which is in the lowest 20% of towns in NSW in terms of socio-economic disadvantage. The impacts of any major decline in the fishing industry in areas like the Clarence are likely to be significant. It also briefly highlighted the importance of the industry to tourist amenity and seafood supply (Harrison, 2010).

Over the past two decades the restructuring of the fishing industry and deregulation of fish marketing has been slowly impacting fish marketing co-operatives (co-ops). Their viability and future has been investigated by two studies (Hassal 2009; and GHD 2014). The 2014 study found that most NSW fishing co-operatives (79%) rate their viability as reasonable or below, with only three categorising their business viability as good, or very good (GHD, 2014). The report indicates that loss of members and throughput may require co-operatives to amalgamate or cause closures of small co-operatives, replacing them with private marketing arrangements. The report indicates the fisheries reform process may bring about these changes earlier than expected (GHD 2014). The wider social and economic impacts of co-operative closures or amalgamations on fishers and local communities in which

the co-operatives are based were not explicitly examined in either the GHD or Hassal reports.

While all the studies mentioned above included some analysis of social data, a detailed examination into the social aspects of the NSW fishing industry had not been done prior to this Project. There are, however, a number of national studies that have relevance to the NSW situation.

A national study into the mental and physical health of fishers concluded that fisher health is generally poor, with stress relating to regulatory uncertainty a significant factor (King et al., 2014). Although this study did not directly involve NSW fishers, given the historical situation and some of this project's findings, it is likely that the findings would apply to NSW as well.

The FRDC project 'Let's talk Fish' explored the level of 'social acceptability' of professional fishing in Australia, including NSW through a large-scale survey and a number of smaller case studies and in-depth interviews covering Sydney, Melbourne and Brisbane. The 'Let's Talk Fish' project was initiated in response to evidence that sections of the Australian community and decision makers believe the industry is not sustainable and aimed to establish a better understanding of attitudes (positive and negative) towards the fishing industry. The study found that the industry enjoys a high level of social acceptability, however this was dependent on respondents thinking that the sector was being effectively managed and could clearly demonstrate its environmental stewardship. The nature and degree of social acceptability was influenced by certain key values, beliefs, personal norms, attitudes, levels of trust and risk perceptions. Respondents consistently prioritised environmental protection over fishing industry livelihoods. Strongly negative judgements were linked with stronger environmental values and beliefs, and more accepting attitudes were linked to trust that the industry would work to sustain future fish stocks. However, most respondents had low trust in the industry and doubted its trustworthiness, pointing to concerns in relation to the social licence of wild-catch fisheries (Mazur et al., 2014). Evidence of problems relating to social licence for the NSW industry is also seen in regular calls for fishing to be banned or significantly reduced in areas up and down the coast (eg see Collins, 2015).

More recently a market research survey conducted on behalf of the Australian Government concluded that the general public has a low level of awareness about Australian fisheries and the role of the industry in Australia's economy, yet recreational fishers and people in regional communities had higher levels of interest and awareness. In addition, it found a range of positive and negative perceptions relating to the industry, with positive perceptions focusing on its contributions to local economies and employment and its role in providing a healthy food source. Negative perceptions related to concerns around over-fishing and environmental impacts/sustainability, and concerns that the best fish are exported, that fresh product is too expensive and that labelling is confusing. Sustainability was widely regarded as the key objective that fisheries management should aim for and the most trusted source of information about whether the industry is achieving this was scientists. The study found that the general public was keen to support and 'see' the Australian industry and overall did not feel like the resource is in jeopardy,

thus indicating a general level of trust in current management arrangements (Essence Communications, 2015).

While all these studies point to some of the likely contributions of the industry to local communities, none systematically identifies the full range of benefits that the wild-catch industry provides. Without a thorough understanding of these benefits it is impossible to accurately determine whether proposed or existing management changes might inadvertently impact these benefits, or to understand the interconnections between professional fishing and other sectors in regional coastal areas. It is also impossible to determine how decision makers, industry or the local community can capitalise on these benefits by developing strategies that protect or enhance industry contributions in ways that grow overall community wellbeing. This Project therefore represents the first and only comprehensive study of both the social and economic contributions of the wild-catch fishing industry to local communities in NSW. It is envisaged that the data presented in this report will form an important baseline upon which future research can build to allow regular monitoring of contributions over time.

2. OBJECTIVES

1. Evaluate the economic contribution of professional wild-catch fisheries for eight regions covering the whole NSW coast, including the regional economic impacts such as multiplier effects, employment and contributions to related sectors within regions, building on previous similar studies (see Section 4.1).
2. Evaluate the social contributions of professional fisheries for the same regions, including the participation of fishing families in community organisations, heritage values of fishing for regions, and the social aspects of economic contributions, building on previous studies (see Sections 4.1–4.7).
3. Establish a methodology to be used for ongoing social and economic evaluations as part of government reporting and industry engagement, building on recent and ongoing work in this field (see Section 7).
4. Write a report integrating the social and economic evaluations for each town identifying the role of professional fisheries in that community, and highlighting threats to sustainability and viability, in a form suitable for engaging with local and state government agencies.
5. Create flyers for a general audience, including photographs and personal stories, to raise awareness of the role of professional fisheries in coastal communities (see Section 8).

3. METHOD

The Project objectives include an analysis of both the social and economic contributions of the wild-catch industry to local communities. The methodological approach therefore included two main components:

1. An economic survey incorporating an economic questionnaire, an analysis of existing data including catch data (from DPI) and price data (from Sydney Fish Market and other sources), case studies examining alternative supply chains, and an investigation into levels of investment in the industry.
2. A social survey incorporating in-depth interviews, focus groups, content analysis and three questionnaires.

Although there has been some assessment of economic contributions in the past (see Section 1.2), there is no established theoretical framework for evaluating the social and economic contributions of fishing industries to communities in an integrated and holistic manner. One of the primary objectives of this Project was therefore to establish a methodological approach for assessing social and economic contributions together. Reporting on social and economic contributions separately fails to appreciate the ways different aspects of social, economic and cultural life interact to influence the wellbeing of individuals and communities. Therefore the integration of these aspects was crucial to the success of this Project.

3.1 Theoretical framework – a social wellbeing approach

The Project's methods and analysis were informed by a consideration of the many different factors influencing the wellbeing of communities. To this end we broadened the research question to take into account the ways these different aspects of community life interact.

Research question: *How does wild-catch professional fishing in NSW contribute to community wellbeing in NSW coastal communities?*

The development of an integrated approach to considering both the social and economic contributions of the wild-catch industry was guided by a 'social wellbeing' framework. We adopted the following definition of wellbeing, which is adapted from Nobel laureate Amartya Sen's (1987) capabilities approach:

> **Wellbeing is a state of being with others, which arises where human needs are met, where one can act meaningfully to pursue one's goals, and where one can enjoy a satisfactory quality of life**
> *(Mc Gregor, 2008 in Coulthard et al., 2011 p454).*

This definition recognises that the needs, freedoms and quality of life conditions that contribute to wellbeing are likely to be different across different geographical, societal and cultural contexts (Coulthard et al., 2011). It builds on established theory around the measurement of 'quality of life' or 'standard of living' that developed in the mid-20th century. Since that time there has been considerable scholarly and policy debate how best to measure quality of life. Central to this debate has been the role of mental and social wellbeing in influencing community and individual

wellbeing and, in particular, the importance of people having the capability to live the life they choose or value (Coulthard, 2012, Sen, 1999, Nussbaum et al., 1993, Sen et al., 1987, Stiglitz et al., 2009).

Most studies into quality of life conducted around the world now recognize the interplay of a variety of different factors in influencing community and individual wellbeing. An understanding of both 'subjective' measures of wellbeing, as well as traditional, objective measures such as income and education, is now considered essential to any studies of this nature (Nussbaum, 2003, Partridge et al., 2011, Nussbaum, 2000, Stiglitz et al., 2009, Himes-Cornell et al., 2013, Kasperski and Himes-Cornell, 2014, OECD, 2013, New Zealand Quality of Life Project, 2007). This is in recognition of the fact that people's sense of wellbeing can differ considerably, regardless of their economic circumstances, given the human ability and tendency to adapt expectations to their situations. Equally, focusing on goods or resources alone fails to take into account the different amounts of primary goods required by different people to satisfy the same needs (Garnham, 1999). The social wellbeing approach extends this concept further by also recognizing that that the notion of wellbeing can be highly malleable, with people assessing their own wellbeing in the context of socially constructed meanings formed through their relations with others (Coulthard et al., 2011, Deneulin and McGregor, 2010, Gough and McGregor, 2007). For example, professional fishers who experience an element of stigmatisation as environmental 'rapers and pillagers' of marine resources may have lower wellbeing than professional fishers who are respected in their community as hardworking primary producers. Therefore the relationships that people have within their communities can strongly influence their own sense of wellbeing.

The concept of wellbeing is thus a useful tool to explore the environmental, political and economic aspects of sustainability issues, including within the fisheries sector. It considers values, aspirations and motivations and focuses on the wide range of social relationships that are integral to people achieving their wellbeing (Coulthard et al., 2011). The 'social wellbeing' approach borrows from the UK-based Economic and Social Research Council (ESRC) Wellbeing in Developing Countries (WeD) conceptual framework, which measures three aspects of wellbeing;

- Material: the resources people have and the extent to which needs are met including food, income and assets, access to services and environmental quality
- Relational: the extent to which social relationships enable people to act to achieve (their own conception of) wellbeing
- Subjective: the level of satisfaction with the quality of life people achieve; a person's own perceptions; and the values and beliefs that shape those perceptions (Britton and Coulthard, 2013, Coulthard et al., 2011, Coulthard, 2012).

This approach combines an objective evaluation of circumstances in which a community finds itself with a subjective evaluation of those circumstances, whilst also giving emphasis to the social context by which these meanings are framed and in which conceptions of wellbeing can be achieved (Britton and Coulthard, 2013). While work has been done that uses the 'social wellbeing' approach to

measure and assess current wellbeing within fishing communities (Britton and Coulthard, 2013), we are unaware of any study that seeks to rigorously investigate the contributions of professional fishing to community wellbeing. This Project uses a slightly different approach to understanding wellbeing and use of the 'social wellbeing' framework[2]. The three aspects of what we have term 'community wellbeing' were thus slightly modified as follows:

- Material: the extent to which the NSW wild-catch fishing industry contributes resources for local communities to meet their needs, including food, income and assets, access to services and environmental quality.
- Relational: the extent to which the NSW wild-catch fishing industry contributes to the development and maintenance of social relationships that enable communities to achieve (their own conception of) wellbeing.
- Subjective: the level of satisfaction with the contributions made by the NSW wild-catch fishing industry to the quality of life of local communities and the values and beliefs that shape these levels of satisfaction.

[2] Given our focus on community wellbeing we will subsequently use the term 'community wellbeing' to describe our application of the social wellbeing approach to the research question.

3.2 Defining the study areas

The study was aimed at assessing contributions on both a statewide and regional scale. The geographic boundaries of the areas to be studied were identified using a number of methods. The reliance on Australian Bureau of Statistics (ABS) census data for building the economic models (see below) meant that ABS statistical area boundaries were used as the basis of regional level analysis, however as far as possible this was matched with Department of Primary Industries Fisheries regions (Figure 3) in order to allow for comparison with available catch data. By examining ABS statistical areas and DPI fishing regions eight study areas were identified and used as the basis for fieldwork and data analysis. Table 1 outlines the areas selected.

FIGURE 3. NSW Estuary General and Ocean fisheries management zones (NSW Department of Primary Industries, 2012) and project study areas

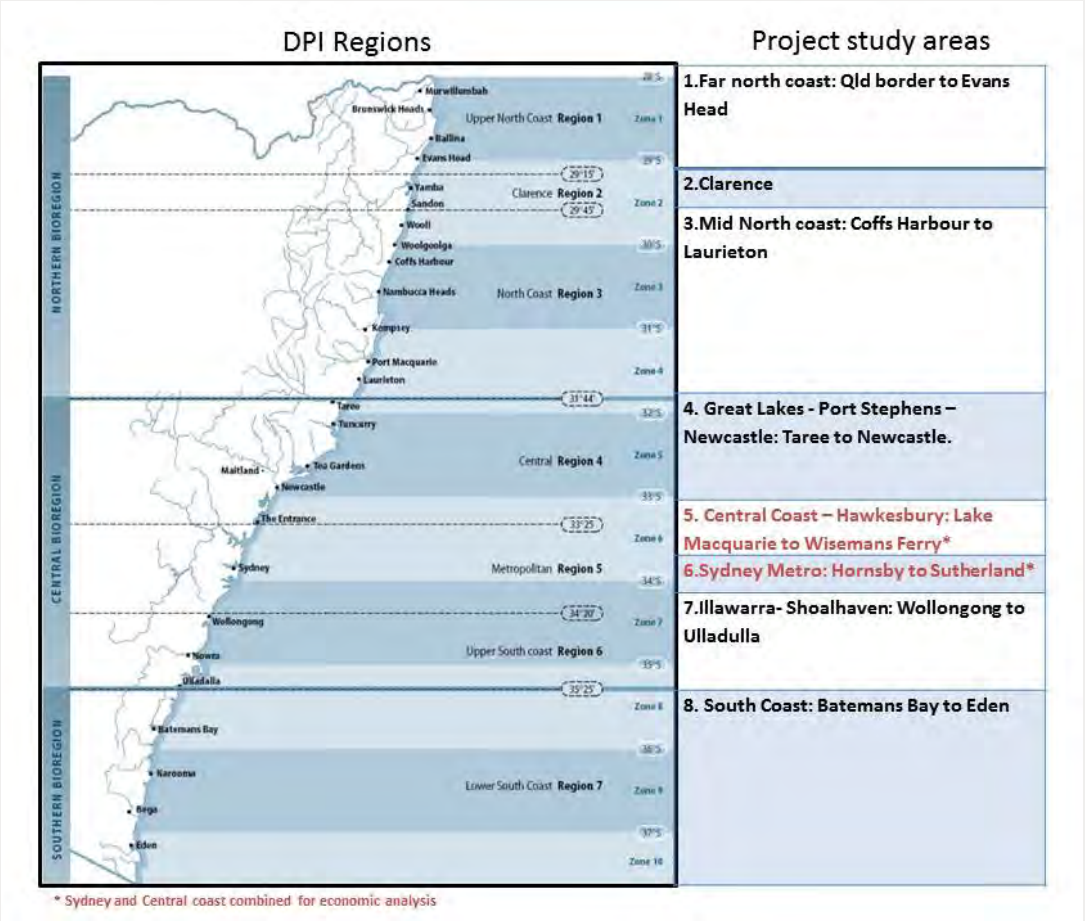


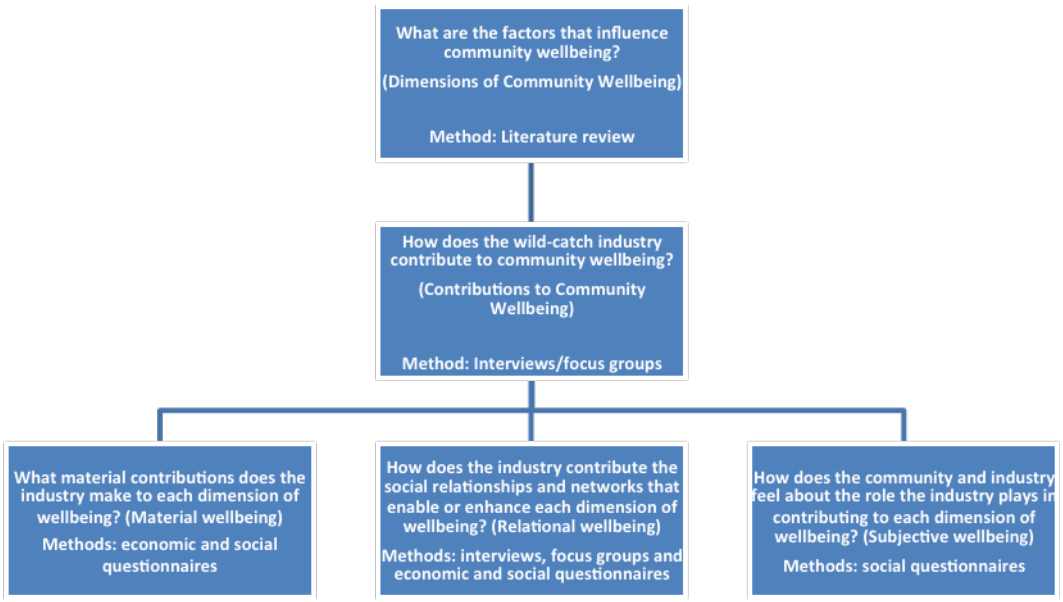
TABLE 1. Project study areas

Study Areas	ABS Statistical Area Name	ABS Statistical Area level	DPI Region (Estuary)	DPI Zone (Ocean)
1. Far North coast	Tweed Valley	SAL3	1	1
	Richmond Valley – Coastal			
2. Clarence	Clarence Valley	SAL3	2	2
3. Mid North coast	Coffs Harbour	SAL3	3	3
	Kempsey – Nambucca	SAL3		
	Port Macquarie – East	SAL2		4
	Port Macquarie – West			
	Laurieton – Bonny Hills			
4. Great Lakes – Port Stephens – Newcastle.	Taree – Gloucester	SAL3	4	
	Great Lakes	SAL3		5
	Port Stephens	SAL3		
	Newcastle	SAL3		
5. Central Coast – Hawkesbury	Lake Macquarie – East	SAL3	5	6
	Lake Macquarie – West			
	Wyong	SAL3		
	Gosford	SAL3		
	Dural – Wisemans Ferry			
6. Sydney Metro	Metropolitan SA4s including Sutherland Hornsby	SA4		
7. Illawarra – Shoalhaven	Illawarra	SAL4	6	7
	Shoalhaven	SAL3		
8. South Coast	Batemans Bay	SAL2	7	8
	Batemans Bay – South			
	Eurobodalla Hinterland			
	Broulee – Tomakin			
	Moruya – Tuross Head			
	Narooma – Bermagui	SAL2		9
	Bega – Tathra	SAL2		
	Eden			10
	Bega – Eden Hinterland			

3.3 An integrated approach to understanding contributions to wellbeing

In order to determine how the industry contributes to community wellbeing it was first necessary to determine some of the important factors that influence the wellbeing of a community and the individuals within it. Figure 4 illustrates the process by which we moved from an understanding of what influences community wellbeing to a methodological approach to investigating the contributions of the wild-catch industry to wellbeing.

FIGURE 4. Methodological approach to assessing wild-catch industry contributions to wellbeing



In order to provide a foundation for our understanding of the different factors that influence community wellbeing we conducted a detailed literature review of studies of community wellbeing and quality of life. The literature review assembled a range of different indices currently used around the world and within Australia to measure quality of life, sometimes also referred to as 'standard of living' (Nussbaum, 2003, Partridge et al., 2011, Nussbaum, 2000, Stiglitz et al., 2009, Himes-Cornell et al., 2013, Kasperski and Himes-Cornell, 2014, OECD, 2013, New Zealand Quality of Life Project, 2007). These are summarised in Appendix 2 and are termed 'dimensions of wellbeing'.

The second stage of the project involved fieldwork (see Section 3.4 for details). Using a grounded theory approach (Glaser and Strauss, 1967), we began with a number of largely unstructured interviews where general questions were asked about the participants' beliefs about the contribution of the fishing industry to their local community. Some trends began to emerge in these early interviews,

which we determined could be grouped around some of the main 'quality of life' indicators (or 'dimensions of wellbeing') identified in the initial literature review. Further fieldwork was subsequently conducted so as to test and confirm the identified 'contributions to wellbeing' themes. This process confirmed there were seven 'dimensions of wellbeing' most relevant to this study, with a range of possible contributions identified for each dimension, as detailed in Figure 5. If this framework were to be applied outside NSW the dimensions of wellbeing and the possible contributions of fisheries to those would need to be validated.

FIGURE 5. Dimensions of community wellbeing and contributions of the NSW professional fishing industry to each dimension

Dimensions of community wellbeing (things that contribute to overall community wellbeing)						
A resilient local economy	Community health and safety	Education and knowledge generation	A healthy environment	Integrated, culturally diverse, and vibrant communities	Cultural heritage and community identity	Leisure and Recreation
Contributions of professional fishing to community wellbeing (how the fishing industry contributes to each of the dimensions of wellbeing)						
Revenue Employment Relationships with service industries, post harvest sector and tourism	Provision of nutrition and food Search and Rescue	Skills training formal and practical (life skills) Transfer of environmental knowledge (eg to policy makers, and younger generations)	Environmental stewardship Engagement in catchment and fisheries research, planning and management	Cultural and religious celebrations/ events Contributions to community life (eg sponsorships, donations)	Cultural heritage and history of fishing Sense of place and identity (eg 'fishing towns')	Public infrastructure (eg jetties, wharves, slipways) Bait for recreational fishers

These common dimensions and the possible contributions identified through initial fieldwork were subsequently used as the basis for developing a theoretical approach for the economic analysis and as a means of integrating the results of the social and economic analyses. This involved determining how the NSW professional wild-catch fishing industry contributes to each of these seven dimensions of community wellbeing by looking at material, relational and subjective measures of wellbeing. Methodological tools employed included an economic questionnaire, in-depth interviews and focus groups, and three social questionnaires. Each of the seven identified dimensions and the contributions to them are explained in greater detail below. Indicators for the contributions are identified in the Results and Discussion Section.

3.3.1 A RESILIENT LOCAL ECONOMY

Economic or financial wellbeing has long been recognised as a fundamental component of personal and community wellbeing. Traditionally measures of wellbeing have always included employment statistics, income levels and housing conditions as key indicators of the material wellbeing of the communities undergoing assessment. The capabilities approach, pioneered by Sen (1987) and Nussbaum (1993), questioned an overreliance on these measures as an indicator of development and highlighted the need to look more broadly than simple economic statistics. Measures of material wellbeing now look beyond income levels and employment statistics to include analysis of the security of income and the availability and quality of jobs, recognising that choice of employment offers the ability for individuals to fulfil their own personal ambitions and goals (OECD, 2013). For some within the community, wellbeing may not be defined by level of income or profitability but by other factors such as flexibility, autonomy and extent to which work is challenging or stimulating. Quality of employment and wellbeing in the workplace are also increasingly considered essential components of overall wellbeing and these are influenced by such factors as earnings, social relationships at work, the level of autonomy people have and levels of support from peers and the wider community (OECD, 2013). Given that individual wellbeing is influenced by both the *availability* and *quality* of jobs (OECD, 2013), community wellbeing is likely to be enhanced by the availability of a variety of strong, stable employment options and revenue-generating sectors. This allows for a range of opportunities for employment according to the diverse skills sets, ambitions and aspirations of the individuals within a community. Long-term stability of employment options provides for intergenerational equity, ensuring employment opportunities are available for future generations. Resilient economies also support local employment opportunities so that workers are able to contribute to the social and economic life of their communities without having to commute long distances or travel out of the community to work. Finally, community wellbeing is likely to be enhanced if local economies are able to adapt and respond to shocks or fluctuations in economic conditions and to changing circumstances through innovation (Partridge et al., 2011, New Zealand Quality of Life Project, 2007, OECD, 2013, Australian Bureau of Statistics, 2013).

A resilient economy based on, or including, a fishery resource has additional levels of complexity due to its reliance on the health of the fishery. Excessive entry of fishing effort into a fishery leads to resource depletion and erosion of the sustainability of the fishery to support jobs and communities in the long term. This can lead to long-term management challenges requiring interventions to limit access and to reduce fishing effort and thereby enable the stocks and economic flows from the resource to recover. Therefore management of fishing effort and capacity is essential to ensure a sustainable flow of economic benefits from the fishery to the community in the long term and avoid stock collapse with enduring economic and community costs. In fishing communities, therefore, economic resilience is closely tied with environmental sustainability and cannot be solely measured on the level of income or profit that they produce. A highly profitable fishery may not always be a sustainable one, and a sustainable fishery may not

always be highly profitable. The need to change management practices from time to time to respond to environmental drivers is central to managing a fishery in a sustainable manner. Similarly, fishers must adapt to seasonal or climatic changes which influence species availability. For some this may mean substituting other species or other fisheries, or engaging in work outside the industry. Hence we see that a resilient fishing community is one that has the flexibility to accommodate the environmental and regulatory changes that influence fish abundance, as well as fishers with different levels of fishing activity and motivation.

This study sought to understand the economic contributions of fishing to a resilient local economy in a number of key ways. These are detailed in Table 2.

TABLE 2. Contributions of the NSW wild-catch fishing industry to a resilient local economy

Dimension of community wellbeing	Contributions of the NSW wild-catch fishing industry	
A resilient local economy	Material	> Primary economic impact through direct revenue and business profitability > Secondary economic impacts (or multipliers) to regional economies through relationships with service industries providing inputs for professional fishing
	Relational	Interactions between the local fishing sector and other economic markets and sectors, including: > Interactions with the post-harvest sector > Interactions with the tourism sector > Interactions with the recreational fishing sector
	Subjective	Level of community support and understanding of the economic contributions of the fishing sector

3.3.2 COMMUNITY HEALTH AND SAFETY

The importance of consuming seafood as a regular component of a healthy diet has been recognised around the world. For example, U.S. and Australian food authorities recommend consumption of fish at least twice a week due to the many health benefits associated with the high levels of Omega 3 and other vitamins and minerals (Food Standards Australia New Zealand, 2011, U.S. Dept. of Health and Human Services, 2005). The overall wellbeing of the community is influenced by the physical and mental health of its residents. Healthy citizens are more likely to be able to contribute to the social and economic life of a community and create less direct costs to the community associated with health care (Australian Bureau of Statistics, 2013). Health is also considered one of the most significant factors influencing individual happiness and wellbeing (Australian Bureau of Statistics, 2013). 'Quality of life' indicators relating to community health tend to focus on life expectancy, however it is recognised that this data is strongly influenced by lifestyle factors that include smoking, alcohol consumption and nutrition. There is a need for members of the community to be able to access seafood products to meet the nutritional requirements provided through seafood. This need can be met through a range of channels, including aquaculture, imported products, as well as Australian and local wild-caught products. This study examined the importance of local fishing industries in NSW as a supplier of nutritious food and investigated whether they play a role in contributing to community safety through their presence on the state's waterways, as detailed in Table 3.

TABLE 3. Contributions of the NSW wild-catch fishing industry to community health and safety

Dimension of community wellbeing	Contributions of the NSW wild-catch fishing industry	
Community health and safety	Material	> Contributions to food security and the nutritional needs of local communities > Contributions to community safety through involvement in maritime search and rescue operations
	Relational	Channels through which consumers access the products supplied by the NSW industry
	Subjective	> The level of importance the community puts on the provision of local product by a local industry for health and nutrition > Contributions to Indigenous mental and physical health and wellbeing needs

3.3.3 EDUCATION AND KNOWLEDGE GENERATION

The capability to build one's skill set and knowledge is considered essential to wellbeing in order for citizens to be able to participate fully in the economic and non-economic life of their community (OECD, 2013). Knowledge and life-long learning are associated with the resilience of local communities and in particular the ability to adapt to changing social and economic conditions, including changing work environments. They are also associated with individual wellbeing as learning opportunities can significantly contribute to people's ability to fulfil personal ambitions and goals (New Zealand Quality of Life Project, 2007). The 'quality of life' literature tends to focus on people's involvement in formal learning opportunities, such as school or university based education and training, however it also recognises that much knowledge generation and transfer can also be informal and practical ('on the job'). This type of learning is often intergenerational, creating links across generations and contributing to the strength and cultural fabric of society (Australian Bureau of Statistics, 2013). The Project therefore sought to consider both types of learning opportunities and the benefits they provide the wider community, as detailed in Table 4.

TABLE 4. Contributions of the NSW wild-catch fishing industry to education and knowledge generation

Dimension of community wellbeing	Contributions of the NSW wild-catch fishing industry	
Education and knowledge generation	Material	Formal training and learning opportunities provided by the professional fishing industry
	Relational	Social learning and informal knowledge transfer
		Contributions to community knowledge, especially environmental knowledge
	Subjective	Levels of trust and respect for the knowledge and skills of the fishing industry

3.3.4 A HEALTHY ENVIRONMENT

NSW coastal communities depend on and value the environment in a variety of ways. These include ecosystem services such as clean air, water, food, and shelter, as well as economic resources that rely on the natural environment to exist. A healthy environment is closely related to many other aspects of community and individual wellbeing, including human health (Australian Bureau of Statistics, 2013, Partridge et al., 2011). Visitors and residents also value the recreational, relaxation and spiritual opportunities provided by the natural environment in NSW, and the protection of these values is considered to be of high importance by the Australian community (Australian Bureau of Statistics, 2013, Sweeney Research, 2014). The Project investigated the contribution of the NSW wild-catch industry to a healthy environment, as detailed in Table 5.

TABLE 5. Contributions of the NSW wild-catch fishing industry to a healthy environment

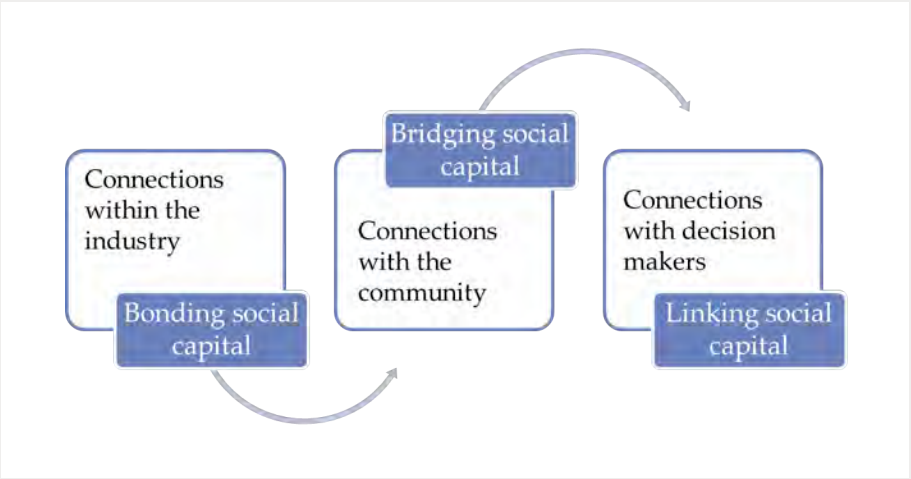
Dimension of community wellbeing	Contributions of the NSW wild-catch fishing industry	
A healthy environment	Material	> Practicing sustainable and environmentally friendly fishing > Involvement of the industry in stewardships activities
	Relational	The role of the NSW fishing industry in wider environmental management networks
	Subjective	The level of trust in the fishing industry to act in a sustainable manner

3.3.5 INTEGRATED, CULTURALLY DIVERSE, & VIBRANT COMMUNITIES

This concept of wellbeing refers to communities having active cultural lives in which people from various groups feel connected and have opportunities for a good life across generations, across cultures and across socio-economic class divisions (OECD, 2013, Partridge et al., 2011, New Zealand Quality of Life Project, 2007, Australian Bureau of Statistics, 2013). Integration allows communities to feel connected and supported, which means embracing diversity, which is also known to enhance resilience and innovation within local communities (Australian Bureau of Statistics, 2013). Vibrant communities embrace opportunities for cultural expression including through the arts, community events and important holidays or celebrations.

A fundamental component of integrated communities relates to social connections and relationships. Individual wellbeing is enhanced by feeling supported and included within the community and is influenced significantly by the notion of reciprocity. Reciprocity involves people both giving and receiving from the community. This can increase a feeling of belonging and inclusion. The extent to which reciprocity occurs within communities, and the ways in which it occurs, is driven by the strength of different forms of social capital. Social capital is defined as "networks together with shared norms, values and understandings that facilitate co-operation within or among groups" (Foxton and Jones, 2011 p. 1). There are three main types of social capital (Figure 6). Bonding social capital refers to links between people within a common social or geographical group (e.g. families or cultural groups). Bridging social capital relates to more distant connections across different groups (e.g. across businesses or communities, or between different social groups). Involvement in community life, including citizenship activities; memberships of clubs or sporting organisations and volunteering are all activities which assist in building bridging social capital (Foxton and Jones, 2011, Brooks, 2007). Finally, linking social capital refers to connections with people in positions of power (Foxton and Jones, 2011). Linking social capital can be significant because it assists in building support and enhancing the political voice of citizens. Individual wellbeing can be strongly influenced by whether people are given the opportunity to have a say in decisions that affect them (New Zealand Quality of Life Project, 2007, Nussbaum et al., 1993, OECD, 2013).

FIGURE 6. Forms of social capital.



The Project examined the contribution of the NSW wild-catch industry to integrated, diverse and vibrant communities. This included examining its contributions to cultural diversity, participation in cultural events and celebrations, as well as its role in in all three types of social capital, as detailed in Table 6.

TABLE 6. Contributions of the NSW wild-catch fishing industry to integrated, culturally diverse and vibrant communities

Dimension of community wellbeing	Contributions of the NSW wild-catch fishing industry	
Integrated, culturally diverse and vibrant communities	Material	> Contributions of the NSW wild-catch industry to the needs of a diverse community > Involvement in citizenship activities and community events
	Relational	Role of the NSW industry in building and maintaining social networks (formal and informal) in local communities (social capital)
	Subjective	Community awareness and beliefs in relation to the importance of the services provided by the fishing industry for community life

3.3.6 CULTURAL HERITAGE AND COMMUNITY IDENTITY

Cultural heritage refers to the ways of living developed by a community, passed on through generations, including customs, practices, places, and objects. It includes both tangible and intangible things. Cultural heritage helps inform the ways a community sees itself and helps to build a sense of common purpose and values. Community identity refers to the ways communities are known and experienced; the ways people come to connect with communities and see themselves as part of them. This may in part be driven by locality but it can also be influenced by common sets of values, interests or beliefs, by relationships with others within a community, and by common practices or purposes (Harrington et al., 2008). The role of the fishing industry in contributing to a shared sense of community identity and contributions to the cultural heritage of local communities was explored in a number of ways, as outline in Table 7.

TABLE 7. Contributions of the NSW wild-catch fishing industry to cultural heritage and community identity

Dimension of community wellbeing	Contributions of the NSW wild-catch fishing industry	
Cultural heritage and community identity	Material	Contributions to the history of NSW coastal towns and regions
	Relational	Contributions to cultural and community identity
	Subjective	Importance to the community of the contributions of the industry to a shared sense of community identity and to local cultural heritage

3.3.7 LEISURE AND RECREATION

Many of the quality of life frameworks examined through the literature review emphasised the importance of leisure and recreation, or work-life balance, to community and individual wellbeing. These included opportunities for fun, play and participation in the arts and cultural events, often measured through time-use surveys (Australian Bureau of Statistics, 2013, OECD, 2013, Partridge et al., 2011, Nussbaum et al., 1993, New Zealand Quality of Life Project, 2007). The Project considered how the NSW wild-catch industry contributes to the recreational lives of its communities in a number of ways, as outlined in Table 8.

TABLE 8. Contributions of the NSW wild-catch fishing industry to leisure and recreation

Dimensions of community wellbeing	Contributions of the NSW wild-catch fishing industry	
Leisure and recreation	Material	Contributions of the fishing industry to community recreation.
	Relational	Social connections and interactions between the wild-catch industry and recreational users.
	Subjective	The level of importance recreational users put in the provision of local services and infrastructure by the fishing industry.

3.4 Ethical considerations

The Project in full, including the economic and social questionnaires outlined below, all underwent assessment by the UTS Human Research Ethics Committee. Given the sensitive nature of much of the information collected through this research, special care was taken to ensure the privacy and anonymity of all participants. This included the following:

- No personal information was shared with anyone outside the project team.
- The questionnaires were all anonymous, so the data could not be linked back to individuals.
- The raw data (e.g. the paper copies of completed questionnaires) were seen only by the research team.
- The aggregated data (e.g. a database or spreadsheet) will be held by A/Prof Kate Barclay as the data custodian for this project. A UTS data management site will list this data as being available for re-use for research purposes only. Any potential researchers will need to contact A/Prof Barclay to gain access to that data. 'Aggregated' means the data will be grouped (by region, with a minimum of five to a group) to make it impossible to see individual businesses.
- In terms of the interviews we prepared a detailed consent form that we asked all our participants to complete as part of the interview process. These forms provided instructions to the project team about how the participants would like their stories to be used, including whether they consented to be identified, photographed and whether they agreed for the data to be archived and reused.

3.5 Round 1 fieldwork – in-depth interviews

Fieldwork was conducted in two stages. The first, and most extensive, stage was conducted over a period of nine months from September 2014 to May 2015. Every study region listed in Table 1 (Section 3.2) was visited over the course of these nine months. Initial contact with interview participants was made in a variety of ways. These included:

- Recommendations from project Steering Committee members
- Announcements through the PFA newsletter, local media and social media
- Advertising of 'drop in sessions' at co-operatives and other venues through co-operative networks and local media
- Targeted invitations towards community members including local councils (usually the Mayor and General Manager of each council area visited), Chambers of Commerce and local tourism bodies
- 'Snowball' sampling whereby people interviewed recommended additional people to contact.

The response to the qualitative fieldwork was very receptive and numbers were limited only by availability of time rather than a lack of willingness to participate. In total 164 people were interviewed across all eight regions (Table 9).

TABLE 9. Interview participants by region

Region	No. interviewees
Far North Coast	27
Clarence	14
Mid North coast	22
Great Lakes – Hunter	27
Central Coast – Hawkesbury	21
Sydney	12
Illawarra – Shoalhaven	6
South Coast	35
Total	**164**

The majority of the interview participants were directly engaged in the fishing industry as fishers, members of fishing families or co-operative staff (66%), however interviews were also conducted with a range of other sectors, as outlined in Table 10.

TABLE 10. Interview participants by relationship to industry

Fishing Industry	Interviewees	Other	Interviewees
Licensed fisher	71	Local government (including councillors)	15
Fisher and fish merchant	9	Service industry	8
Indigenous fisher	5	Retail outlet/ restaurant/take away	7
Partner/wife	7	Industry representative body	5
Co-operative staff, managers or board	18	Community/ recreational fisher	6
		Wholesaler/processor	5
		Government (state)	3
		Tourism	3
		Other	2
Total	110	Total	54
Grand Total			**164**

These interviews were transcribed and entered into NVivo 10, a software package for analysis of qualitative social data. In a small number of cases, where the interview had involved multiple participants, transcripts were not able to distinguish between individuals. In these cases the transcript was entered as single participant, reducing the total number of participants to 155. The final breakdown of the transcripts analysed through NVivo are outlined in Table 11.

TABLE 11. Interview participants per study area by relationship to industry

	Far North Coast	Clarence	Mid North Coast	Great Lakes - Hunter	Central Coast-Hawkesbury	Sydney Metro	Illawarra-Shoalhaven	South Coast	Total
Fisher	11	9	5	12	10	2	5	7	61
Co-operative staff/manager/board	3	3	4	5				3	18
Government (local)	2		3	2	1	3		4	15
Fisher + fish merchant		1	3	1			1	4	10
Partner/wife	1			1	5			1	8
Community/rec fisher	2	1	1	2				1	7
Retail/ restaurant/ takeaway			1		5			1	7
Service industry				1				5	6
Indigenous	1			1		1		3	6
Industry body			1			4			5
Wholesaler/ processor	1					2		2	5
Tourism body					1			2	3
Government (state)		1	1	1					3
Unrelated business								1	1
Total	21	15	19	26	22	12	6	34	155

Prior to commencement of the interviews the Project objectives were explained and a detailed consent form provided to each participant to complete either before or after the completion of the interview. All participants were provided the opportunity to ask questions about the project and this often involved significant discussion about how the project was related to the ongoing government reform, how the data would be used and the relationship of the project to the NSW DPI.

The majority of interviews were audio-recorded and subsequently transcribed in full. Where significant sections of the interview included discussion about matters outside the core research questions (for example, many interviews featured extended discussions about the ongoing reform process) these interviews were logged and only the relevant sections transcribed. Where it was not possible to audio-record the interview (e.g. because of problems with background noise) or the interviewee did not give consent to being recorded, detailed handwritten notes were taken. Where requested, copies of interview notes or transcripts were provided to the interview participant for review and amendments as necessary.

All the transcripts, interview notes and interview logs were entered into NVivo 10 and coded. Due to the large amount of data obtained through this first round of fieldwork, NVivo coding was initially conducted by searching for key terms within the data and coding the results rather than coding every transcript individually. Each transcript was then checked to ensure coding was complete and consistently applied. As the analysis involved multiple coders, inter-coder reliability was checked regularly to ensure consistency across the project team.

3.6 Economic methods

There is a range of economic methods used to address several economic valuation questions. We investigated the Gross Value of Production (GVP) data, which indicates primary economic activity through direct revenue. We then examined the profitability of fishing businesses, as happens in other states of Australia. This requires an economic survey, which also enabled us to address the NSW industry request for an analysis of secondary economic impacts (or multipliers) to regional economies through relationships with service industries providing inputs for professional fishing. This modelling was performed by the Western Research Institute (WRI).

Industry members of the Project Steering Committee also expressed a desire to investigate the catch sector relationships with the post-harvest sector, for which consistent data is lacking. Industry also wished to have insights into adding value, rather than traditional marketing through Sydney Fish Market (SFM), and also wished to see what investment was taking place in the industry.

The economic methodology linked with the social survey to identify the socio-economic relationships between professional fishing, tourism and recreational fishing.

3.6.1 Gross Value of Production

The Gross Value of Production (GVP) was investigated through contact with NSW DPI in respect of catch records, and the SFM in respect of fish prices. The industry observation that the GVP does not sufficiently reflect the industry value was investigated. SFM provided fish prices data for NSW fish caught in the 2012–13 period. NSW DPI provided catch data for all species in the 2012–13 period and the data sets were compared to find the extent of fish product going to the SFM, and product not going via Sydney and potentially getting prices in excess of those assumed in the GVP approach. This approach also provided information for the identification of value added by industry in the marketing chain, which was further investigated in discussion with industry.

3.6.2 Business profitability

An economic questionnaire was developed using the experience of previous studies in NSW, other states and Commonwealth fisheries (Dominion 2006; Harrison 2010; Econsearch 2014; George and New 2013). The purpose of this was to estimate the profitability of fishing businesses and to obtain information on the fishing expenses of wild-catch fishers for use as inputs into the regional economic modelling undertaken by Western Research Institute.

Knowledge of fishing business profitability provides an important context to our understanding of the economic contributions of the NSW wild-catch industry. Profitable businesses that are able to invest in their operations and make larger-scale contributions to their regional economies can be indicative of economic security in the future in managed fisheries.

Economic profitability was determined from the profit and loss accounts of fishers, with certain adjustments being made, as explained in Appendix 3. For example, the opportunity costs of labour and capital are included with accounting measures and so an economic profit would be a level of return greater than a normal return to capital and may potentially attract investment or new entrants into a fishery. An economic loss, as seen in a negative economic rate of return, means a business forgoes the opportunity costs of capital and labour, but can still be at a level where fishing operations continue. In other words, in this situation a business maybe operating at a financial surplus, but not at a sufficient level to offset the potential earnings if they chose to invest in an alternative industry.

The annual survey method is a snapshot of a given financial year (in this case 2012–13) and does not enable us to assess the sustainability of the observed results, particularly for fisheries where inter-annual variability is a feature. The fish stocks underpinning the fisheries would have to be included in much larger bioeconomic modelling exercise to comment on the economic sustainability of the industry.

A questionnaire eliciting information for the economic evaluation was posted under the DPI's confidentiality process to all professional fishers and fishing businesses registered with NSW DPI in September 2014.[3] The mail survey is an established method for fishery economic surveys, but a number of factors combined to impact on the response rate to this survey. Most notable was uncertainty and distrust of any requests for information perceived to be associated with the ongoing NSW government reform of professional fisheries. In addition, there was significant opposition to the study from one vocal industry group when the project first commenced. During the period the questionnaire was open, DPI hired consultants to also contact industry members for economic information as part of the reform process. The DPI economic survey was conducted concurrently with our questionnaire and confusion between the two is likely to have impacted on our response rate.

[3] DPI protected the confidentiality of licensed businesses by not giving the contact list to the researchers directly. DPI provided the database to an external mailing house, and UTS provided the questionnaire to the mailing house to send out. The mailing house destroyed the contacts list after mailing out the questionnaires.

The ongoing reform process in NSW, being conducted by the NSW DPI, has created a tense atmosphere within the industry, where levels of trust are low and studies of this nature are viewed with extreme suspicion. The Project team expended considerable resources on addressing misconceptions relating to the Project and responding to industry concerns, including direct interactions on the phone, in person and online with industry group representatives and individual fishers. In response to industry concerns, the deadline to return completed questionnaires was extended so we could instigate a range of strategies to encourage greater buy-in from industry and boost response rates. These strategies included:

- Face-to-face discussions about the survey during field visits
- Distribution of incentives in the form of FRDC caps to research participants
- A reminder letter and an FAQ document
- Numerous reminder emails, texts and Facebook posts on the project Facebook page, through the project email distribution list and through PFA communication channels
- Industry leaders, including steering committee members, acting as 'champions' for the Project, encouraging their peers to participate – this included a flyer that was prepared and distributed amongst all available channels which included testimonials from industry leaders about the importance of the study.

Despite all these efforts the response rate remained low, with final numbers of surveys received totaling 57, or 5.8% of the 989 registered NSW fishing businesses to whom the questionnaire was posted. The level of response limited the extent to which the results could be disaggregated by both fishery and region as outlined in the results.

3.6.3 The regional economic analysis and economic multipliers

Regional economics investigates why economic activity takes place in different areas, and the connections between different sectors of the economy in generating economic activity. Traditionally there have been "Keynesian" income and expenditure approaches, and then what is called input-output (IO) modelling based on national accounting data. In this study we use the Generation of Regional Input-Output Tables (GRIT) technique, which incorporates census national accounts and other data (WRI, 2016- Appendix 5 this report). Input-output modelling has been used in many regional fishery economic studies in Australia (Tamblyn and Powell, 1988; Powell et al., 1988; EconSearch 2014).

From fishing business receipts received, the initial expenditure on inputs for fishing is made in the NSW economy and this expenditure then produces an amount of output. Fish catching businesses require inputs in the form of good and services such as fuel, nets, victualling and maintenance.

The Project extended the analysis of the economic contributions of the industry to include examination of these economic 'multipliers' – that is, how the income from professional fishing flows through to other businesses that provide goods and

services to the wild-catch fishing industry. The estimation of regional economic benefits was undertaken by the regional development research organisation Western Research Institute (WRI). The economic information from the operational and financial data, collected from the economic questionnaires distributed to all professional fishing operators, was used to generate regional expenditure estimates. The expenditure estimates were put into WRI's model of the NSW regional economy to calculate the economic impacts of professional fishing on regional coastal economies and at the NSW State level. Modelling was undertaken for the financial year 2012–13. The full results of this analysis can be found in Appendix 5. This study addresses one of the criticisms of linear coefficients in input-output modelling using a marginal coefficient approach as explained in WRI (2016) (see Appendix 5).

3.6.4 The secondary seafood sector

Further analysis into the post-harvest sector was requested in order to evaluate the contributions of the industry to those businesses that sell the products supplied by NSW fishers. The seafood sector includes processors, wholesale and retail seafood and bait suppliers, and the hospitality (restaurants and takeaway food) sector. There are no accurate data available for either the quantities or prices in the secondary sector. The study was able to make estimates of the possible regional economic contribution of secondary seafood sector state-wide by using the wild-catch regional results and information from previous site specific regional economic studies.

The previous studies involving regional economics and the wild-catch and seafood sector in NSW are (Tamblyn and Powell, 1988; Powell et al., 1988; Harrison 2010). Regional studies have been completed in other states (Econsearch 2013), and there are also international reviews (Kelsey et al. 2013). There are two scenarios in the NSW site-specific regional seafood studies cited above. One is where fish are landed and have little processing (Tamblyn and Powell, 1988; Powell et al., 1988) and the other is where fish are further processed as in the Northern Rivers (Harrison 2010). In estimating the state-wide secondary sector estimates, we use the ratio of primary to secondary output in the past studies to generate a low and a high imputed output value for the secondary sector in the absence of available data on this sector.

3.6.5 Value chain case study

When wild-catch is landed it is purchased for processing and enters the value chain. The industry wished the research to portray some of the value chains that are regional and do not involve SFM.

The wild-catch and secondary sector relationships were examined through an analysis of existing catch and price data supplied by the DPI, SFM and other co-operative and non-co-operative sources, as well as the social questionnaire of fish merchants. This enabled us to identify some key species not being marketed via SFM in which value is being added by the secondary sector in the regions. We then discussed with the industry how to present these as specific case studies and meet commercial confidentiality issues. This led to us taking a conceptual illustrative

approach for a range of species, illustrating where added value is occurring. The results of this analysis are detailed in Section 4.1.3.

3.6.6 Investment case study

The industry indicated that government often underestimated the amount of past capital investment in the industry and also the current lack of investment in most NSW fisheries due to the reform process, which impacted the responses in our questionnaire. The economic questionnaire enabled some investigation into the levels of investment in the industry. The wild-catch fishers provided data on their fishing assets, enabling analysis of the average age of vessels and other assets of the respondents to the economic survey. The survey also asked about recent capital purchases and debt levels in respect of fishery assets. The available data were combined with an analysis of the qualitative interview data in relation to any discussions about possible or likely future investments. The results of this analysis are detailed in Section 4.1.2.

3.7 Social questionnaires

Three questionnaire surveys were designed by the Project team in conjunction with market research company UMR, and peer reviewed by Professor Allan Curtis. These surveys were designed to explore key aspects of the 'dimensions of wellbeing' and possible contributions of the fishing industry identified through the interviews (see Table 1). The final reports on each of these three questionnaires are provided in Appendix 7.

3.7.1 General public

A total of 1,423 interviews were completed via computer-assisted telephone interviews (CATI) conducted between 28 October and 9 November 2015 by market research company UMR. This survey included a sample of both landline (65%) and mobile phones (35%) and had an overall response rate of 24%. The survey focused on coastal residents in the eight study regions of NSW (see Box 1 for definition of coastal). The data was weighted so the sample matched ABS census data to ensure data was representative according to age and gender on a state level. Table 12 provides details of the demographic profiles of the respondents to this survey.

TABLE 12. Demographic profile of community social questionnaire participants

Demographics		Total (%)
Gender	Male	49%
	Female	51%
Age	18 to 29 years	21%
	30 to 39 years	17%
	40 to 49 years	17%
	50 to 59 years	16%
	60+ years	29%
Region	Far North Coast	11%
	Clarence	10%
	Mid North coast	11%
	Great Lakes – Port Stephens – Newcastle	11%
	Central Coast– Hawkesbury	17%
	Sydney Metro	19%
	Illawarra – Shoalhaven	12%
	South Coast	10%
Total household income	Under $40,000	25%
	$40,001 - $80,000	26%
	$80,001 - $120,000	27%
	Over $120,000	22%
Highest qualification	No Tertiary	27%
	TAFE/ Tech/ Trade Only	38%
	University	35%
Recreational or any other type of fisher	Recreational/Professional wild-catch fisher	35%/1%
	Non-fisher	64%

The average interview length was 18.5 minutes. The script included a range of questions focusing on four main areas:

- Fish and seafood purchase behaviours
- Preferences regarding provenance of seafood
- Attitudes towards the NSW professional fishing industry
- Holiday-driven consumption and the tourism experience.

3.7.2 Fish merchants and co-operatives

A total of 77 interviews were conducted via CATI between 30 October and 15 December 2015 by market research company UMR. A small selection of sample contacts (fish retailers/wholesalers and co-operatives) was provided by DPI. This included 16 co-operatives and 15 fish retailers/wholesalers who had provided prior permission to be contacted. This sample was obtained in two main ways:

- Through the DPI 'fish receiver' licencing system: Access to contact details for businesses licenced as 'fish receivers' is restricted due to privacy considerations. Therefore, DPI staff agreed to contact a sample of these fish receivers individually on behalf of the Project team in order to obtain their permission to be contacted by UMR.
- Wholesalers/retailers and co-operatives who were interviewed in the first round of qualitative fieldwork were invited to participate.

All these contacts were invited to participate in the survey. The balance was sourced via the electronic Yellow Pages. Table 13 provides an overview of the firmographic[4] characteristics of interview participants.

[4] Firmographics, similar to individual demographics, details the characteristics of the 'firms' or businesses that participated in the questionnaires

TABLE 13. Firmographic profile of fish merchant and co-operative social questionnaire participants

Firmographics		Total	Sample Size N=
Region All	Far North coast	13%	10
	Clarence	4%	3
	Mid North coast	17%	13
	Great Lakes – Port Stephens – Newcastle	8%	6
	Central Coast – Hawkesbury	8%	6
	Sydney Metro	36%	28
	Illawarra – Shoalhaven	8%	6
	South Coast	16%	12
	Other NSW	5%	4
	Other State	1%	1
Main Business type	Co-op	11%	9
	Wholesaler	14%	11
	Retailer	53%	40
	Other (Restaurant, Exporter, Importer)	17%	13
	Fisher (Professional, Aquaculture, Indigenous)	5%	4
Turnover	Less than $1 million	32%	25
	$1 – $5 million	34%	26
	$6+ million	12%	9
	Unsure/refused	22%	17
Business operation	0 – 5 years	5%	4
	6 – 10 years	6%	5
	Over 10 years	88%	68

The average interview length was 15 minutes. The script included a range of questions focusing on four main areas:

- Purchase and supply activity
- The importance of 'local product' to these businesses
- Attitudes towards the NSW professional fishing industry
- Involvement in training and education and contributions to the wider community and industry.

3.7.3 Tourism and hospitality providers

An online questionnaire of the tourism and hospitality industry was conducted between 28 October and 14 December 2015. The survey was distributed through regional and local tourism bodies in coastal NSW and a range of industry groups, including:

- Destination Tweed
- Visit Byron Bay
- Ballina Tourism
- Richmond Valley Tourism
- Clarence Valley Tourism
- Coffs Coast (includes Belligen)
- Nambucca Valley Tourism
- Kempsey Council Tourism networks
- Port Macquarie-Hastings tourism networks
- Destination Port Stephens
- Central Coast Tourism networks
- Tourism Transport Forum
- Shoalhaven Tourism
- Eurobodalla Tourism
- Bega Valley Tourism
- North Coast Regional Tourism Organisation
- Hunter Regional Tourism Organisation
- Central Coast Regional Tourism Organisation
- South Coast Regional Tourism Organisation
- Caravan, Camping and Touring Industry Association of NSW
- Bed & Breakfast and Farmstay Association NSW
- The Accommodation Association of Australia
- Restaurant and Catering Industry Association

The online questionnaire resulted in 40 completed responses from across a broad cross section of the industry. All of the study areas were represented in the survey, with the majority coming from the northern areas (see Table 14). The maximum theoretical margin of error at 95% confidence level is ± 15. Given the survey used opportunistic sampling it cannot be considered to be representative of the tourism industry at large.

TABLE 14. Firmographic profile of tourism and restaurant owners who participated in the tourism questionnaire

Firmographics		Total	Sample Size N=
Region (Multi)	Far North Coast	23%	9
	Clarence	28%	11
	Mid North Coast	25%	10
	Great Lakes – Port Stephens – Newcastle	5%	2
	Central Coast – Hawkesbury	10%	4
	Sydney Metro	8%	3
	Illawarra – Shoalhaven	8%	3
	South Coast	13%	5
	Other NSW (e.g. West, Central West, South West)	3%	1
	Victoria Coast	3%	1
	Others	5%	2
Turnover	Less than $1 million	60%	24
	$1 – $5 million	23%	24
	$6+ million	3%	9
	Unsure/refused	22%	1
Business Type (Multi)	Restaurant	15%	6
	Caravan Park	13%	5
	Motel	13%	5
	Tourist attraction	10%	4
	Tourism, Marketing and Advertising	10%	4
	Visitor Information Centre	8%	3
	Fishing charter operation	8%	3
	Bed and breakfast	5%	2
	Hotel	3%	1
	Guest house	3%	1
	Real Estate offering holiday accommodation	3%	1
	Serviced Units	3%	1
	Others	15%	6
Business operation	Less than 1 year	3%	1
	1 – 5 years	20%	8
	6 – 10 years	10%	4
	Over 10 years	65%	26

The survey took approximately 10 minutes to complete and included questions focused on the following key areas:

- Business focus and peak demand periods
- Attitudes and perceptions regarding the contribution of professional fishing/ seafood to tourism
- Restaurant-specific questions on seafood sourcing and sales
- Services provided and promotions undertaken related to the seafood industry.

3.8 Overall analysis

The data derived through the methods outlined above were analysed, collated and examined within the framework of the wellbeing approach, guided by the seven identified 'dimensions of community wellbeing'. Emphasis was given to ensuring that data included material, relational and subjective measures of wellbeing. Table 15 details the finalised list of 'dimensions of wellbeing', the fishing contributions to community wellbeing and the data sources for each. Subsequent data collection (through additional interviews) concentrated on filling knowledge gaps in each of the wellbeing dimensions across statewide and regional scales

3.9 Round 2 fieldwork - validating results

Following completion of the analysis, a second round of fieldwork was conducted to validate and confirm results. This second round of fieldwork took the form of two workshops: the first with industry stakeholders (primarily the project Steering Committee); and the second with NSW DPI fishery managers and researchers. At each workshop the preliminary results were presented and workshopped with participants to refine and verify the findings.

In addition, these workshops were used to trial a tool that can be used to gauge stakeholder groups' perceptions of the strength and importance of industry contributions to community wellbeing, and to highlight differences and similarities between the groups' perceptions. At each workshop the group considered the data gathered by the Project and rated the strength and importance of the industry's contribution to each of the seven 'dimensions of wellbeing'. This involved allocating a score between 1 and 5 for each dimension (1 being not at all important or strong and 5 being very important or strong). The Project researchers then used their understanding of community perceptions (based on the interviews and questionnaires) to estimate community perceptions of the strength and importance of industry contributions to wellbeing. This tool will enable researchers to explore differences in ideas about the importance and strength of industry contributions that might exist between the industry, government and the community. It provides insight into where each sector feels that the potential of the industry contributions can be developed further, which can assist in prioritising actions to protect, support or grow industry contributions. If this tool is to be applied in ongoing monitoring of social and economic contributions in NSW or applied elsewhere, it should be trialled again with a wider sample of government and industry stakeholders, and with a wide sample of community representatives (rather than being done by the researchers).

TABLE 15. Methodological framework for the identification of contributions of professional fishing to community wellbeing

Dimensions of community wellbeing	Contributions of the NSW wild-catch fishing industry		Indicators	Methods
A resilient local economy	Material	Primary economic impact through direct revenue and business profitability	GVP	Analysis of catch and price data
			Business profitability	Economic questionnaire
		Secondary economic impacts (or multipliers) to regional economies through relationships with service industries providing inputs for professional fishing	Regional inputs (multipliers)	Input/output analysis
			Investments	Qualitative interviews
	Relational	Interactions between the professional fishing industry and the post-harvest sector	Value of the secondary (post-harvest) sector	Catch and price data – DPI SFM
			Post-harvest supply chain characteristics	Qualitative interviews
			Importance of the NSW wild-catch industry to the secondary (post-harvest) sector	Social questionnaire – fish merchants
		Interactions between the professional fishing industry and the tourism sector	Professional fishing tourism products	Qualitative interviews Social questionnaire – coastal communities
			Importance of the NSW wild-catch industry to the NSW tourism sector	Social questionnaire – tourism and hospitality businesses
		Interactions between the professional fishing industry and the recreational fishing sector	Comparing the value of the NSW recreational and professional fishing sectors	Social questionnaire – coastal communities Qualitative interviews
			Value of NSW wild-caught bait market	Catch and price data – DPI SFM
	Subjective	Level of community support and understanding of the economic contributions of the fishing sector	Beliefs about economic importance of the industry (including amongst recreational fishers)	Social questionnaire – coastal communities

Community health and safety	Material	Contributions to food security and the nutritional needs of local communities	Purchasing patterns – local seafood	Social questionnaire – community and fish merchants
			Seafood preferences – local seafood	
		Contributions to community safety through involvement in maritime search and rescue operations	Rescues and maritime safety incidences	Qualitative interviews
	Relational	Channels through which consumers access the products supplied by the NSW industry	Purchasing channels – local seafood	Social questionnaire – community and fish merchants
	Subjective	The level of importance the community puts on the provision of local product by a local industry for health and nutrition	Beliefs about importance of producing local seafood for community consumption	Social questionnaire – coastal communities
		Contributions to Indigenous mental and physical health and wellbeing needs	Beliefs relating to role of professional fishing in Indigenous communities	Qualitative interviews Literature review
Education and knowledge generation	Material	Formal training and learning opportunities provided by the professional fishing industry	Education and training levels and opportunities for informal learning in learning to be a fisher, including: > Fishing practices > Boat handling > Food handling > Regulatory knowledge > Environmental knowledge > Physical and mental strength/preparedness > Etiquette and 'unwritten laws'	Social questionnaire – fish merchants Qualitative interviews
	Relational	Social learning and informal knowledge transfer		
		Contributions to community knowledge, especially environmental knowledge	Community and sector based interest in 'fisher knowledge', including: > Researchers/ managers > Indigenous communities > Recreational fishers and the general public	Qualitative interviews
	Subjective	Levels of trust and respect for the knowledge and skills of the fishing industry (social licence)		
A healthy environment	Material	Practising sustainable and environmentally friendly fishing	Sustainability assessment of the fishing industry	Literature review Qualitative interviews
		Involvement of the industry in stewardships activities	Involvement in environmental stewardship activities	Qualitative interviews
	Relational	The role of the NSW fishing industry in wider environmental management networks	Involvement in environmental management programs and committees	Qualitative interviews Social questionnaire – fish merchants
	Subjective	The level of trust in the fishing industry to act in a sustainable manner	Community trust in industry/ social licence	Social questionnaire – community

Integrated, culturally diverse and vibrant communities	Material	Contributions of the NSW wild-catch industry to the needs of a diverse community	Cultural significance of NSW seafood products	Qualitative interviews Social questionnaire – fish merchants
			Role of the fishing industry in providing opportunities for different socio-economic and cultural groups	
		Involvement in citizenship activities and community events	Contributions to cultural events	
			Sponsorship and donations	
	Relational	Role of the NSW Industry in building and maintaining social networks (formal and informal) in local communities (social capital)	Contributions to social capital – bridging, bonding and linking	Qualitative interviews Social questionnaire – fish merchants
	Subjective	Community awareness and beliefs in relation to the importance of the services provided by the fishing industry for community life	Importance of the role of the industry in community life	Qualitative interviews Social questionnaire – community
			Importance of seafood for community celebrations	
Cultural heritage and community identity	Material	Contributions to the history of NSW coastal towns/regions	Historical role of the industry in regional growth and formation	Literature review Qualitative interviews
			Contributions to cultural heritage (eg infrastructure or artefacts)	
	Relational	Contributions to cultural and community identity	Historical migration patterns associated with fishing	Literature review Qualitative interviews
			Historical role of fishing in Indigenous communities	
			Community identification with fishing heritage and notion of 'fishing villages'	
	Subjective	Importance to the community of the contributions of the industry to a shared sense of community identity and to local cultural heritage	Levels of concern over loss of identity associated with decline in industry significance	Social questionnaire - community
Leisure and recreation	Material	Contributions of the fishing industry to community recreation	Contributions of infrastructure for recreational users	Qualitative interviews Social questionnaire – fish merchants
			Contributions of bait for recreational fishing.	Qualitative interviews Social questionnaire – community and fish merchants
	Relational	Social connections and interactions between the wild-catch industry and recreational users	Contributions of fishing knowledge to recreational boaters and fishers.	Qualitative interviews
	Subjective	The level of importance recreational users put in the provision of local services and infrastructure by the fishing industry	Importance of local bait to recreational users	Social questionnaire - community

4. RESULTS AND DISCUSSION

This chapter is structured according to the seven identified 'dimensions of community wellbeing'. The results of our investigations into industry contributions towards each of these dimensions is outlined, and where necessary subdivided according to the methods used to gather the appropriate data (i.e. social questionnaires, interviews or economic questionnaire). Each section also contains a discussion of the findings of the project specific to each 'dimension of wellbeing'. A broader analysis of the project findings overall is contained in Section 5.

4.1 A RESILIENT LOCAL ECONOMY

In government statistics showing the value of agricultural and fisheries production, the Gross Value of Production (GVP) is estimated from the fish catch and first point of sale data from Sydney Fish Market. In the absence of other 'economic' information, the GVP is used as a headline measure of economic activity. This measure, however, fails to recognise the contributions the industry makes to the wider economy through its relationships with other businesses that sell goods and services to NSW professional fishers and those that market the products they produce (the post-harvest sector). The Project examined both these relationships primarily through the industry-wide economic questionnaire and the analysis of existing catch and price data sourced from the DPI and the SFM. The social questionnaires and fieldwork interviews also uncovered a range of additional social and economic relationships between the industry and other sections of NSW local economies. Table 16 outlines the key indicators and methods used to measure each of the identified contributions to a resilient local economy.

TABLE 16. Indicators and methods used to investigate the contributions of professional fishing to a resilient local economy

Contributions of the NSW wild-catch fishing industry		Indicator	Methods
Material	Primary economic impact through direct revenue and business profitability	GVP	Analysis of catch and price data Economic questionnaire Input/output analysis Qualitative interviews
		Business profitability	
	Secondary economic impacts (or multipliers) to regional economies through relationships with service industries providing inputs for professional fishing	Regional inputs (multipliers)	
		Investments	
Relational	Interactions between the professional fishing industry and the post-harvest sector	Value of the secondary (post-harvest) sector	Catch and price data – DPI SFM Qualitative interviews Social questionnaire – fish merchants
		Post-harvest supply chain characteristics	
		Importance of the NSW wild-catch industry to the secondary (post-harvest) sector	
	Interactions between the professional fishing industry and the tourism sector	Professional fishing tourism products	Qualitative interviews Social questionnaire – coastal communities
		Importance of the NSW wild-catch industry to the NSW tourism sector	Social questionnaire – Tourism and hospitality businesses
	Interactions between the professional fishing industry and the recreational fishing sector	Comparing the value of the NSW recreational and professional fishing sectors	Social questionnaire – coastal communities Qualitative interviews
		Value of NSW wild caught bait market	Catch and price data – DPI SFM
Subjective	Level of community support and understanding of the economic contributions of the fishing sector	Beliefs about economic importance of the industry (including amongst recreational fishers)	Social questionnaire – coastal communities

4.1.1 Primary economic impact of the NSW wild-catch industry

The economic contribution to the fishing industry in NSW is made at various levels and can be measured by several economic indicators. In this section we report on two economic values: (i) the GVP and (ii) the estimated economic profit among fishing business operators. Both these measures relate to the revenue generated directly by the industry (primary production). They were examined through existing catch and price data obtained from the NSW DPI and the SFM and the economic questionnaire of NSW fishing businesses. Section (4.1.2) quantifies a third important economic value – the regional economic impact of wild-catch fishing in the NSW economy.

4.1.1.1 Gross Value of Production (GVP)

The gross value of production (GVP) is a revenue measure estimated from the available catch and price data and is often referred to a gross measure of the economic contributions of the wild-catch industry to the NSW economy. GVP relies on catch logbook and landings data from NSW DPI and then uses an estimated average price per species at the first point of sale using data from Sydney Fish Market. Thus the GVP is a production value at point of first sale for the wild-catch and does not include the secondary seafood sector (e.g. processors, wholesalers and retailers).

In the 2012–13 financial year the NSW catch was 12,332 tonnes and had a GVP of $81.7m (source NSW DPI data).

While the GVP is a measure of activity, it does not tell us the profitability of the producers or the regional importance of this activity to the NSW economy. For example, there are a range of general businesses in the community providing inputs and services to fishing businesses and these are measured through a regional economic approach, rather than by the GVP (see Section 4.1.2).

4.1.1.2 Fishing business profitability

The financial and economic survey of the operations of NSW fishing businesses was used to determine business profitability. The results are reported in Appendix 3. In interpreting the results, it is important to note the limited number of survey responses (57, of which 46 were used) and that the 4.8% of business responses had 10.5% of state-wide revenue, meaning the responding businesses had higher fishing activity than the non-responding businesses. This may impact the business profitability results to an unknown extent. The low response also means that the sample was not sufficient to complete an analysis of the performance of businesses in each fishery, but it did enable joint fishery results to be presented.

In the 2012–13 financial year the average businesses sampled in different fisheries had a –2.0% economic return to capital invested (Table 9). Economic returns were estimated at 10.1% in the sample of ocean trap and line and Rock Lobster (OTL/RL) businesses confirming anecdotal information of improved fishing in that year. The group of 16 estuary general and estuary prawn trawl (EG/EPT) businesses

had economic returns of –10.1% indicating they are not covering opportunity costs. The business sampled in estuary general, ocean trap and line and ocean haul (EG/OTL/OH) and those in ocean trap and line and ocean trawl (OTL and OT) had an economic return of 0.3%, slightly under a normal economic return. Given that a zero economic return means the business meets opportunity costs of labour, capital and includes recovered management costs, the sample results are showing acceptable economic performance, with lower results in the EG/EPT. The opportunity cost of capital follows ABARES value applied in fisheries surveys, a rate of 7% per year (George and New 2013). This exceeds the real interest rate that could be earned on an investment elsewhere and takes some account of investment risk in the fishing industry.

Some fishers with these endorsements indicated the annual environmental fluctuations in these fisheries may make these results an unreliable indication of the longer term profitability of these fisheries. Fisheries such as Estuary Prawn Trawl, for example, can exhibit highly variable catch levels from year to year given its reliance on adequate rainfall (see Section 4.1.1.3).

TABLE 17. Economic profitability of major NSW fisheries (2012–2103)

Fisheries	EG/OTL/ OH	EG & EPT	OTL & RL	OTL & OPT	Average vessel
Economic rate of return to capital	-0.29%	-10.08%	10.07%	-0.34%	-2.05%

The sampled businesses in this survey may indicate an improved level of economic performance in the industry, as seen in economic returns to capital relative to the previous economic surveys (Dominion 2002, 2003a,b, 2004, 2006), but the results are not strictly comparable by fishery. A similar study into business profitability conducted on behalf of the NSW DPI in 2015 (Ag.Econ.Plus et al., 2015) provided estimates made by imputation using past surveys and current information and indicated that ocean haul has positive economic returns in their survey period. There are again issues in comparing their results with the current study, but their modelling predicts lower economic returns across industry than were found in the current survey. All the surveys demonstrate, however, that the industry is continuing to experience relatively low levels of profitability across most fisheries. Section 4.1.1.3 contains an analysis of some of the factors that interview participants felt were influencing industry profitability.

The limited response rate means the results in the current study have an unknown amount of respondent bias, given these businesses showed more economic activity than the non-responding businesses. For example, it may be that better performing businesses had more motivation to reply to the survey than underperforming businesses, given the industry reform process which was running during the survey period. The extent of any bias is unknown, but it appears that the businesses responding may not be representative of all businesses in the NSW industry. The secondary sector was not part of the profitability survey though licenced fish receivers were contacted in the social questionnaires.

Influences on profitability

Our fieldwork interviews illustrated that those connected with the industry feel it is important to recognise the role of adaptability and flexibility in any measurements of material contributions to local economies. Questionnaires such as the one undertaken as part of this research capture a moment in time and are limited in their capacity to fully recognise the way economic contributions change and adjust to different environmental and market conditions. Many fishers discussed how economic contributions could fluctuate significantly, for example, in response to rainfall patterns from year to year. Our interviews therefore indicated that that fishing businesses needed to be flexible and able to diversify in response to these changing conditions. Examples of diversification strategies included fishers having licences across multiple fisheries, seeking alternative income streams from external work, or using fishing as a 'part time' or supplementary occupation (34% of fishers interviewed). This might mean, for example, that fishers concentrate on alternative income sources in lean fishing years, whilst capitalising on abundance in more successful years.

> **When I'm doing it tough, I feel for some of them because I know what happens within the fishing industry here. When I'm doing it tough (with) the money that I earn through the three money outlets or incomes that I've got, some of the fishermen must be doing it tough. Knowing full well that's their only income. August, September are the two hardest months of the year to make a living fishing. If you can make ends meet in August, September and carry on then the rest will look after itself.**
>
> *Fisher (091014_5) Clarence*

Another diversification strategy involved maintaining multiple endorsements or licences in different fisheries. A third of the fishers we interviewed discussed how they sought to guard against fickle environmental or market conditions by diversifying their fishing interests (34%).They indicated that this allowed them to respond to seasonal variations, including market, weather and environmental conditions, by targeting different species using different methods. One interviewee, a very successful estuary fisherman, said the ability to drop one fishery and pick up another in accordance with environmental and market conditions was the key to being successful in estuary fishing in the biological context of NSW.

> **You need to be able to pick and choose when you go and what you target too, what sort of fish you target and where and how. You need that versatility... A lot of fishermen own endorsements in a lot of different fisheries. They will go trap and line for a while. They will lobster fish in the lobster season. They will beach haul and then they might prawn when the prawns are running in the summer...**
>
> *Fisher (230415_3) Central Coast*

This is relevant to our understanding of the economic contributions of the industry because it demonstrates that economic contributions may fluctuate from season to season or year-to-year, and long term monitoring of business profitability is essential in order to fully understand trends over time. It also highlights the need

to develop management systems that cater for the ability of fishers to respond to changes in environmental and market conditions in order to build the resilience of the industry.

Attitudes toward profitability

There was some disquiet amongst fishers we interviewed as to whether business profitability was a fair measure of the success of their business – many maintained that they were comfortable with the livelihood that fishing afforded them and rejected external assessments of whether their businesses were 'viable'. In general, two main schools of thinking emerged from the interview data in relation to questions around profitability and business management, as outlined in Table 10. 'Group A' fishers were often larger operators, with wholesale or retail operations associated with their fishing business. While they still spoke with passion about their connection to fishing and the importance it has to their personal identity, they also placed a heavy emphasis on running a successful, profitable business. In general they specialised in one or two fisheries and sought to maximise the economic return for the species captured by value adding or seeking alternative market places to the SFM or co-operative system. They were more likely to be involved in high-volume fisheries that required extensive travel and often held multiple licences and/or operated several vessels. They were the most likely fishers to have multiple employees (including family members) and larger net worth. They represented approximately a third (33%) of the 85 licenced fishers we interviewed in the first stage of fieldwork.

'Group B' fishers often ran what they contended were successful businesses. When compared to the 'Group A' fishers above, however, these people appeared to prioritise some non-business aspects of fishing over making large profits or expanding their businesses. Their motivations included fishing as a 'way of life', a tradition connected to them and their families, and the opportunity to work autonomously, outdoors in nature. These fishers were more likely to be involved in multi-method fishing, often focusing on inshore fisheries such as estuary general and ocean haul. Many of these fishers emphasised the importance of maintaining diversity in their fishing operations to allow them to move from one fishery to the next on a seasonal basis or in response to weather or market conditions. 'Group B' fishers were the more likely to make use of the co-operative or SFM system to minimise the time and expense involved in marketing their own products, although some had begun to experiment with small-scale vertical integration (e.g. through selling at local farmers markets or direct to local restaurants). They represented approximately half (56%) of licenced fishers we interviewed in the first stage of fieldwork.

TABLE 18. Segmentation of fishers according to business models indicated in interviews

Group A fishers	Group B fishers
Involvement in single or limited number of fisheries (i.e. specialist fishers). Often focused on high-volume offshore fisheries such as purse-seine, ocean fish/prawn trawl, abalone or longline, although some generalist estuary fishers also fit in this category. Significant travel often involved. Value adding common often through own wholesaling or processing facilities. Multiple markets – markets selected according to optimum price, often outside the co-operative or SFM system.	Endorsements in multiple fisheries, especially in shore fisheries such as estuary general and ocean haul (i.e. generalist fishers). Limited or small scale vertical integration or value adding – usually market direct to co-operatives or SFM. More likely to be involved in 'part-time' or seasonal work outside the industry.

Barriers to profitability

There was considerable discussion among interviewees about the many barriers and challenges the industry currently faces. The NSW industry has been in an almost perpetual state of reform and review for over 30 years (See Section 4.6) as a result of historical over-allocation of the resource and in response to the evolution in our understanding of effective fisheries management. This has been an often painful process for industry, and the cumulative impact of these changes was noted by many interview participants. While it is beyond the scope of this research to investigate whether these changes are impacting the profitability of industry, they were noted by many interviewees as barriers constraining the industry and also limiting the economic benefits the industry can provide to its communities. The most commonly mentioned challenges related to regulatory impacts on the industry (66%). Regulatory barriers included the impacts of marine protected areas and recreational fishing havens on access to fishing grounds, but were also related to other aspect of fisheries management which inhibited the ability of fishers to work in a profitable, environmentally sustainable or safe manner. Closely related to these concerns over regulatory barriers was discussion around the current reform process (39%), with many participants expressing anger, distress or anxiety about the uncertainties the reform had created. The following quote illustrates some of the frustration felt by those within the industry over the latest round of industry reform:

> Bureaucrats can do a lot of things to you and it's not the amount of money, it's the little bits and the little bits and the little bits over the years, like over 25 years. You lose four or five different incomes, and all of a sudden the whole conglomerate changes... Now you're forced into little boxes where you've got a long-line endorsement, that's all you can do. You can go long-lining because you can't afford to do anything else because the levies are that high and you're shit scared if you don't go and catch it, that you won't get any future endorsements... So we went through all that process, the restricted fishery.

> Everyone that didn't make it was out. Everyone that was in, was in, beauty. Then restricted fishery changed to this share managed fishery we're into now. They said, right-o everything's good now. We've got a 10-year management plan in place, fisheries management strategies, you've done your EIS. We're only seven years into the plan, no, this isn't working. So I reckon the whole of DPI should be sacked because they've done 15 years of all this shit and put everyone through crap, and got rid of a lot of fishermen, and now they're saying, Oh no, it's not working.
>
> *Fisher (060515_2) South Coast*

The costs and expenses of maintaining a fishing business were commonly discussed by research participants (43%), along with the difficulties of managing a profitable business that is at the mercy of unpredictable weather conditions (32%). This view was particularly prevalent in the northern part of the state where difficult bar crossings have significant impacts on the ability of the fleet to access fishing grounds in certain weather conditions. Other challenges included competition from cheap imported products – seen by some respondents in the general public CATI questionnaire as inferior in quality (34%) – as well as concerns over how well the SFM market system serves fishers (27%).

4.1.2 Secondary economic impacts of the NSW wild-catch industry (multipliers)

The fieldwork interviews revealed the many different ways that fishers are making economic contributions to a range of other the businesses within their communities.

> Our dollars go a long way... I would replace one capital item every second year. Like I've got two boats, two trailers so our local boat dealer obviously gets both money for new – I've just bought a new trailer, last year I bought a new outboard motor. There's $3000 to $6000 a year of my money and he gets to service that equipment and my money goes through our local marine dealer here. He gets quite a lot of – about – I don't know – you'd have to ask him but probably 20 percent of his business is from the professional fishing industry.
>
> *Fisher (041114_2) Mid North coast*

The strength and importance of these relationships were explored through the economic questionnaire of fishing businesses as well as the social questionnaire of the general public. This analysis was supplemented by an investigation in the current levels of investment of fishers into their own businesses – a factor closely related to business profitability that greatly influences the potential of fishers to grow the economic multipliers related to their activities, and therefore their contributions to regional economies.

4.1.2.1 Regional economic analysis and economic multipliers

The estimation of regional economic benefits was undertaken by the regional development research organisation Western Research Institute (WRI). The economic information from the operational and financial data, which was collected

from the economic questionnaires distributed to all professional fishing operators, was used to generate regional expenditure estimates. The expenditure estimates were put into WRI's model of the NSW regional economy to calculate the economic impacts of professional fishing on regional coastal economies and at the NSW State level. Modelling was undertaken for the financial year 2012–13. The full results of this analysis can be found in Appendix 11.5. The output can be measured for the seven coastal areas in this study and then for the whole of NSW. Table 19a shows the initial and flow-on economic impacts of professional fishing on the total NSW economy, and in Table 19b the results of the regional economic analysis are presented for each regional area along the NSW coast.

This analysis found that at the NSW State level, the initial expenditure of $65.5m by professional fishing generated an initial direct output of $79.44m and then a flow-on of $139.8m of indirect output giving a total impact of $219.2m of economic output on the NSW economy, as reported in Table 19a.

TABLE 19A: The initial and flow-on economic impacts of professional fishing on the total NSW economy (Source: WRI, Appendix 5)

Expenditure by region ($65.5m)	Output ($m)	Value added ($m)	Household income ($m)	Employment (no.)
Initial	79.44	34.82	17.44	1000.1
Flow-on	139.77	70.03	33.40	402.8
Total impact	219.21	104.85	50.85	1402.9
Type II multiplier	2.76	3.01	2.92	1.4

In Table 19a the value added from the regional expenditure of professional fishing businesses adds a total of $105 million in value added (gross regional product, GRP), $51 million in additional household income and total full-time equivalent (FTE) employment of 1,403 jobs representing the sum of direct and indirect jobs.

The initial expenditure and total impact on the NSW economy can be related as a ratio referred to as a Type II multiplier. For example, for output, $291.21/$79.44 gives a Type II output multiplier of 2.76. The Type II multipliers for value added, household income and employment are 3.01, 2.92 and 1.4, respectively. These indicate the dimensions of multiplication in the general economy associated with the wild-catch production. The values of the multipliers were slightly higher than those previously estimated in South Coast studies (Tamblyn and Powell, 1988; Powell et al., 1988) and slightly lower than those estimated in the Northern Rivers study (Harrison 2010). This is consistent with the state-wide model being an average of sites with differing multipliers.

At the regional level, results from the economic modelling in Table 19b show the greatest increase in GRP in the Great Lakes – Hunter region($22.5m), followed by the Central Coast ($18.6m) and Clarence ($12.3m), with a total increase in GRP for all regions of $81.5 million.

TABLE 19B. The economic impacts of professional fishing on the respective regions (Source: WRI, Appendix 5).The whole NSW results cover all the areas and account for economic activity between areas, not calculated in each region or by adding those regions (the all regions column).

Regions	Far North Coast	Clarence	Mid North Coast	Great Lakes - Hunter	Central Coast	Illawarra	South Coast	All Regions	NSW
Initial expenditure ($m)	6.22	12.00	8.39	13.28	13.59	5.92	6.25	65.66	65.66
Output ($m)	11.87	26.35	19.34	42.06	41.50	15.53	14.16	170.81	219.21
Value Added ($m)	4.45	12.32	8.57	22.49	18.62	7.43	7.63	81.50	104.85
Household income ($m)	2.48	5.55	3.97	9.42	10.30	3.43	3.38	38.54	50.85
Employment (no.)	95	238	154	310	209	121	152	1,279	1,403

Household income had the highest impacts in the Central Coast ($10.3m), followed closely by Great Lakes –Hunter ($9.42m). The largest employment impacts were seen in the Great Lakes –Hunter (310), Clarence (238) and the Central Coast (209) regions, with a total of approximately 1,279 FTE jobs achieved across all regions and 1,403 when all NSW is considered.

4.1.2.2 Levels of Industry Investment

Past and current investments in the NSW wild-catch industry were identified from the economic survey. The economic survey asked about the assets held by fishing businesses and the age of these assets to assist with depreciation calculations. Of the 50 businesses with boats responding, there was only evidence of some businesses in the OTL/RL fishery category making capital investments. This reflected the security of the RL fishery management regime, with businesses also willing to take on higher levels of debt.

In other fisheries one survey respondent indicated that only two new boats of over $120,000 had entered the EPT fishery in the past decade, remarking that sales of second-hand boats were more common. Three businesses replying to the survey had substantial engine rebuilds of around $30,000 in the past five years and other businesses had purchased fishing nets (e.g. for hauling at around $125,000). Small capital expenditures on boat trailers up to $15,000 were more common. Other capital expenditure was on cool rooms and ice machines, with some of this possibly assisting fishers to sell in the secondary seafood sector.

In respect of interest and debt repayments, the survey information on debt asked for both capital expenditure and fishery access, such as licences or share purchases. Interest repayments were between $3,500 per annum for estuary fishing businesses and up to $16,250 per annum for OTL/Rock Lobster businesses

(Appendix 3 Table 3). Half of the fishing businesses responding to the survey had no debt, and comments with the survey confirmed a reluctance to go into debt in the current climate, with uncertainty expressed about reform and their future involvement in the fishery.

The survey results suggest the fishing businesses are spending a maintenance level of capital expenditure to keep vessels operating, but there were no signs of businesses borrowing to fund vessels or purchase shares for fishery access. The exception to this appeared to be in OTL/RL where the RL fishery had signs of businesses leasing quota, with little available for purchase, and with the capital value of quota increasing since the 2012–13 period.

Our social fieldwork interviews also indicated that current levels of uncertainty in the industry and low levels of profitability in some sectors are inhibiting investment. This is most clearly demonstrated by a reluctance of many within the industry to invest in expanding their businesses, maintaining or upgrading their vessels, or purchasing additional equipment. It is also demonstrated by the ageing of the workforce and a reluctance to encourage new entrants, including the next generation of long-established fishing families, to the industry. The project research team were made aware of several specific examples of fishers delaying investment, including comments about uncertainty given in the economic questionnaire.

4.1.3 Interactions between the professional fishing industry and the post-harvest sector

The economic questionnaire was able to measure the relationships between the wild-catch industry and the businesses that service it. Further analysis in to the post-harvest sector was required in order to evaluate the contributions of the industry to those businesses that sell the products supplied by NSW fishers. This includes retail and wholesale seafood stores, bait suppliers and the hospitality (restaurants and takeaway food) sector. These relationships were examined through an analysis of existing catch and price data supplied by the DPI, SFM and other co-operative and non-cooperative sources as well as the social questionnaire of fish merchants.

4.1.3.1 Value of the secondary (post-harvest) sector

The study was able to make estimates of the possible regional economic contribution of secondary seafood sector state-wide by using the wild-catch regional results and information from previous site specific regional economic studies. These are estimates based on imputation because accurate information on the secondary sector was not available. The previous studies involving regional economics and the wild-catch and seafood sector in NSW are by Tamblyn and Powell (1988); Powell et al. (1988); and Harrison (2010). Regional studies have been completed in other states (Econsearch 2013) and there are also international reviews (Kelsey et al. 2013). There are two scenarios presented in the NSW site-specific regional seafood studies. One is where fish are landed and have little processing (Tamblyn and Powell, 1988; Powell et al., 1988) and the other is where fish are further processed as in the Northern Rivers (Harrison 2010). In estimating the state-wide secondary sector estimates, we use the ratio of primary to secondary output in the

past studies to generate a low and a high imputed output value for the secondary sector (see Appendix 7). Table 20 indicates low and high estimates of the size of the secondary sector and associated jobs, and also estimates of the entire size of the wild-catch plus the secondary seafood sector in NSW.

TABLE 20. The regional primary catching sector with retail and processing estimates (low and high)

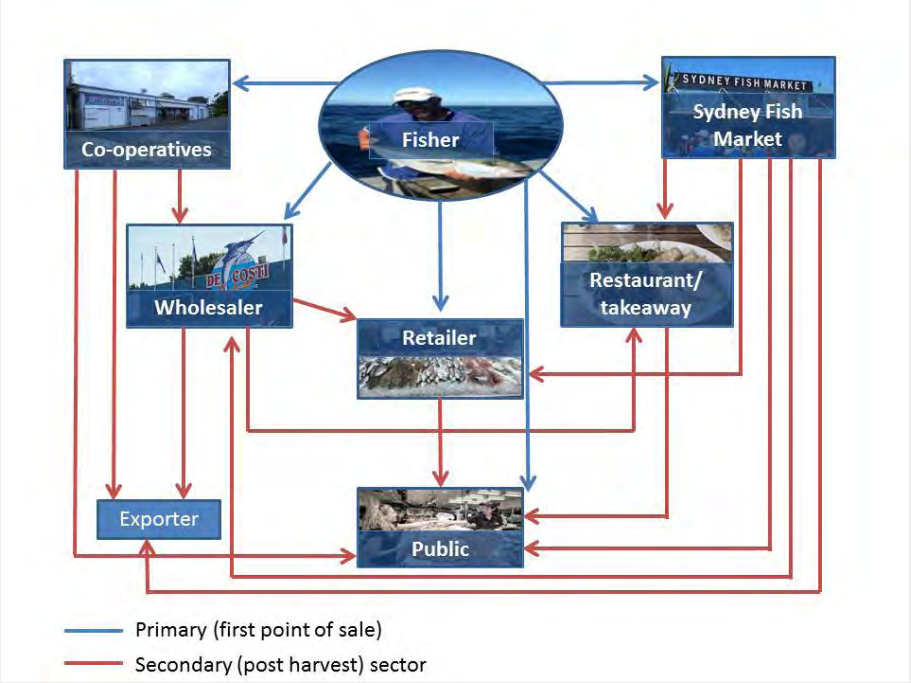
All NSW	Output ($m)	Added Value ($m)	Household Income ($m)	Employment (FTE)
Catching sector	219.10	104.50	50.90	1,402.90
Retail and processing (est.) low	217.03	110.60	66.50	1,887.90
Total (est.) low	**436.13**	**215.06**	**117.40**	**3,290.80**
Retail and processing (est.) high	282.14	143.73	86.45	2,454.24
Total (est.) high	**501.24**	**248.23**	**137.35**	**3,857.14**

The secondary sector estimates in Table 12 show that for the year 2012–13 the state-wide estimates of both the catching and secondary sector are between $436m and $501m for output, between $215m and $248m for added value, and between $117m and $137m for household income. The sectors employ a total of between 3,291 and 3,857 FTE jobs across NSW, which would translate into many more part-time and casual jobs among as seen across the fishing and secondary industries in NSW. These estimates do not include aquaculture.

4.1.3.2 Post-harvest supply chain characteristics

Analysis of the supply chain for seafood products in NSW reveals that historical patterns of supply – whereby fishers traded exclusively with the SFM, either through their local co-operative or directly – have now evolved into increasingly complex networks in which fishers may pursue a variety of markets. NSW fishers determine on a day-to-day basis whether to sell their product to local people directly (side of road, back of boat, farmers markets), local retail outlets, restaurants or tackle shops (bait supply) or to send it through co-operatives or direct to the SFM. The fishers we interviewed have complex networks of relationships with exporters, wholesalers, retailers, freight companies and members of the community (see Figure 7).

FIGURE 7. Conceptual diagram of the NSW supply chain



The decisions they make about how they market and sell their catches is influenced by these relationships as well as by personal skills and interest in marketing activities, price, expenses, transport logistics, the amount of product on the market, the condition of the product and the species they have landed. Often a single catch will go to a variety of markets. Small quantities may be sold directly to local markets (for example, to the general public, retailers and restaurants), with the bulk of the catch then being sent to wholesalers or the SFM. This allowed the fishers we interviewed to spread their risks from the often unpredictable auction system of the SFM.

> Regardless of what they are in Sydney, whether they're fifty cents a kilo or three dollars a kilo, he's still getting his two dollars a kilo for his Blackfish locally. So, one lot of guys are just swimming them out and not taking them, because if you send up a hundred kilo, there might be thirty kilo that don't sell, so it doesn't make it worthwhile sending them. So by having an outlet there as a fish shop, there's an economic value to him... and he targets that. He goes to work knowing that he's going to get a certain value.
>
> *Fisher (101214_1) Illawarra – Shoalhaven*

Accessing local markets was often seen by fishers as a more financially profitable but time intensive process – sometimes this may allow the fisher to obtain a premium price for their product. Yet on other occasions the sale price might be equivalent or lower than what they would achieve in the market. In these cases, considerable savings can be made by removing costs associated with transport, freight and consignment fees. Other fishers prefer to utilise the co-operative system to save the time and expense involved in direct marketing.

Sydney Fish Market

SFM has a key role to play in seafood marketing and we found for the financial year 2012–13 that up to 41% of NSW caught fish by volume and 46% by value were sold via SFM. SFM conducted a similar internal study for key species in 2011 and concluded the volume was 37% (personal communication, Gus Dannoun, SFM). This means that of the NSW catch at first sale in 2012–13 ($81.2m), approximately 60% of the value (about $48m) was remaining in the regions and being transformed into secondary sector revenues (Box 2). SFM is an important transparent market which can move high volumes of fish species and provide continuous market prices for the sale of different species, thus informing fishers and those involved in the secondary seafood sector.

Local or regional sales

A comparison was made of the NSW catch data and the SFM sales data to see which species tended to go, or not be sent, to SFM. The analysis and interviews with industry led us to identify eight species where most of the catch produced in the regions does not go to SFM. These species are subject to value adding through a range of inventory control measures (King prawns); changing of product form (Whiting); packaging as bait for recreational fishing wholesalers (Sardines/sprats and School prawns); high-end export markets (Mullet roe); and using low-value fish (Mullet) for professional fishing bait and local human consumption.

BOX 2. SPECIES REMAINING IN THE REGIONS

King prawns *(Melicertus latisulcatus & Melicertus plebejus)-*

- 430t (66% of total catch) sold outside Sydney Fish market (SFM).
- Often managed through inventory control, i.e. uses freezing to buy and hold product until prices are higher. Allows fishers in regional areas to receive more than net SFM price. Holding inventory is not costless, but can be advantageous
- Niche markets in live prawns are also an option.

School prawns *(Metapenaeus dalli & Metapenaeus macleayi)*

- 627t, (68% of total catch) traded outside SFM.
- Sold in roughly a 50:50 ratio between human consumption and bait for recreational fishers.
- The proportion used for retail, versus bait, may change with variations in the size of the School prawn (e.g. Pittwater large and Clarence smaller). Selling as bait in small packages, adds value and high margins at the wholesale and retail levels.

Sea Mullet *(Mugil cephalus)*

- Almost totally marketed outside of SFM (2,315t, 96%).
- The whole Mullet is used for fillets, roe is exported for a high price and entrails for professional and recreational fishing bait. There are also local markets for Mullet as a whole fish.
- Considerable seasonal employment generated through associated processing, wholesaling and retailing activity.

Eastern School Whiting *(Sillago flindersi)*

- 573t (63% of total catch) traded outside of SFM.
- Export market to Asia— sold as a breaded product in the domestic retail market, with benefits to processors, wholesalers and retailers.

Australian sardine *(Sardinops sagax)*

- 196t (86% of total catch) traded outside SFM.
- They benefit wholesalers, packers and retailers with producers in the north and south of the state.
- Demand for NSW Sardines as a "local" recreational fishing bait exceeds the supply, supplemented by Sardine/Pilchard like species from interstate sources.
- Also finding new niche markets for human consumption as smoked products, 'butterflied' in restaurants and as sashimi.

Whitebait *(Hyperlophus vittatus)*

- Otherwise known as Sandy sprat, (83t, 70% of total catch) has uses similar to the Sardine.

Australian salmon *(Arripis trutta)*

- 1,237t (66% of total catch) traded outside SFM. It is used for human consumption, professional fishing bait and some recreational fishing bait/berley.

Mulloway *(Argyrosomus japonicus)*

- 36t (47%) traded outside SFM.
- Growing in popularity as a table fish, sold in regional retail outlets.

4.1.3.3 Importance of the NSW wild-catch industry to the secondary (post-harvest) sector

The questionnaire given to the fish merchants indicated that the majority felt the NSW industry was important to the success of their businesses and they were concerned about potential job losses, loss of income and the ability of their business to survive if the industry were to be further restricted (Table 21). Locally caught products were consistently the highest sellers across these businesses, although the extent of this varied between study areas.

TABLE 21. Levels of concern amongst fish merchants about potential impacts of loss of local product to their business

Issue	Concerned	Not Concerned
Loss of availability of seafood to my business if allowable catch or fishing areas are (further) restricted	83%	16%
Loss of income to my business if allowable catch or fishing areas are (further) restricted	82%	18%
Potential job losses in my business if allowable catch or fishing areas are (further) restricted	81%	18%
The ability of my business to survive if allowable catch or fishing areas are (further) restricted	81%	19%

The majority of the fish merchants interviewed as part of the social questionnaires indicated that they purchased their local seafood from wholesalers (44%) or direct from local fishers (40%). A smaller yet still significant percentage of fish merchants purchased their seafood from the SFM (38%) or local co-operative (19%). These figures and our fieldwork interviews indicate that fish merchants rarely rely completely on local fishers to source their products. These businesses need to ensure continuity of supply and often aim to stock a range of products to meet the different tastes and budgets of their customers. This means they must source their products from a range of suppliers, with local fishers being one of several sources. The availability of a variety of products in relatively reliable and consistent quantities means that SFM and larger-scale wholesalers play a significant role in the supply chain by catering for the needs of both big and small operators across local, state-wide, national and international scales. In addition, the SFM plays an important role in benchmarking prices, giving fishers, fish merchants and consumers an insight into the current market value of a range of seafood products.

4.1.4 Interactions between the professional fishing industry and the tourism sector

The fieldwork interviews indicated a range of ways in which the wild-catch industry supports and enhances the economic potential of other important sectors within regional communities. One of the most significant of these relationships was the role the wild-catch seafood industry plays in local tourism markets. This concept was explored through the fieldwork interviews and social questionnaires of the general public and hospitality industry.

4.1.4.1 Professional fishing tourism products

The link between a local fishing industry and tourism was frequently mentioned in our fieldwork interviews. These discussions fell into two main categories. The first involved discussion of the contribution of the industry to tourism through the provision of sought-after seafood meals for visiting tourists. The second contribution discussed was the provision of an experience for visitors wishing to witness fishing practices or a working harbour. Many of our discussions and interviews with people involved in the tourism industry highlighted that tourism experience was an area which has to date received little attention. Increasingly sophisticated marketing approaches are beginning to emerge around local seafood supply as a tourism product through, for example, seafood inclusion in tourism 'food trails' that tap into the growth of 'food ethics' amongst consumers. The full potential of this market appears, however, to be relatively untapped in NSW at present.

> **There is a lot of people who wouldn't see that, particularly if you're from the larger city area. It's the same sort of thing as those farm stays and animal farms. If you live in the country, those things are pretty normal to you. You see them everyday. But there is also lots of people who don't see them every day and don't realise what exactly happens and how that process works. I think absolutely it would be something that would be a marketable tourism experience.**
>
> *Council tourism and marketing manager (031114_2) Mid North Coast*

In some regional areas there are some small-scale examples of the NSW fishing industry becoming part of a local tourism product, rather than being in conflict with it. These include the redevelopment of the Bermagui co-operative as tourism drawcard. Having a visible fishing industry is an important factor in this, with a number of interview participants discussing the importance of local professional fishing boats in the marketing strategies of seafood outlets. The presence of working boats in a harbour is seen as giving authenticity to the local seafood experience. Advertising that promotes product as fresh and local alongside the spectacle of fishing boats offloading catch provides a point of differentiation from suburban fish shops or restaurants. The central position given to the fishing vessels and port area in the upcoming redevelopment of the SFM is an example of the increasing recognition of the need to maintain a physical presence of the industry as a crucial part of the overall 'brand' of the SFM (see Box 3).

People come here to be able to have their lunch and watch the fishing boats come in, and fishermen unloading the catch, and just knowing it's a wholesale site gives a perception that the fish is fresher... it's so important to the authenticity of the site.

Sydney Fish Market representative (250315_1)

BOX 3. SYDNEY FISH MARKET

Sydney Fish Market (SFM) was established in 1945. In 1964 the State Government established the NSW Fish Authority and gave it control of the Fish Market system, establishing the main market in the current Pyrmont site the following year. From 1979 all co-operatives were required to sell through SFM if they wished to send product to the Sydney metropolitan area. These requirements remained in place until the late 1990s with deregulation of SFM. Today fishers and co-ops have diverse markets, but the SFM remains an important component of their overall sales. Our Project estimates that NSW fishers send approximately 46% of their product to SFM for sale each year. Similarly, NSW remains SFM's largest supply base with just under 56% of their product sourced from NSW. This equates to under 7.5 million kilograms of product or over $47 million in value.

SFM plays a key role in providing seafood to wholesalers, retailers and restaurants across the Sydney region and the broader NSW community. It uses a 'Dutch auction' system which is designed to move product quickly at the best possible price. Held every weekday at 5.30am the auction begins at the highest price and drops until a bid is made. This system sells around 1000 crates every hour, equating to an average of 50 to 55 tonnes of fresh seafood every day.

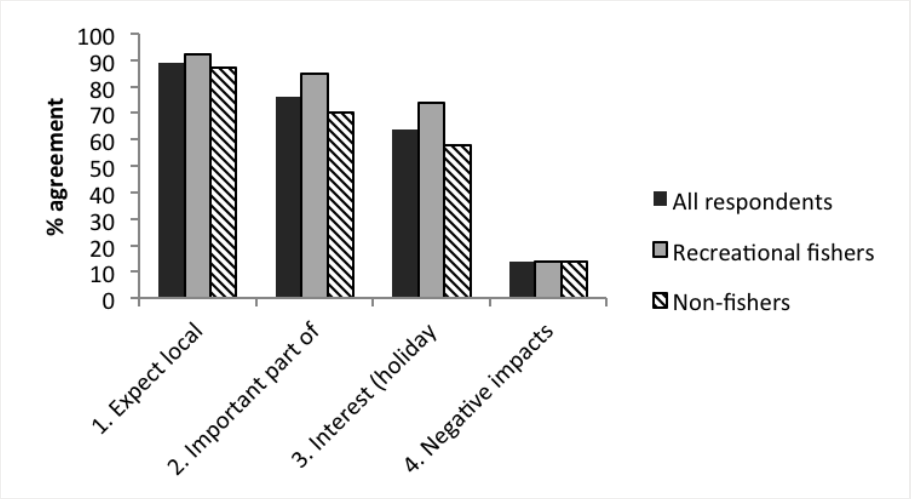
The Sydney Fish Market is a Sydney icon and a major tourist attraction within the Sydney area. In 2015 more than 3 million people visited SFM. This included more than 690 000 international tourists— equivalent to more than a fifth (22%) of international visitors to the Sydney region.

SFM provides a unique insight into the NSW fishing industry for visitors because they can witness all aspects of the supply chain, from the trawlers delivering their catch, to the wholesale and retail aspects of the industry. A major redevelopment of the site planned over the next few years has prioritised maintaining the integration of these core elements together in Blackwattle Bay.

The social questionnaire explored both aspects of contribution to the local tourism industry – the provision of seafood products to the local tourism market and the provision of a tourism experience. The results indicate that relationships between fishing and tourism are, at present, largely informal and not clearly understood by the fishing or tourism sectors. This relationship is a 'sleeping giant' in its potential to provide mutual and community-wide economic benefits. The community survey indicated that 89% of respondents expect to eat local seafood when they visit the NSW coast and 76% felt that eating local seafood was an important part of their coastal holiday experience (Figure 8). In addition, amongst the members of the general public surveyed, 64% of respondents indicated they would be interested in watching professional fishers at work while on holidays. This was especially strong amongst recreational fishers – 74% of whom were interested in watching professional fishers at work, compared with 58% of non-fishers. In addition, the

visibility of professional fishing is not a problem for tourism, with 82% of all respondents disagreeing with the statement that "seeing professional fishers at work detracts from my enjoyment of the coastal environment when on holiday".

FIGURE 8. General public questionnaire responses – percentage agreement with the following statements: 1) I expect to eat local fish or seafood from the local region when I visit the NSW coast; 2) Eating seafood caught or grown in the local region is an important part of my coastal holiday experience; 3) I would be interested in watching professional fishers at work when on a coastal holiday (e.g. unloading their catch) and 4) Seeing professional fishers at work detracts from my enjoyment of the coastal environment when on holiday.



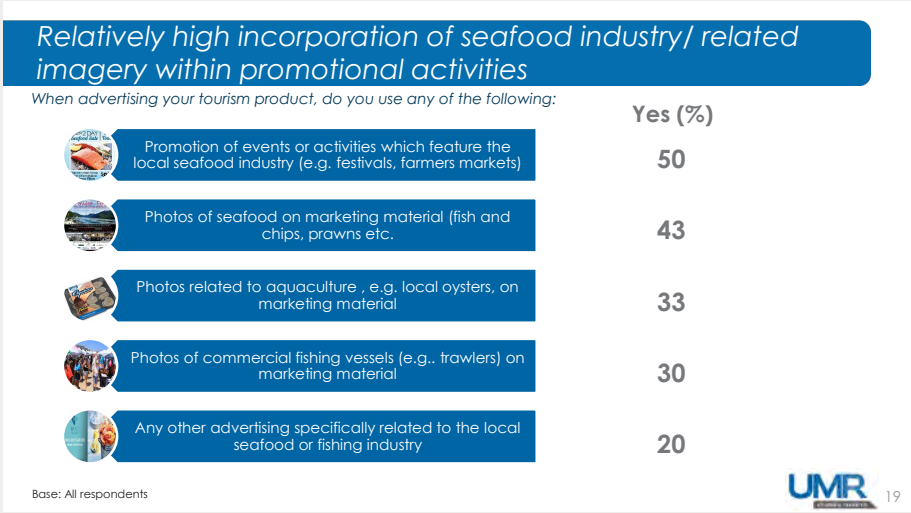
4.1.4.2 Importance of the NSW wild-catch industry to the NSW tourism sector

The results mentioned above were supported by the opinions of the tourism operators surveyed. All the businesses (100%) who responded to the questionnaire felt that visitors and tourists expect to eat local seafood when they visit the NSW coast, and 98% believed that eating seafood was an important part of their customers' holiday experience. They also strongly agreed that the history of the industry (83%) and the spectacle of watching fishers at work (75%) were important aspects of the tourism experience in their area.

Fifty percent of the tourism operators we surveyed had previously undertaken some form of promotional activity that featured the seafood industry (Figure 9). This included advertising local seafood-specific or fresh produce events, and utilising industry-related images in print and digital formats (e.g. videos, social media and blogs). The focus of the images used in marketing was mostly on seafood, as well as fishing vessels, indicating that a local seafood industry is already being used as part of the marketing strategies of local tourism and hospitality businesses. This is likely to be, at least in part, a reflection of the knowledge of these operators about what their customers are looking for when they visit the coast. Of the businesses

surveyed, 84% said they are 'often' or 'always' asked to provide advice to tourists on where to access local seafood, and 58% said they participate in cross-promotional activity with seafood outlets.

FIGURE 9. Tourism operator questionnaire responses – promotional practices



4.1.5 Interactions between the professional fishing industry and the recreational fishing sector

4.1.5.1 Comparing the value of the NSW recreational and professional fishing sectors

The relationship between the recreational and professional sectors was highlighted in many of the interviews conducted throughout the Project. Many interviewees noted that the two sectors are intertwined and interrelated in a variety of social and economic ways. Both sectors were considered to make important economic contributions to local communities and these contributions were often seen as interdependent. For example, the economic contributions of recreational fishers to local communities are enhanced when they purchase local bait from the wild-catch industry. Despite these synergies, public discourse often focuses on comparing the economic value of the two industries, underpinned by a contention that the recreational fishing industry is 'worth more' to local economies and therefore should be prioritised in resource allocation decision making. Attempting to compare the economic contributions between the two industries, however, feeds into a misleading understanding of the relationship between them.

From an economic perspective it is a complex task to make a direct comparison of the contribution of the two industries. The theory would compare the marginal net benefit of the last fish caught by each sector and use this as an indicator as to the direction of sectoral re-allocation (Lindner et al. 2006). There have been no empirical allocation studies between the two sectors in NSW, and the current study has not had this as an objective. Often a recreational fisher will have a higher

willingness to pay for one marginal fish, but the professional fisher is able to deliver fish in quantity to consumers who also value fish availability. Economic surveys on recreational expenditure are based on discretionary spending of individuals who, in the absence of recreational fishing, are likely to spend that same dollar elsewhere. Professional fishing revenue is primary production; the loss of this industry would mean the loss of net revenue from the economy and residual capital moving to other industries.

Some interview participants highlighted the relative consistency of economic contributions from primary production contributing to economic stability, contrasting this with the more seasonal and, on occasions, fickle tourism and recreational fishing markets. While many interview participants acknowledged a decline in the economic importance of professional fishing in their communities, there was still a sense that it provided relatively stable and ongoing employment opportunities and multiplier economic benefits that complemented and supported other industries in the region, including recreational fishing.

> **Economically I see the fishing industry as a baseline in our community. Whilst it is seasonal, generally year-to-year it's something that's been there for a hundred years providing a steady economic benefit to the town and the region. Other industries fluctuate and any region - whether it's in the city or country - needs baseline economic load for their economy to survive. The fishing industry provides that. It also has the benefit of being a sustainable fishery, not only from the point of view of its fishing practices, but also from a family point of view. So it's the type of business that can be handed down through families if they choose, which builds a sense of tradition in the town, and also gives those families a feeling of self-worth that they're a second, third or even fifth generation family business. So they've got that sense of history and self-worth, which is also extremely important in any industry, particularly in small towns.**
>
> *Secretary Chamber of Commerce and non-fishing business owner (050515_2) South Coast*

Recreational fishers are often featured in fishing, social and popular media as being at odds with the professional fishing industry. There are regular calls through these forums and direct lobbying of the NSW Government to remove professional fishing from a range of areas along the NSW coast, and this trend is consistent with other states where professional inshore fishing has been progressively removed in favour of recreational fishers (Queensland Government, 2015, Victoria State Government, 2015). This vision of conflict between the sectors was not borne out, however, in the general public questionnaire findings. In fact, these results suggest that compared to non-fishers recreational fishers are much more engaged and interested in the practices of the industry and are more likely to support their local fishers. Over a third (35%) of the general public sample identified as recreational fishers (mostly males aged between 40 and 59 years). These recreational fishers were:

- More engaged in the local vs. non-local sourcing of seafood issue and were much more likely to express an interest in and preference for locally sourced seafood. They were also significantly more likely to purchase fish from their local co-operative (see Section 4.2)

- Not significantly different from the wider public in terms of their level of support and trust in the industry (see Section 4.4)
- More likely to be interested in purchasing local seafood and watching professional fishers at work than non-fishers when on holidays (see Section 4.1.4 – Relationships with the tourism industry)
- More likely to show strong preferences for purchasing local bait (see Section 4.7).

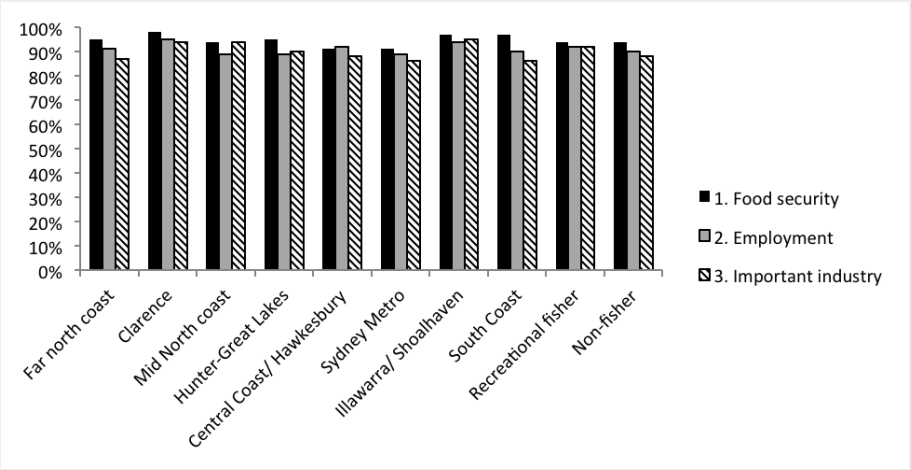
4.1.5.2 Value of the NSW wild-caught bait market

These results suggest that the economic benefits provided by the professional and recreational industries are not mutually exclusive. In fact they are mutually beneficial and this is most clearly demonstrated by the economic value of the NSW bait market. A 2013 survey of Recreational fishing in NSW estimated saltwater fishers spend $39 million per year on bait and burley (McIlgorm and Pepperell 2013). The local NSW wild-catch professional fishing industry is estimated to supply up to a quarter of this bait and burley to recreational fishers in NSW. As indicated in Box 2 bait species are amongst some of the most significant of the species traded outside the SFM, ensuring the returns remain in the region in which they are captured and processed. The results of the general public questionnaire, however, also suggest the recreational fishing community is a significant market for professional fisheries' seafood for human consumption, and that the majority of the recreational fishing community supports the ongoing existence of a sustainable professional fishing industry in coastal areas of NSW.

4.1.6 Community support and understanding of the economic contributions of the professional fishing sector

The extent to which the economic contributions of the NSW wild-catch industry are recognised and valued within local communities was explored through the general public questionnaire. The majority (90%) of respondents felt professional fishing is an important industry for NSW, and 90% believed that the industry provides important employment opportunities in NSW towns. In addition, 82% of respondents were concerned about potential job losses that might occur if further restrictions were placed on the industry. These responses were consistent across all the eight study areas and across both recreational fishers and non-fishers (see Figure 10).

FIGURE 10. General public questionnaire responses – percentage of respondents who agreed or strongly agreed with the following statements: 1) I believe it is important we produce our own seafood in NSW and reduce our reliance on food imports, 2) The professional fishing industry provides important employment opportunities in many NSW coastal towns and 3) Professional fishing is an important industry for NSW.



The employment provided by the NSW wild-catch industry is likely to be of stronger significance in some communities over others. Regional areas such the Clarence and sections of the South Coast have high levels of unemployment and limited employment opportunities, and in these areas the impact of the wild-catch industry is likely to be of high significance.

4.1.7 Discussion

The results of our analysis of the contribution of the wild-catch industry to resilient local economies suggest that the industry is an ongoing process of evolution. While experiencing a range of challenges from competition with other sectors, rising expenses and regulatory uncertainty, the industry remains an important part of local economies, both directly through the primary production of revenue and employment, and indirectly through its relationships with service industries, post-harvest businesses, and the tourism and recreational fishing sectors.

4.1.7.1 Strength and importance of economic contributions to regional and Indigenous communities

The Project indicates that professional fishing and the secondary sector have a likely output in 2012–13 of $436m – $501m, with estimates of between 3,291 and 3,857 full-time jobs across NSW. This output is distributed across the state, with the highest impacts in the Central Coast ($10.3m) followed closely by Great Lakes – Hunter ($9.42m). The largest employment impacts were seen in the Great Lakes – Hunter (310), Clarence (238) and the Central Coast (209) regions. The relative importance of these economic inputs is likely to vary across the state. For example,

smaller regional communities on the Mid-North Coast and Great Lakes – Hunter areas of NSW, including Nambucca, Taree and Forster – Tuncurry, and the South Coast, including Eden and parts of the Illawarra, are all ranked within the top 50 areas of social disadvantage within the state (Australian Bureau of Statistics, 2011). It is therefore likely that the industry would be of greater relative importance to these communities. Overall, the industry enjoys high levels of community support across all the regions surveyed, with nine out of ten NSW coastal residents agreeing that professional fishing is an important industry for NSW. The same proportion believe the industry provides important employment opportunities in NSW towns, and eight out of ten were concerned about potential job losses that might occur if further restrictions were placed on the industry. These results varied slightly between regions but remained consistently high across the state.

A higher-than-average level of reliance on industries such as professional fishing is especially apparent within the Indigenous community. A study by Schnierer and Egan (2012) identified 43 Indigenous people as having worked in NSW wild-catch fishing sector in the previous 15 years. Of the 34 Indigenous fishers who participated in that research, 70% had spent their entire working lives as professional fishers. Few participants were first-generation professional fishermen in their families, with estimates ranging up to seventh generation. Eighty-one percent of participants operated in a family-owned business and 54% inherited their professional fishing entitlement from family members. Eighty-four percent indicated that they fished mostly on their traditional Country, mostly in the estuary general and ocean haul fisheries. These fishers represent 2.6% of total fishing businesses in NSW and 3.1% of total shares held (Schnierer and Egan, 2012).

The benefits of professional fishing to these local Indigenous communities are substantial. In 2012–13 the national employment rate within Indigenous communities was 47.5%, much lower than the overall employment rate for Australians generally (72.1%). Unemployment rates are significantly higher for men with a Year 10 or below level of education – an education rate attained by nearly half of all Indigenous men of workforce age (Commonwealth of Australia, 2016). The importance of secure, intergenerational work opportunities for Indigenous people cannot therefore be overstated, particularly in regional communities where employment options are more limited.

4.1.7.2 Comparisons with other sectors – tourism and recreational fishing

One of the most significant findings of the Project was the highly complementary and interdependent social and economic relationships that currently exist between the NSW wild-catch sector and both regional tourism and recreational fishing. Both these relationships are under-studied and relatively unrecognised in the popular discourse that tends to portray professional fishing as being in conflict with recreational fishing and tourism. Both relationships also offer significant potential for growth, with many opportunities to develop new and innovative approaches to tapping into consumer interest in the wild-catch industry and demand for the product it supplies.

The community survey indicated that 89% of respondents expect to eat local seafood when they visit the NSW coast and 76% felt that eating local seafood was an important part of their coastal holiday experience. In addition, amongst the members of the general public surveyed, 64% of respondents indicated they would be interested in watching professional fishers at work while on holidays. This was especially strong amongst recreational fishers – 74% of who were interested in watching professional fishers at work compared with 58% of non-fishers. The interviews revealed some local examples of tourism and hospitality operators tapping into this market potential. Presently, however, relationships between the two industries are largely informal, and there is capacity for this to be built further for mutual benefit. This would be necessary at all the geographic and jurisdiction scales – local connections between the tourism and fishing industries would facilitate professional relationships between fishers and hospitality businesses, as well as assisting to improve social licence concerns and attract additional tourism dollars. Regional and state government agencies seeking to foster regional development may also benefit from closer working relationships between the tourism and fishing industries, as well as the agencies that manage them.

Economic comparisons between the recreational and professional wild-catch sector are problematic for a number of methodological and ethical reasons. Perhaps most significant is the failure of comparisons of this nature to recognise the high degree of economic interdependency that exists between the two sectors. The revenue generated through the wild-catch industry directly supports and sustains the NSW recreational fishing industry through the provision of bait products, especially Sardines (Pilchards) and School prawns. These two high-value and high-volume bait products are largely traded outside the SFM system, ensuring the profits from secondary value adding may benefit regional areas. While our investigation quantifies the extent to which the NSW wild-catch industry contributes to recreational bait sales, analysis of catch data indicates that it may account for up to a quarter of the $39 million spent on bait and burley by recreational fishers in NSW each year (McIlgorm and Pepperell 2013).

The Project also revealed that recreational fishers are much more engaged in questions around seafood quality and provenance than non-fishers and therefore are more likely to support their local industry, especially their local co-operatives, when purchasing seafood products. They were also significantly more likely to be interested in purchasing local seafood and watching professional fishers at work than non-fishers when on holidays, suggesting that efforts to market the seafood industry as a tourism product may benefit from targeted campaigns amongst the recreational fishing community. These findings also suggest that arguments that pit recreational against professional in the fight for the tourism dollar are likely to be counterproductive to the interests of both groups, and there is a failure to recognise the complexity of factors that drive tourists to visit regional NSW communities. For example, these results suggest that recreational fishers are rarely likely to be 'purely' recreational fishing tourists. Recreational fishing is one of range of activities that visitors might undertake when on holidays and for a large proportion of them these activities are also likely to include eating local seafood at restaurants and takeaway food shops or purchasing prawns or other seafood products from the local co-operative or fish retailer.

4.1.7.3 Industry resilience and innovation in the face of challenges

This Project has revealed for the first time in NSW the ways in which the wild-catch industry relates to a range of other sectors in local economies. It has also uncovered the potentially significant opportunities to grow and develop these relationships in order to deliver benefits across all sectors and the community as a whole. This could be achieved by the fishing industry forging stronger relationships with local and regional tourism bodies and businesses and tapping into consumer and tourism demand for local product and local experiences that showcase the industry to visitors. The ability of the industry to better capitalise on the future potential for maximising and enhancing their economic contributions is currently constrained by a number of cultural and regulatory barriers. These include difficulties in accessing and marketing fresh local seafood to local consumers as well as tourists.

Since deregulation of the co-operative system in the 1990s there is no longer any regulatory requirement for fishers or co-operatives to supply their product to SFM. However, new direct supply chains to local markets have not been created in all locations, and for a range of social and economic reasons some fishers still prefer to sell their entire product to SFM rather than market some of their own catch locally. Supplies depend on the weather and other environmental conditions, so marketing can be complex, and some fishers are not interested in or do not have the right skills for this aspect of the seafood business. The lack of consistency of supply of wild-catch product is seen as a problem for some hospitality businesses, and it also makes it difficult to plan tourism experiences such as watching an unloading vessels in port. Workplace health and safety restrictions have required many wharves to restrict the extent to which the public can view and interact with fishers at work.

These challenges are not insurmountable, however, and point to a potential source of diversification of professional interests for co-operatives, individual fishing businesses and the SFM. Our research revealed a number of examples of 'early adoption' of a new approach to growing the value of the NSW wild-catch industry, which have developed in response to changing market and regulatory conditions. These have largely been led by the 'Group A' fishers outlined in Section 5.1.1.3 but have also between increasingly recognised as a viable alternative for 'Group B' fishers wishing to maximise their returns.

Since deregulation of the seafood marketing system in the mid-1990s there has been a gradual reduction in the amount of NSW fish catch being sent to SFM as alternative marketing pathways develop. Co-operatives have been caught in the middle of these changes, with some adapting better than others. The Project has examined the available data and found that changes in marketing have led to innovation and vertical integration in the seafood industry in the regions, with more fish being sold from near their place of production consequent greater regional benefits. The industry has noted these opportunities, and many fishers seek to gain more than the SFM price net of freight and commissions from local fish buyers. Others in the catching sector have vertically integrated to gain some of what has

traditionally been the margin of the secondary sector (the processors, wholesalers and retail). The overall economic change has been in the distribution of secondary sector revenues, with more revenues gradually accruing to the seafood sector in the regions, while retailers in Sydney presumably have substituted lost NSW product from other areas in Australia or from imports.

The use of the GVP measure based on logbook catches and SFM prices still has a role for estimating the revenue attributable to the catch sector (landed price), which is sought by government for statistical purposes. However, it is apparent that more of the secondary sector value is staying in the regions and the NSW government needs to be aware of this and of the economic benefits accruing to fishers who can benefit from vertical integration. Obtaining some of the secondary price margin can help the viability of fishing businesses.

We predict this innovation and integration will increase as fishers seek to gain the maximum return from their fish and, where possible, reduce efficiency losses from transport costs and commissions. Niche marketing opportunities for locally produced fish are also likely to increase in order to meet the demands of health conscious consumers and tourists seeking locally produced seafood, and this is an area where regions can benefit from strategic seafood marketing to add value. It should be noted that 'Group A' fishers are the early adopters in this area and additional support and advice may be required to facilitate involvement of 'Group B' fishers.

4.2 COMMUNITY HEALTH AND SAFETY

Table 22 outlines the main indicators and methods used to investigate the NSW professional fishing industry contributions to community health and safety.

TABLE 22. Indicators and methods used to investigate the contributions of professional fishing to community health and safety

Contributions of the NSW wild-catch fishing industry		Indicator	Methods
Material	Contributions to food security and the nutritional needs of local communities	Purchasing patterns – local seafood	Social questionnaire – community and fish merchants
		Seafood preferences – local seafood	
	Contributions to community safety through involvement in maritime search and rescue operations.	Rescues and maritime safety incidences	Qualitative interviews
Relational	Channels through which consumers access the products supplied by the NSW industry	Purchasing channels – local seafood	Social questionnaire – community and fish merchants
Subjective	The level of importance the community puts on the provision of local product by a local industry for health and nutrition	Beliefs about importance of producing local seafood for community consumption	Social questionnaire – coastal communities
	Contributions to Indigenous mental and physical health and wellbeing	Beliefs relating to role of professional fishing in Indigenous communities	Qualitative interviews Literature review

4.2.1 Contributions to food security and the nutritional needs of local communities, including channels for accessing local seafood

The role of the NSW wild-catch industry as food producers (or food harvesters) is one of the most immediately obvious contributions that the industry makes to local communities. The contribution of the industry to the food and nutritional needs of local communities was one of the most frequently raised ideas within the fieldwork interviews (discussed by 68% of participants in the fieldwork interviews).

> Well, basically, it's a food resource. In my opinion. We're only collectors. We harvest the community resource for them, and supply it in the best possible condition that we can. Basically for [a] healthy diet... As a service for the community. We actually work for the community. They own the resource. We just harvest it for them.
>
> *Fisher (071014_2) Mid North Coast*

These discussions focused on the nutritional benefits of local product, which was perceived as fresher and of higher quality than other products available on the market. Related to this was discussion about the quality control measures put in place by the industry, partially in keeping with Safe Food standards, but also often undertaken as additional measures to improve the handling of the product (32%). Many of the fishers interviewed took pride in the quality of their product, which they attributed to the way they managed the process of catching and storing the fish, as well as the environmental characteristics of the areas they fish.

> I supply chefs with prawns and the green prawns and they want Hawkesbury River prawns. They want stuff that is fresh not frozen, not dipped in a chemical, they know where it comes from, they want to know it's sustainably fished and they want it and they're willing to pay for it.
>
> *Fisher (020615_1) Central Coast – Hawkesbury*

Some fishers indicated that they chose to manage their own catch rather than consigning it through the co-operative system due to a desire to maintain control of the way it is handled and managed. Many of these indicated that they believed they had built a name for themselves in their local markets or through Sydney Fish Market for the quality of their products.

> You definitely get a name... [S]napper for example, you would look at all the Snapper sent and there's a fair variation in price. It can vary from $12 to $7 a kilo, but most often I'm always at the top end of that price range just because the buyers know you, know your name... it's all about how you look after your fish... Because we catch the fish, when you're line fishing, quite often it's one at a time, so you can unhook that fish and put it straight in an ice slurry... It chills them to the core straight away, whereas if you've got to deal with a huge big net full of fish it can be an hour or two until those fish actually get in the ice slurry... We run a business that's not too small, but not too big in that way. You would want to make sure that your product is good and maximise [returns].
>
> *Fisher (230415_3) Central Coast – Hawkesbury*

Analysis of the economic questionnaire results indicated that of the fishers who responded, only 8.5% of their product was sold outside NSW. Analysis of DPI and SFM catch and price data also supports the conclusion that the majority of seafood products caught in NSW are sold in NSW (see Appendix 4). The social questionnaires explored the extent to which this product is valued and used by NSW consumers.

4.2.1.1 Purchasing patterns – local seafood

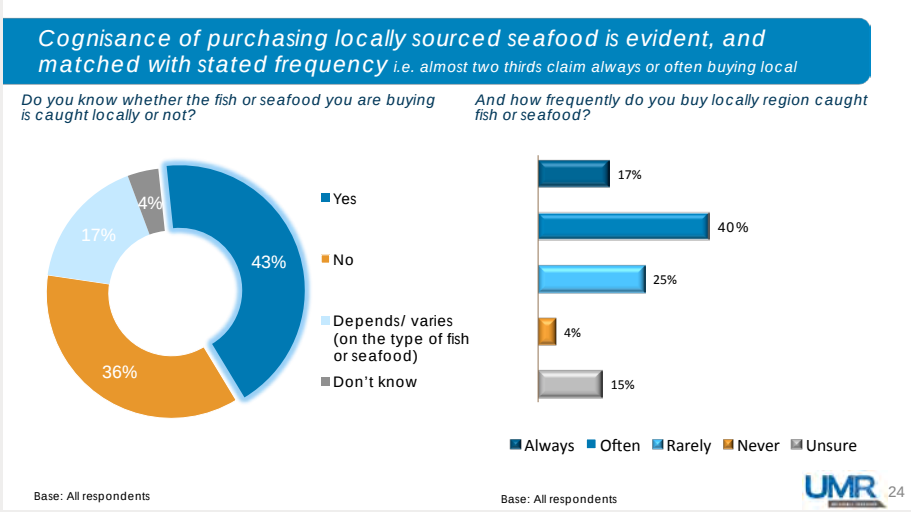
In order to examine NSW consumer purchasing patterns in relation to seafood products, the general public questionnaire first investigated the frequency of seafood purchases in general. It found that 86% of all participants in the general public questionnaire said they had purchased fish and seafood within the past three months. Most reported making purchases at least once a month (80%), with just over half of these (42%) doing so at least once a week. Only 5% said they never buy fish or seafood. In general, purchase incidence and frequency increased relative to

age, education and income. Products reported as purchased were predominantly fish (94%), then prawns (66%) and followed by other varieties of shellfish.

After establishing seafood consumption patterns the questionnaire went on to investigate the extent to which local wild-caught product was an important food source for local communities. This involved first establishing the way consumers think of 'local' product. Around half the respondents (51%) interpreted the term 'local' to mean their region (within a 100 km radius), and roughly equal amounts defined it as their immediate town or city (13%), whereas others saw it as more encompassing of their state (10%) or country (14%). Opinions were clear, however, with only 1% classifying themselves as unsure. Definitions did vary by location, with respondents in the Clarence most likely to think 'region' and those in Sydney most likely to think 'country'.

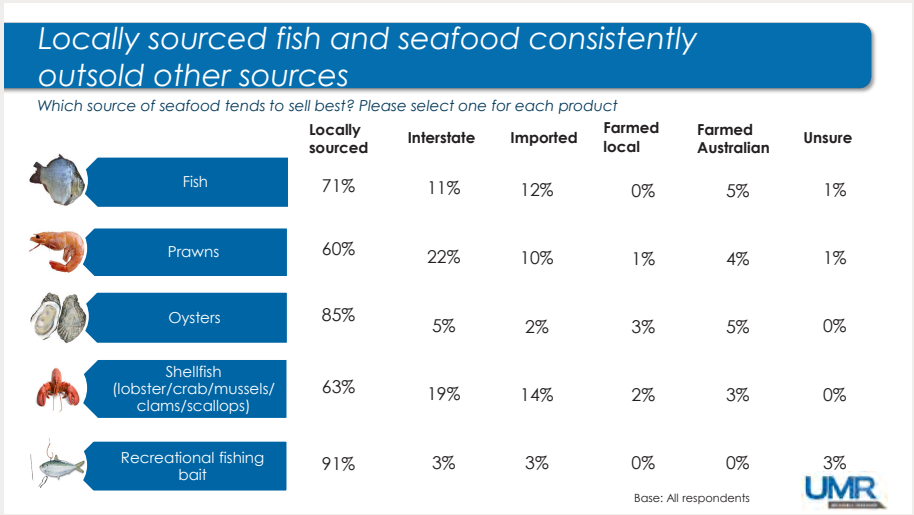
When directed to think of 'local' in terms of regional product (i.e. within a 100 km radius), nearly two-thirds (57%) of participants claimed that they always or often purchase locally sourced seafood. However, just over a third (36%) were not confident that they knew whether the seafood they purchase is indeed caught locally or not, and almost one fifth (17%) thought it dependent on the type of product purchased (Figure 11). Across the state, frequency of purchase of local product was highest in the study areas of Far North Coast, Clarence and Mid North Coast, and lowest in Sydney and Central Coast areas.

FIGURE 11. General public questionnaire – purchasing frequency of local product and extent of awareness of seafood provenance



The results of the fish merchants' questionnaire were very consistent with those found in the general public questionnaire. Fish merchants indicated that local product was consistently the highest-selling product across all product lines, underlining the importance of a local industry, not just for their businesses but also to meet consumer demand (Figure 12).

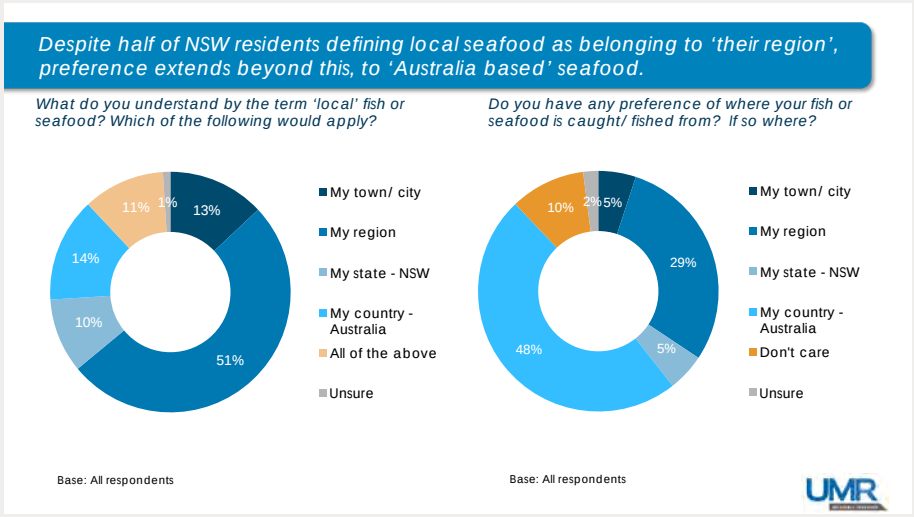
FIGURE 12. Fish merchant questionnaire responses – best-selling product lines.



4.2.1.2 Seafood preferences – local seafood

The questionnaire also asked about people's preferences in relation to local product. While the majority (48%) of respondents preferred Australian product, a large portion also displayed preferences for local product from either their region (29%) or town/city (5%) (Figure 12).

FIGURE 13. General public questionnaire – understanding of and purchasing preferences in relation to seafood provenance



These preferences were strongly influenced by the geographical location of the respondents, with residents of the more metropolitan areas (Sydney and Central Coast) significantly more likely to prefer Australian product and residents of the

Clarence significantly more likely to prefer regional product (Table 14). In addition, respondents were significantly more likely to purchase local product if they were aged 60 and over, had a strong preference for local or regional product, or identified as a recreational fisher.

TABLE 23. Preferences and consumer practices in relation to seafood provenance by study area. Significant difference highlighted in blue (significantly higher) and red (significantly lower)

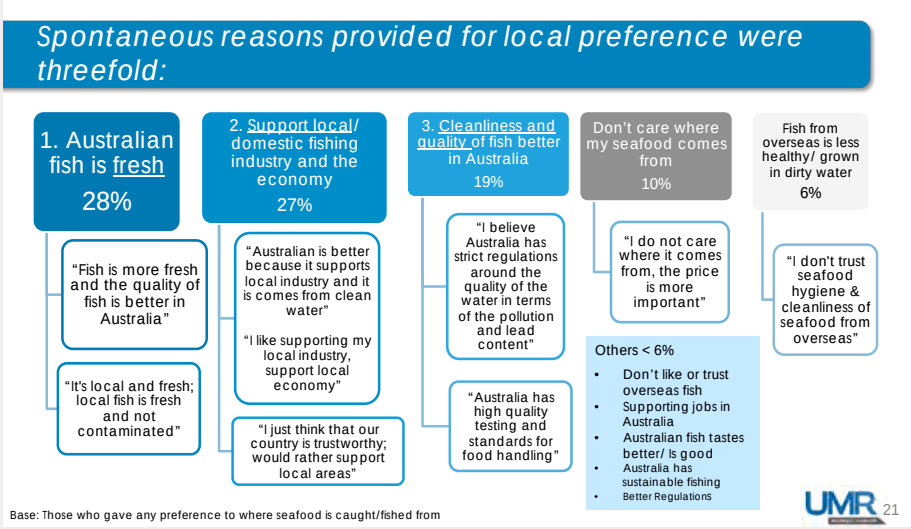
	Prefer Australian seafood (%)	Prefer local seafood (%)	Always purchase local (%)	Often purchase local (%)	Rarely purchase local (%)
NSW state	**48**	**29**	**17**	**40**	**25**
Far North Coast	39	38	26	45	21
Clarence	36	48	26	50	18
Mid North Coast	37	37	24	36	24
Great Lakes-Hunter	43	34	14	38	25
Central Coast	52	21	11	36	33
Sydney	66	11	10	31	27
Illawarra-Shoalhaven	52	27	15	41	26
South Coast	42	37	16	51	23
Recreational fisher	46	33	19	**44**	24

*The original interview question in survey referred to this category as 'regional', defined as within a 100 km radius.

Table 23 also compares purchasing preferences with purchasing behaviour across the regions. Overall it indicates that the number of respondents that preferred local seafood correlated most closely to purchase patterns of 'often'. Further work would be required by industry to determine the key barriers to growing this market (that is, to facilitate a shift from 'often' to 'always') and to attracting new customers. Some indications of the reasons why people would prefer to buy local seafood does provide some insights into this area.

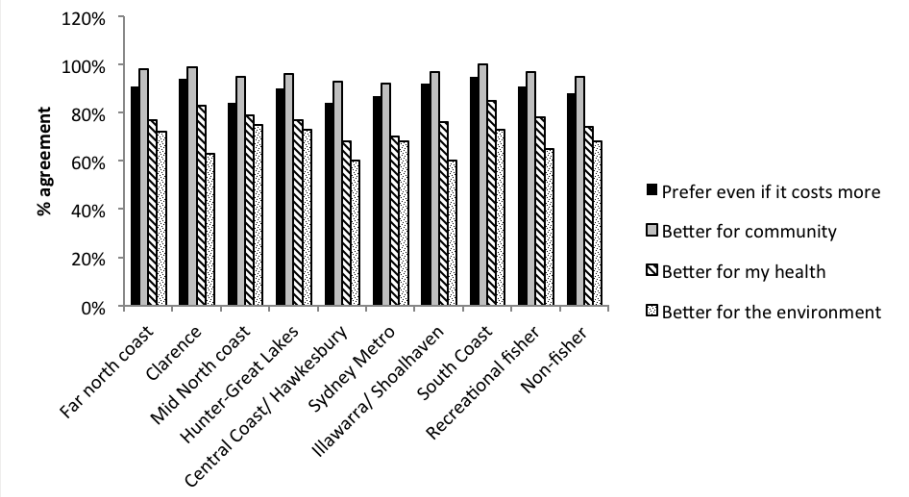
The reasons why people show preferences for local product were also explored. Unprompted, qualitative responses from the general public recorded by the CATI interviewers included associations of freshness, cleanliness and quality, and the willingness to 'support local' (Figure 14).

FIGURE 14. Unprompted responses to open ended question about provenance preferences



On prompting, the strength of the relational components of purchasing preferences became clear, with 96% of respondents indicating the desire to support their local community was a major motivation in purchasing local product (Figure 15). This was consistently strong across all the study areas but strongest in the regions to the north and south of Sydney (96–100%) and lowest in Sydney and the Central Coast (92–93%).

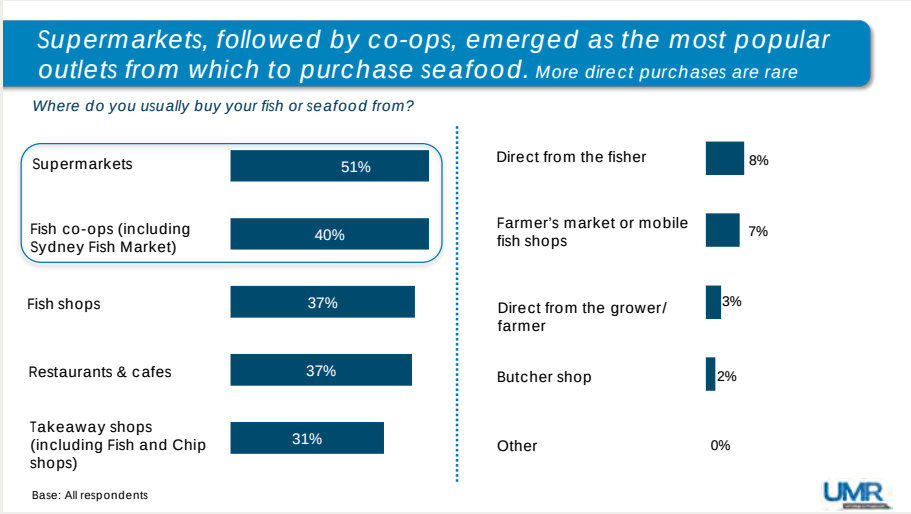
FIGURE 15. General public questionnaire responses – percentage agreement with the following statements: 1) I prefer local fish or seafood even if it costs more; 2) I prefer local fish or seafood because it is better for the local community; 3) I prefer local fish or seafood because it is better for my health and 4) I prefer local fish or seafood because it is better for the marine environment.



4.2.1.1 Purchasing channels – local seafood

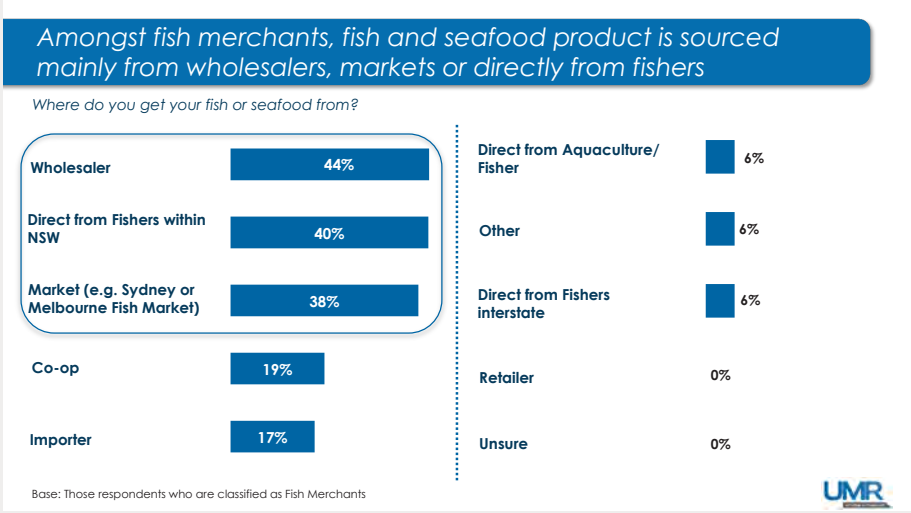
The general public questionnaire indicated that the outlets frequented most often by the general public for purchase of fish and seafood products included supermarkets (51%) and fish co-operatives (40%) (Figure 16). Only small numbers are purchasing directly from the fishers themselves (8%). Consumers in the Clarence and recreational fishers in general were significantly more likely to purchase their seafood from their local co-operative, while consumers in Sydney were more likely to purchase from fish shops. Consumers in the Great Lakes – Port Stephens – Hunter and Central Coast study areas were significantly more likely to purchase from the supermarket.

FIGURE 16. General public questionnaire – purchasing patterns in relation to outlets



Fish merchants primarily sourced their seafood products from wholesalers, direct sales from NSW fishers and the Sydney or Melbourne Fish Markets (Figure 17). This finding varied according to the primary business type. Co-operatives largely sourced their product direct from fishers. Other retailers and wholesalers obtained their product from a wider variety of sources, including direct from fishers, from the markets, wholesalers and to a lesser extent from co-operatives and importers.

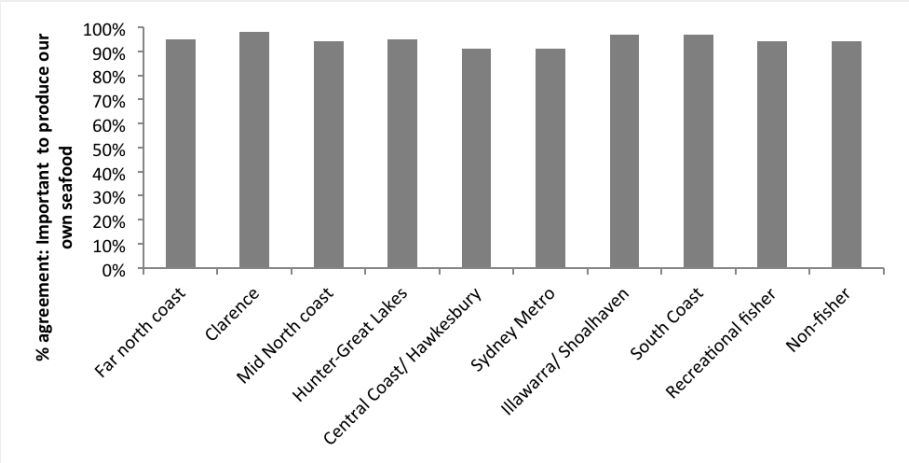
FIGURE 17. Fish merchant questionnaire responses – sources of seafood.



4.2.2 Community beliefs about importance of local seafood for community health and nutrition.

Despite the stronger preference for Australian product, there was almost universal agreement that the NSW industry is important for local food security, with 94% of respondents agreeing with the statement 'I believe it is important we produce our own seafood in NSW and reduce our reliance on food imports'. This was consistent across all regions and for recreational fishers (Figure 18).

FIGURE 18. Fish merchant questionnaire responses – sources of seafood.



In addition, respondents had high levels of interest in knowing where their seafood comes from – 37% were 'extremely interested' and 35% 'very interested'. This suggests a desire to be actively engaged in decision making about the source of their seafood based on their beliefs and preferences. As indicated in Figure 15, 76% of questionnaire respondents believed local seafood was better for their health.

4.2.3 Contributions to Indigenous mental and physical health and wellbeing

The primary tools for investigating the contributions of the NSW wild-catch industry to Indigenous health and nutrition were fieldwork interviews and a literature review. Consideration of Indigenous health issues in relation to the NSW wild-catch industry falls into three main categories. The first is the health and wellbeing benefits of employment and engagement in traditional practices on Country. The second relates to the nutritional benefits provided to a generally low income group by access to a ready, cheap and healthy source of protein. Finally, there are health and wellbeing benefits associated with the community connections facilitated and grown through the act of fishing together and sharing the catch amongst the community.

Access to traditional lands has been recognised as a determinant of health in both remote and urban contexts, with evidence suggesting that connection to Country strengthens self-esteem, self-worth, pride, cultural and spiritual connections and positive states of wellbeing (Kingsley et al., 2013). In addition, Indigenous Australian adults who live on homelands/traditional country are more likely to have no current long-term health condition when compared with those who do not recognise homelands, and they are less likely to report having a high/very high level of psychological distress (Australian Institute of Health and Welfare, 2015). There are also significant health benefits to Indigenous people by their maintaining a connection with their ancestral lands, family and communities and working in areas of natural resource management and use that involves nurturing and maintaining these connections (Australian Institute of Health and Welfare, 2015, Hunt, 2010).

Our identity as human beings remains tied to our land, to our cultural practices, our systems of authority and social control, our intellectual traditions, our concepts of spirituality, and to our systems of resources ownership and exchange. Destroy this relationship and you damage – sometimes irrevocably – individual human beings and their health (Anderson, 1996 cited in Australian Institute of Health and Welfare, 2015 p. 152).

Another important contribution provided to the Indigenous community through involvement in the industry is through the notion of 'cultural contributions', whereby Indigenous fishers share a proportion of their catch with their local community. Schnierer and Egan (2012) found that 90% of Indigenous fishers they surveyed gave some of their catch to their local Indigenous communities. Estimates ranged from 5-20% of annual catch, or an average of 9.8%. Those that said they did not share were largely in the restricted hand-gathering endorsements where the community members were able to fulfil their own needs (Schnierer and Egan, 2012). These

results were reflected in our own interviews when Indigenous fishers discussed their cultural obligations to share a portion of their catch with their community.

> **When we get an abundance of fish we take so much to the local community and share it with – around and then just drive around the mission and then back into town because there's so many Aboriginal relatives that live in town as well. We just go around to key family members that we know will pass it on to the rest of their families.**
>
> *Indigenous fisher (061114_7) Great Lakes – Hunter*

For those without a family or community member engaged in fishing, the non-Indigenous wild-catch industry provides ready access to a cheap, fresh food source of cultural significance and nutritional benefit. In particular, the cheaper, less popular species of fish such as Mullet *(Mugil cephalus)* and Luderick (*Girella tricuspidata)* are widely preferred by many Indigenous people.

> **They love blackfish [Luderick] and Mullet…That's their bush tucker. But if they didn't have the access to come here and buy it, there is no way they've got any means to go and catch it themselves, because they don't know how to do that anymore. So they buy a lot of bush tucker here and oysters. They love their oysters.**
>
> *Fish retailer (081014_3) Mid North Coast*

The most recent 'Closing the Gap' report found life expectancy for Indigenous Australians remains stubbornly low at 69.1 years for males and 73.7 years for females, a gap of 10.6 years for males and 9.5 years for females between Indigenous and non-Indigenous citizens (Commonwealth of Australia, 2016). Indigenous people living in coastal areas often report a decline in seafood consumption as being a critical factor in poor health. Indigenous professional fishers are therefore seen as important contributor to the health of local Indigenous communities through their provision of fresh seafood (Voyer et al., 2014)

> **That is the most healthiest thing that we've had, that we've got, because it's our natural food source. The Mullet and everything else that's in there, you just check with the doctors and everything what vitamins and everything in it, the oils and everything that it provides for, and they're only just finding out the vitamins or whatever are needed for the people, from the fish sources.**
>
> *Indigenous fisher (260315_2) South Coast*

There are complex family and cultural connections existing around food provision, preparation and consumption within Indigenous communities and these have strong relationships with health and wellbeing outcomes. For example, a study by Thompson and Gifford (2000) into the cultural and social influences on managing diabetes within a Melbourne Indigenous community found that a reduction in opportunities for men to contribute to the family meal decreased the strength of their family and cultural connections and made them more likely to avoid or ignore diagnoses of diabetes. This study also highlighted the importance placed on eating family food and participating in sport or other activities with family and community as activities that connect the community and protect individuals from

illness. However, these same factors also resulted in increased stresses as family members struggled with the pressure of fulfilling their obligations to their families and communities (Thompson and Gifford, 2000). All these findings are consistent with the stories of many Indigenous communities living on the NSW coast. The act of fishing plays a role not just in providing fish to eat, but it also maintains and strengthens family connections. There are strong expectations that catches will be shared amongst family and kin.

> **But it's part of our wellbeing, as well... I suppose it's like a lot of people meditate. To us, it's, I suppose, to some degree, our meditation. Getting out there with nature. Looking and seeing and observing, taking it in and learning. And it's about, you know, not just individuals, it's about the family. You come back with fish or what have you. Your family have got fish, and your extended family, they come around and you share it out.**
>
> *Indigenous fisher (170215_1) Far North Coast*

Community and family connections are also built and maintained by the act of going fishing. Traditionally the act of fishing – particularly beach haul fishing – was a community activity involving multiple generations and extended family groups. Current regulations restrict the ability of unlicensed fishers to participate in beach haul operations and are the source of additional pressure and stress of Indigenous professional fishers.

> **The other ones don't come down the beach so much, I think they're losing touch with their culture a little bit. A matter of fact, I think they see us as more of a link to their culture than some of their own people because we've had – well from when the Aboriginal people used to work in the crews on the beach, you know, quite a lot of them. There was an Aboriginal fellow that taught me how to fish, so they look at me as one of them. They're probably partially right.**
>
> *Fisher (non-Indigenous)(041114_3) Mid North Coast*

In addition, licences were often shared amongst family groups with multiple generations, brothers, cousins and uncles all involved in the fishing business in some capacity. A number of Indigenous fishers have stories of family breakdown and disputes between brothers or fathers and sons as the results of regulatory systems that require licences be held by individuals rather than shared. The role of Indigenous professional fishers in NSW therefore appears to be a highly valued, but also highly stressful vocation for those involved, particularly given the decline in the numbers of active fishers.

> **It's a community thing, and it is there for the community. Right?... It's a thing that I've missed, because, like I said, with all these regulations and rules and everything, I've missed that connection with my people... the thing of it is, these arseholes, these government departments... they don't know what they're doing... They're really screwing our lives up... That's the truth.**
>
> *Indigenous fisher (260315_2) South Coast*

4.2.4 Contributions to community safety through involvement in maritime search and rescue operations

Another significant contribution to community health and safety highlighted in the interviews was the role of fishers in search and rescue operations in local waterways. This was primarily investigated through fieldwork interviews. Of the fishers interviewed, 62% discussed their first-hand experiences of towing in vessels or vehicles that had run in to trouble, being involved in rescues of people they had come across by chance, or taking part in more coordinated search and rescue operations.

> I pulled four souls out of the water last year from an overturned boat; towed many, many more broken-down boats back to the ramp. Because of our presence on the water and because fish tend to run better in very, very bad weather, we tend to be out there and we tend to be the first responders when there is something goes wrong. Even in the case of it doesn't necessarily have to be people at risk, so boats breaking away from moorings and becoming a risk to other property as they're getting blown across the harbour. Usually after a big weather event, (we) do a lot of cleaning up around the bay... People love your presence on the water then.
>
> *Fisher (180914_1) Great Lakes – Hunter*

Stories like this ranged from the dramatic rescue of vessels at sea (including yachts rescued by Eden fishers during the notorious 1998 Sydney to Hobart Yacht Race) to the day-to-day assistance provided to stranded vessels that had run out of fuel or had engine failure on the state's many estuaries (see Box 4).

In addition, the interviewees discussed some of the barriers they had experienced in relation to maintaining this important community function, including the increasing bureaucratisation of the Volunteer Marine Rescue, insurance concerns, and the impact of increasing occupational health and safety requirements.

> [W]e were involved in one [incident] some time ago where we were called to help tow a boat off the end of the beach. We did have an unfortunate accident where a rope broke and a man had his hand injured, and we went through hell with WorkCover and the insurance company. That went for years... We were covered, yeah, but it was a nightmare. Stress over three years. Well, the fella who hurt his hand wasn't actually working. He came out on our boat just to help... He was just a passenger, and a rope broke and it ricocheted and hit his hand... So we're not that keen to help out in situations like that. They can get more professional people to do that sort of thing.
>
> *Fisher (200215_2) Clarence*

4.2.5 Discussion

All three social questionnaires indicated that consumers in regional areas support an overall finding that locally sourced seafood is an important source of food and nutrition within local communities, especially in regional areas where preferences and purchasing patterns indicate a strong consumer demand for these products.

While further investigation would be required to accurately determine the factors (such as price differentials) that influence consumer purchasing patterns, our analysis suggests that further growth of this market is at least partially inhibited by a lack of awareness amongst the public as to whether the products they are buying are locally caught. The strong reliance on local co-operatives for seafood sales indicates that these outlets are the premier locations for retail sales to those seeking out local product. It is likely that consumers are less aware of the provenance of the seafood they are buying when they purchase from other popular outlets such as supermarkets, fish shops, restaurants and takeaway food shops. Part of the challenge in addressing this lack of understanding may lie in improving traceability of local product through the supply chain, especially as it moves through wholesalers – the major source of product for most of the fish merchants surveyed.

In addition, the lack of a local industry large enough to service the Sydney and Central Coast markets, or the lack of awareness of the existence of a local industry in these areas, is a likely driver of the a lower level of interest in purchasing local or regional product in those areas. A potential opportunity for the NSW industry may lie in growing local brands in these metropolitan areas.

In regional areas the reasons people prefer local product provide important insights into how contributions to the food and nutrition of local communities could be further maximised. Tapping into the desire of consumers to support their local businesses and local economy may assist in growing local markets. This could be achieved by raising awareness within local communities of the people working in this industry and the role the industry plays in in local economies.

In relation to Indigenous health and wellbeing, the results of the qualitative fieldwork and literature review suggest that compartmentalising cultural fishing from other components of Indigenous health and wellbeing are contributing to a failure to adequately understand and address the complexity of the social determinants of Indigenous health. Although fisheries management measures tend to focus on almost exclusively on resource and ecosystem management, it is clear in the literature and through our interviews and discussions with Indigenous people that cultural fishing extends beyond the resource itself. The gathering and consumption of seafood is simultaneously a cultural, social, professional and recreational act. It is also intricately linked with improved health outcomes through improved nutrition and income as well as strengthening social connections and cultural bonds.

Finally, the role that the professional fishing industry has historically played, and continues to play, in being an on-water presence provides not just an invaluable service that has undoubtedly saved many lives. It also adds to the rich character of the industry as demonstrated in our interviews, with fishers recounting with humour and pathos the occasions in which they have been involved in rescues at sea.

BOX 4. STORIES OF SEARCH AND RESCUE BY PROFESSIONAL FISHERS

Their boat tipped, and as the tide came in, it came up through their toilet outflow, because it was draining into the river, and it filled the boat up with water, and neither of them could swim! So they were a bit stressed! So we rescued them in the middle of the night. They were still here in the morning. And a few weeks later, I got these two mugs in the mail from "The Two Mugs"!

Fisher 041214_3 Central Coast-Hawkesbury

If you see someone you don't just leave them there, you race over and get them out of the water. One day there I had two people and two dogs. The dogs were more trouble getting into the boat but, yeah, that happens all the time. I don't think I know a fisherman that wouldn't help rescue someone if they saw them in trouble.

Fisher 051114_2 Mid North Coast

It was a small boat – not even on a trailer. They came with it on the roof of the car, these people. And they was out of Port Kembla, about a quarter of a mile out. Two person, big persons. One threw (his fishing line) like this, and he fall in front! The other one, because the weight was on the other side...he fall in the water the other side. We went over there, pumped the water. "You're crazy!" I said. "You're crazy!" (laughs) They said, "We capsized!" Of course! Two people, over a hundred kilo each in a small dinghy like that! Anyhow, I took them inside Port Kembla. When they went over there, they grabbed the boat and put it on the roof of the car. Ridiculous! Ridiculous.

Fisher 060315_1 Illawarra-Shoalhaven

We were coming in just on dusk one night and... there are two old men on a tiny little boat upside down, a little sail boat. They'd been in the water since seven o'clock that morning. So they would have been dead. I took them ashore and there were people waiting for them at the sailing club by then, but they would have drowned for sure.

Fisher 061114_1 Great Lakes-Hunter

You know, our grandfather was a fisherman as well, as was his grandfather and his father, but they've done everything from rescue people out of the water to body recovery, which is pretty gruesome, but the thing we do the most is we retrieve stupid people who have done stupid things...One instance which sticks in my memory, it was about a 14 foot boat...and it had this big old two-stroke motor on and I think there was about two adults and about six children in it... no one had lifejackets and the southerly gale came up and I was coming home and I was having enough trouble in my 20 foot boat on my own without eight other people in it. Anyway, I see this light starting to flash me, it was in the night time, so went over and said, what's wrong? He said, the motor's broken down and we're taking on water. Okay, well you better get in here. So the next thing I had eight people in my boat and they were all as wet as a shag. So I took them home, towed their boat home, got home safely and they called the wife and she came out and brought the bus and picked everybody up. My mother went into our fishing clothes and she got them all, you know, nice clean fishing clothes and gave them some nice dry clothes to put on. They came back the next day and picked the boat up, said they were going to bring me a case of beer. I'm still very thirsty waiting for it... Then they didn't bring the clothes back, so I lost about eight sets of clothes.

Fisher 071114_1 Great Lakes-Hunter

4.3 EDUCATION AND KNOWLEDGE GENERATION

Table 24 outlines the main indicators and methods used to investigate the NSW professional fishing industry's contributions to education and knowledge generation.

TABLE 24. Indicators and methods used to investigate the contributions of professional fishing to education and knowledge generation

Contributions of the NSW wild-catch fishing industry		Indicator	Methods
Material	Formal training and learning opportunities provided by the professional fishing industry	Education and training levels and opportunities for informal learning in learning to be a fisher, including: > Fishing practices > Boat handling > Food handling > Regulatory knowledge > Environmental knowledge > Physical and mental strength/preparedness > Etiquette and 'unwritten laws'	Qualitative interviews Literature review
Relational	Social learning and informal knowledge transfer		Social questionnaire – fish merchants Qualitative interviews
	Contributions to community knowledge, especially environmental knowledge	Community and sector based interest in 'fisher knowledge', including: > Researchers/managers > Indigenous communities > Recreational fishers and the general public	Qualitative interviews
Subjective	Levels of trust and respect for the knowledge and skills of the fishing industry		

4.3.1 Formal and informal learning opportunities provided by the NSW wild-catch industry

The process of learning to be a fisher is important not just for the individuals involved in fishing. It also provides wider benefits for local communities, intersecting across all of the other identified 'dimensions of wellbeing'. These are detailed in Table 25.

TABLE 25. Intersection between fishing knowledge and other dimensions of community wellbeing

Dimension of wellbeing	Contribution of fishing knowledge
A resilient economy	Learning to be an effective, productive and sustainable fisher ensures ongoing revenue and employment benefits to local communities.
Community health and safety	Learning to be an effective, productive and sustainable fisher ensures ongoing supply of fresh local product to the community and wider markets. In addition it provides important knowledge and awareness of boat handling, boat mechanics and knowledge of waterways that assist in search and rescue activities.
A healthy environment	The process of learning to be a fisher builds environmental knowledge (see Section 5.4.3). Our interviews indicated that many fishers experiment and innovate with their fishing methods and gear to improve productivity with environmental payoffs, such as reduced bycatch.
Integrated, culturally diverse and vibrant communities	The fishing industry provides educational opportunities and employment prospects to disadvantaged sections of the community.
Cultural heritage and community identity	The intergenerational nature of fishing knowledge (i.e. handed down within families) strengthens the cultural heritage values of fishing as well as being a rich source of information on the environmental history of many of the states waterways.
Leisure and recreation	Many of the fishers interviewed discussed the role they play in providing advice and information to recreational fishers about methods, bait and fishing locations.

These intersections indicate that the process of learning to be a fisher is a fundamental component of providing the full range of community benefits investigated through this Project. The fieldwork interviews identified a range of forms of knowledge required to be a fisher in NSW. These are outlined in further detail below and incorporate both material and relational contributions to wellbeing.

4.3.1.1 Fishing practices

The process of learning to be an effective fisher involves little in the way of formal training, and instead relies on many years of informal, practical and 'hands on' learning, often passed on over multiple generations or through mentoring, as well as individual trial and error. This knowledge includes familiarity with techniques and methods as well as an understanding of fish movements and habits, the influence of weather events on catches and the best fishing locations. While much more difficult to quantify than as training courses attended or offered, this form of knowledge transfer is central to the experience of being a fisher. In discussions about teaching and learning, participants in our fieldwork interviews highlighted the importance of this informal, practical skills training (44%). This compares with only 28% of participants who discussed more formal modes of learning, such as training courses.

The knowledge held by fishers in NSW is closely guarded intellectual property, and partially explains the tendency of maintaining fishing businesses within family groups. These multi-generational businesses pass on not just licenses and assets but also valuable information (e.g. fishing locations, fish behaviour, weather patterns, etc.) that assists in securing its ongoing success. This can also make it difficult for new entrants without this background in fishing who often have to learn the tricks of the trade through trial and error.

> **It's either passed on by your dad or you've got to try and learn it. That's very frustrating when you think there's nothing in this state to educate a professional fisherman on how to be a fisherman. You can't learn to tie a knot. You can't learn to catch nothing. But if I want to be a recreational fisherman, I can do a tech course on how to go and tie lures.**
>
> *Fisher (020615_1c) Central Coast – Hawkesbury*

4.3.1.2 Boat handling

Boat handling, along with food safety, is one of the few areas in which formal training opportunities exist within the NSW fishing industry. All skippers and crew on board licensed vessels must obtain relevant qualifications ranging from a deckhand's ticket through to advanced engineering and masters' tickets. The type of licence required, and the associated level of training, varies according to the duties performed (i.e. deckhand or skipper) and the size of the vessel. Qualifications are obtained by attending a training course (often through a local technical college) followed by examination by the Department of Roads and Maritime. A small number of interview participants indicated that these formal methods of training post a challenge to some members of the industry who struggle with low levels of literacy or problems with confidence in formal teaching environments. This inhibits the ability of these individuals to advance their level of involvement in the industry.

> **Oh, he's a good little seaman. You see blokes that you wouldn't even entertain, but every now and then you see young blokes that come along and you know they're going to be good. But when it comes down to the book side of things, it shies them away a bit. He's struggling with his Master Class 5 thing. He can do all the practical side, he does all the motor work and that – I've taught him all that – he knows how to work the winches, but as far as putting it down on paper, it makes it a bit hard.**
>
> *Fisher (101014_5) Clarence*

This is an area in which local co-operatives play an important role, as do individual fishers who act as mentors or 'sponsors' of their deckhands. Some co-operatives assist fishers with their studies by organising courses specifically for members of the fishing industry, and others act as scribes for fishers who understand the practical application of their studies but have difficulties with reading and writing. Moral support is also provided through encouragement and advice.

4.3.1.3 Food handling and workplace safety

Other formal learning opportunities provided by the NSW industry focus largely on the areas of food safety and occupational health and safety. These were largely provided by larger-scale fish merchants, co-operatives and industry bodies. Our questionnaire of fish merchants indicated that 88% provide training for their staff in safe food handling, 81% in occupational health and safety and 79% in customer service. All fishers are required to undertake training and certification in safe food handling if their product is for human consumption.

4.3.1.4 Regulatory knowledge and business management

Fishers in NSW operate within a complex and ever-changing regulatory environment, governed by multiple pieces of legislation. When entering the industry fishers are encouraged to attend a briefing with a local fisheries officer to be introduced to the relevant fisheries legislation for their area and their fishery. However, there is no formal 'induction' into the industry where fishers are advised of their rights and obligations under various legislative instruments. Much of the information they are required to understand is outlined in various policy documents, regulations and a 66-page 'administration guide' which lays out the licensing requirements for each fishery (NSW Department of Primary Industries, 2015a). This can be challenging for sections of the industry who have limited levels of education or low literacy levels. For such people regulatory knowledge is again learnt through trial and error and informal learning, as well as periodical departmental communications and seminars when legislation changes.

Being a fisher in NSW essentially involves being a small business owner, yet few within the industry have training in business management. This is a problem that may link directly into the low levels of profitability experienced by some sections of the industry. A number of the people we interviewed acknowledged that small business management training was a significant need within the industry, yet delivery of this training is challenged by the lack of both funding and industry take up – fishers are often reluctant to give up a day's potential earnings to attend training courses.

> I can go and get $1 million for an anti-suicide prevention program but they won't give me $50,000 to do a business development program. The biggest issue for all these people or 90 percent of our people is they can catch fish and make dollars but... the business side of it eludes them. The value adding, doing things that increase the value of what you do catch; it's just catch it and sell it because that's what I've done and that's what my dad did and that's what I'm good at. We have people make genuinely elementary simple business mistakes that a person with a background in business just would never make.
>
> *Co-operative board member (041114_2) Mid North Coast*

In order to address this gap, OceanWatch, a Sydney based NGO, has developed a Master Fisherman training program which recognises, endorses and builds on the skills within the industry, and includes training in small business management (see Box 5).

BOX 5. OCEANWATCH MASTER FISHERMAN PROGRAM

OceanWatch Australia is an not-for-profit environmental group which works to advance sustainability in the Australian seafood industry. Projects include a focus on improving habitat management and water quality and working with industry to develop and enhance environmentally friendly fishing practices.

The OceanWatch Master Fisherman program aims to assist in capacity development of NSW fishers and improvement of industry's profile amongst the community. It involves a short training program which is designed to recognise and improve upon the existing knowledge, skills, experience and professionalism of participating fishermen for better community and environmental outcomes. It also provides information to consumers to help them value locally produced seafood.

> ...each of the individual fishers get their own Quick Response code, and the information that's accessible under that Quick Response code includes profile videos of the individual fishermen themselves...profile videos of the methods used within the fishery, and...a whole raft of other information...So, things like stock assessments, the DPI species profiles...links to things like the Environmental Impact Assessments...where the fishermen are actually fishing, and then we're linking as well to recipes and other things.
>
> *OceanWatch Chair*

4.3.1.5 Environmental knowledge

Over time many fishers engaged within the industry have built up considerable knowledge about fish habitats, biology and behaviour, local waterways, weather patterns and climate variability. This knowledge not only has the potential to improve the success and adaptability of fishing practices but also provides a range of 'flow on' benefits that are important for overall community wellbeing. These include providing monitoring and surveillance of environmental health over time, benefits that are explored in greater detail in Section 5.4.4.

4.3.1.2 Physical and mental strength and preparedness

The physical and mental demands of fishing make it an unsuitable or undesirable profession for many within the wider community. Interview participants often described the mental and physical 'toughness' that is required to endure the long, unpredictable and often unsocial working hours, the uncertainty of whether you will earn enough to maintain an adequate income, and the physical challenges of working in unstable work environments in highly changeable weather conditions. These challenges make it difficult to attract and keep new entrants to the industry.

> **You've got to train them. I've probably in my life – I was always one for taking kids off streets. Young fellas that were hopeless at school and taking them and I've put five or six good skippers on this ocean that now are successfully skippering boats. I've trained a lot of deckies and... I've always said the best place to find a deckie is at the skate park. A rough and tough kid that lives on the streets and he's been brought up tough and never had anything. That's where you'll find your best deckhands.**
>
> *Quote – Fisher (0810914_2) Mid North Coast*

The process of training these new entrants therefore involves much more then practical elements of fishing and boat handling. It also involves preparing participants mentally and physically for the challenges of working in the industry. For some of the fishers we interviewed the process of imparting these 'life skills' was framed in terms of teaching new entrants how to 'be a man'.

> **I enjoy training young people... I believe that you get a deck hand. Say you pick him up at 17. You would hope that he's moved on by the time he's 21, and not necessarily that he stays fishing but he has the ethics of how a man should go about his business, whether it be fishing, whether it be this or whether it be that... You're not in control of teaching him so much how to be a fisherman, although we did have a good strike rate with that. A lot of it, we taught them how to be men. A man does this. A man does that. A man doesn't do that. Do you get what I mean? I find that a really big part of my life and always have. People can't believe how much work crew are willing to do for me but they do.**
>
> *Quote – Fisher (180914_2) Great Lakes – Hunter*

The role of fishers in mentoring and guiding disaffected or disadvantaged men or boys seems to be particularly relevant to the trawl fisheries where deckhands are required for physically demanding work, at low pay in unpredictable conditions on relatively small vessels. This environment requires the small crew of two or three to work together to ensure trips are safe and productive. The difficulties of obtaining crew that were up to these challenges, both psychologically and physically, was discussed at length by many of the fishers from these sectors (23% of fishers overall, including 83% of fishers involved in the fish and prawn trawl and Spanner crab sectors). Crew are often sourced from sections of the community that would otherwise struggle to obtain regular employment, including men with low levels of literacy, a history of incarceration or social problems such as drug use and alcoholism. While many bemoaned the difficulties this had caused them, they also cited success stories about the opportunities that fishing had contributed to the rehabilitation and ongoing employment of otherwise marginalised individuals.

> That's my bloke in a nutshell. An alcoholic, big social problems, (I) re-educated him how to live. Got some form of life now, which he wouldn't have had a few years ago. I don't think (he) would be alive now if he didn't work for me.
> *Fisher (061114_3a) Great Lakes – Hunter*

4.3.1.7 Etiquette and 'unwritten laws'

An important part of learning to be a fisher involves building a familiarity with unwritten 'laws of the sea' that govern the way fishers interact with each other and the community. Voluntary 'gentlemen's agreements' were frequently mentioned by interview participants in their discussions of rules about 'taking a shot' or working in busy waterways. For example, one interviewee discussed a gentlemen's agreement between estuary general fishers that has existed for some time on the Shoalhaven River. It dictates that all the prawners' vessels are off the river by 10 am on weekends to make way for the skiers and other recreational users. Again, new entrants require advice and training from older, more established fishers in order to become aware of these invisible rules within the industry.

3.2 Contributions to community knowledge and community beliefs about the importance of fisher knowledge

The fieldwork interviews and social questionnaires explored both the relational and subjective aspects of industry contributions to community knowledge by exploring the role of the industry in wider knowledge systems, and attitudes towards fisher knowledge amongst these networks.

4.3.2.1 Researchers and Managers

Our interviews uncovered a range of ways in which researchers and managers in state, federal and local governments, universities and other businesses are currently benefiting from data and knowledge provided by the NSW wild-catch industry. This includes the regular, required logbook entries that are an important part of regular stock assessments and monitoring of the health of local fisheries. While some conceded this data was not always reliable, participants also noted that because comparable data is not readily available for recreational fisheries, regulators rely heavily on professional catch data combined with biological data and other research methods to manage the fisheries effectively (Flood, 2014).

Approximately a third of the fishers we interviewed indicated they were currently or had been previously involved in formal research programs undertaken by DPI or university researchers. It is difficult to quantify the extent of these contributions because support took a range of different forms, from chartering vessels for research activities through to being more active participants in data collection. Some fishers were paid for their involvement, others volunteered their time, vessels or expertise. The scale and purpose of the projects also varied considerably, from testing gear modifications (e.g. Bycatch Reduction Devices) and contributing to stock or fishery assessments, through to monitoring water quality or seabird numbers.

> I do a fair bit of work with Southern Cross Uni. Help them with water quality monitoring and all that sort of stuff. Sometimes every day for six months... Just (as) a volunteer. I got a bushman's pocket knife last time. A year and half I done. Every day. (laughs)
>
> *Fisher (180515_1e) Far North Coast*

Managers or researchers also make use of the knowledge and skills of the wild-catch industry by involving them in decision-making processes, committees or programs. Formal participation in committees and advisory boards is discussed in greater detail in Section 4.2.4. Community groups, businesses and managers are also tapping into fisher knowledge to build their own and the general public's understanding of environmental change over time.

> Those anecdotal observations are so important that we've actually got a database. Not just for the professional fishers, but for others. They'll make notes on red spot disease. Or they'll make a comment about 'I've never seen it so cloudy'... We just capture all of that because that's all part of that learned experience of being a professional fisher.
>
> *Council Natural Resources Manager (041214_1a) Central Coast – Hawkesbury*

One of the key concerns raised by people in relation to the current decline in the industry and the ageing of the fishers actively engaged in fishing was the potential loss of the body of knowledge held by industry members. Some within the community are anxious that this knowledge be captured before it is lost forever. There does not appear to be any coordinated or strategic response to this issue in NSW as yet. The Sapphire Coast Marine Discovery Centre is an example of one local attempt by the community to try and tap into the knowledge held by the local fishermen and women in the Eden area. It was established as a way of bringing together fishers and scientists following the significant decline in the industry following the closure of the local cannery, coupled with industry restructures in the 1980s and 90s.

> ... the Sapphire Coast Marine Discovery Centre... was born out of the imminent closure of the Heinz Greenseas cannery and the impact that was going to have socially and economically on the town... So, for that specific project, the overwhelming message was coming to us through consultation with the community and with the fishing community, that there is a pool of knowledge within the fishing community, over several generations, that was really, really valuable data, but it wasn't rigorously supported in the science community. So our idea was to match scientists with fishermen, and that's still building.
>
> *Member of tourism body (070515_4) South Coast*

This Saphire Coast program has had mixed success given the sometimes wide cultural divide between fishers and scientists, each of whom have different agendas, interests and worldviews. Over time, however, the Centre has built up some productive working relationships between fishers and scientists.

4.3.2.2 Indigenous communities

Education of Indigenous fishers and, in particular, Indigenous professional fishers is consistent with the non-Indigenous fishers when it comes to 'learning to be a fisher'. It is dominated by informal, relational learning through mentoring and on-the-job training. For Indigenous fishers, however, there is an additional, and highly valued cultural element to this training process which involves passing on customary knowledge and cultural practices. When it came to discussion about the nature of this transference of cultural knowledge, the dominant discourse focused on loss – both potential and current.

Amongst the remaining licensed Indigenous professional fishers in NSW in 2012, the vast majority were involved in the estuary general (71%) and/or ocean haul (63%) industries, with limited representation in the other fisheries (Schnierer and Egan, 2012). As the remaining Indigenous families involved in the industry have aged, participation has further declined. These two fisheries are the only two of all the seven NSW share-managed fisheries that do not allow crew to assist in the fishing operations if they do not hold an endorsement in that fishery. This includes a prohibition of unendorsed crew members being on board a boat, removing fish from gear or boats, stowing or assisting to stow fishing gear, operating or assisting in the operation of fishing gear, operating a vehicle or any other device (e.g. a torch) which might assist in the taking of fish, and putting any fish caught into a container (NSW Department of Primary Industries, 2015a).

These restrictions were criticised by many within the wider wild-catch industry as having significant safety implications (particularly for estuary general fishers who work at night) and impacts on community relations, given that many within the wider community were historically involved in beach haul operations by pulling in the net and assisting in sorting catches (see Section 4.2.2). However, it is Indigenous communities who have suffered most from these regulations. Dominating the discussions with Indigenous interview participants were concerns about the loss of connections with kin and culture associated with the loss of beach hauling as community events in which all members of local Indigenous communities were involved,. Participants spoke of traditional involvement of their communities in the industry, not always as licensed fishers, but as 'spotters' – crew assisting in the hauling,sorting and packing the product. In return the community shared a portion of the catch and had an opportunity to connect with family, share stories and participate in an activity that they strongly regard as a traditional cultural practice. They are no longer permitted to take any part in this activity unless they pay substantial fees to obtain a licence and necessary endorsements, something out of reach to many within these communities, particularly given the low returns and seasonal nature of the work.

> **And if we can't take them out, how the hell can you keep your culture going? Because culture is not given to them. It is taught to them by their elders... I'm at the stage now where the young bloke, within the next few years, he's going to take over from me, and if he's not taught, well, all that history, all my knowledge, all Dad's knowledge, all his grandfather's knowledge, is gone.**
>
> *Indigenous Fisher (260315_2) South Coast*

A recent decision by the DPI to allow cultural fishing beach hauling within the Botany Bay recreational fishing haven is a step towards recognising the significance of this activity as a cultural practice. Local members of the Indigenous community will now be able to haul Sea Mullet during its annual migration for consumption within that community.

4.3.2.3 Recreational fishers and the general public

Another commonly discussed contribution of the NSW wild-catch industry to local communities related to public education or public relations activities undertaken by individual fishers in their daily activities (46% of fieldwork interviewees, including 56% of the fishers interviewed during fieldwork). This largely involved informal knowledge transfer conducted as part of regular interactions with customers, fellow users of the waterways, 'spectators' of fishing operations, and recreational fishers. In some cases it also included visits to schools and universities to talk with children and students about their practices or participate in open days or other educational events. In particular, many of the fishers we interviewed discussed how they would on occasion share some of their knowledge of fish and fishing with recreational fishers as a gesture of goodwill. Others discussed how they would often be 'followed' by recreational fishers who understood that professional fishers would likely have an intimate knowledge of the best fishing spots at any given time and would seek to piggy-back on that knowledge to maximise their own catches.

> **Yeah, people are definitely interested in what you do. When they see you pull up at the ramp and you walk off to your truck, they quite happily walk up to your boat and have a look inside... They're usually pretty good. If you share some data with them, they love it. That's priceless, because they'll come back the next day and they'll say you were right, thanks, I caught a big flathead over there just like you said or yeah, there was plenty of whiting there just like you said, thank you very much and they, in turn, become your agents of goodwill and they tell other people that no, he's not a jerk, he's actually alright this bloke.**
> *Fisher (180914_1) Great Lakes – Hunter*

As indicated above, the annual Mullet haul was highlighted in many interviews as an opportunity for the general public and the community to interact and build relationships and knowledge of the industry amongst the wider public.

4.3.3 Discussion

These results indicate the overwhelming reliance of the NSW wild-catch industry on informal modes of teaching such as occur within families, between mentor and trainee, or between elders and communities. On a broader level, fishers also exchange information about environmental and fisheries management concerns, weather conditions, and tips for catching fish with the wider community, including regulators, researchers and recreational fishers. This reliance on unwritten, accumulated knowledge is highly vulnerable to any disruptions in the relationships that facilitate its transfer. In NSW, on a number of levels the industry is currently experiencing such disruptions in ways that are likely to significantly impede the ongoing strength of the industry's contributions to community education and knowledge.

Particularly in the estuary general and ocean haul sectors, the first major impediment is the regulations that prohibit involvement of any person not classed as an 'eligible fisher'. These rules require that a person involved in any way in the fishing operation be a licensed professional fisher and be nominated by the business owner as an 'eligible fisher' for their business. This includes family members and members of community who might one day wish to take over a licence or begin a career in the industry. It also includes members of the community who may have an interest in fishing or desire to experience what it is like to be involved in a fishing operation, something that in the past has been somewhat of a tourism attraction in many coastal towns during the annual Mullet haul.

> **Fisheries have made it that the interaction between the actual public and the professional fishery can't be what it used to be. Like in the old days when we shot in a patch of fish on the front beach, it was alright for kids and everyone to come and give you a hand and they'd grab a couple of fish and take them home. Now, if they touch the net, they want to take you to court and fine you as much as they possibly can and stop you from fishing for a couple months. It's just gone the opposite way. They're very much towards the 'them and us' and it's the big, bad professional fishery sort of thing. You don't hear of the good side, you only hear of the problem side.**
>
> *Fisher (060515_2) South Coast*

The ageing of the industry is also a major concern for the ongoing future of this contribution to wellbeing. As fishers leave the industry, retire or die they take with them valuable intellectual knowledge. Many are actively discouraging their children from entering the industry, given the ongoing regulatory uncertainty, increasing costs and negative perceptions about the future of the industry. This means that their knowledge is not only lost to new entrants who wish to enter the industry but also to the wider community. The loss of this knowledge has potential flow-on social and economic impacts that so far have not been adequately explored.

> **In the net fishery where the average age is, I think, 58, they don't want to bring their children into it, so we're going to lose a lot of experience which, to us, will be critical to our business because a core part of our business is exporting mullet roe, and if we don't have people there to catch it... the issue for us is in that sense that if we lose too many of these smaller groups, then there's not going to be enough supply, or enough people physically to catch and supply us with the product that we need, a) to run a pretty large factory, and b) to supply the demand from our customers. And as I said, we can supply more than we can ever procure, and it's an export commodity. It's a sustainable export commodity, proven sustainable.**
>
> *Wholesaler (160215_2) Far North Coast*

Despite these concerns, there are active efforts within the industry and communities to capture some of the knowledge held by fishers and their families. These would benefit from a more strategic, state-wide approach which seeks to address some of the major impediments. In particular, efforts to document environmental and oral histories of fishers should be a major priority. Matching up older, retired

or retiring fishers with new entrants in mentoring programs may also assist in ensuring the intellectual knowledge of older fishers is not lost. Training packages considered important for industry operation may require outreach programs which cater to the needs of individuals with low levels of literacy or problems with formal learning environments. Finally, regulations which inhibit community involvement, particularly of Indigenous community members, in beach hauling operations should be reviewed as soon as possible, with a review taking full consideration of environmental, cultural, social and economic dimensions of this issue.

4.4 A healthy environment

A healthy environment is a key component of overall health and viability of the wild-catch fishing industry. Not only is a healthy environment necessary to maintain the quality and quantity of catches, it is also a key factor in determining the nature of the industries relationships with the general public and with regulators. The 'Let's Talk Fish' project demonstrated this in its investigation of community beliefs in relation to professional fishing in Australia. It revealed that support for the Australian industry is contingent on it being perceived as sustainable – 72% of respondents prioritised environmental health over economic benefits of fishing (Mazur et al., 2014). Table 26 outlines the main indicators and methods used to investigate the NSW professional fishing industry's contributions to a healthy environment.

TABLE 26. Indicators and methods used to investigate the contributions of professional fishing to a healthy environment

Contributions of the NSW wild-catch fishing industry		Indicator	Methods
Material	Practising sustainable and environmentally friendly fishing	Sustainability assessment of the fishing industry	Literature review Qualitative interviews
	Involvement of the industry in stewardships activities	Involvement in environmental stewardship activities	Qualitative interviews
Relational	The role of the NSW fishing industry in wider environmental management networks	Involvement in environmental management programs and committees	Qualitative interviews Social questionnaire – fish merchants
Subjective	The level of trust in the fishing industry to act in a sustainable manner (social licence)	Community trust in industry/ social licence	Social questionnaire – community

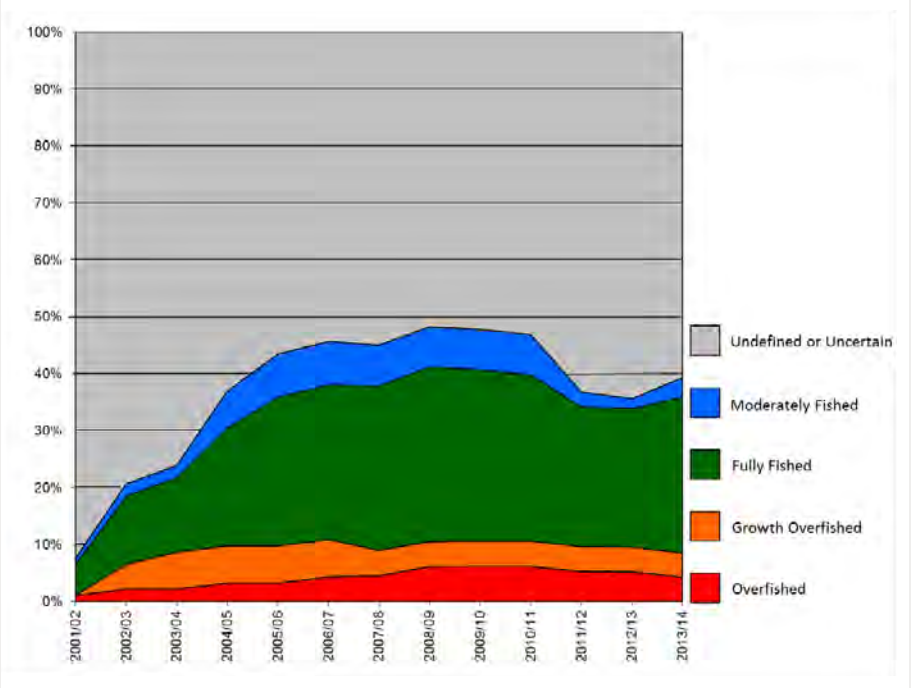
4.4.1 Practising sustainable and environmental friendly fishing

The ability of the NSW professional fishing industry to contribute to community wellbeing is closely tied with the health of the environment in which it works. All NSW fisheries have undergone Environmental Impact Assessments, the health of fish stocks in NSW is regularly assessed, and management adjustments are made as necessary. In addition to fisheries management measures controlling impacts on the target species, there are also other statutory measures in place that are designed to manage the impacts of fishing on the wider ecosystem. These include mandatory Bycatch Reduction Devices, spatial and temporal fishing closures and marine parks.

While current regulations around professional fishing in NSW are tight, there remains a legacy of the impact of overfishing in the last century when fisheries were open access and expansion and growth of the industry was actively encouraged by governments of the time (Lif Lund Jacobsen, 2014). It is likely that this legacy impact will create ongoing sustainability issues for some fisheries and significantly contribute to community attitudes towards the industry. In addition, the fieldwork interviews indicated that there are still some within the industry (as well as outside it), who continue to practise illegal or unethical fishing. This too threatens the environmental sustainability and the social licence of the industry.

At present there is limited, easily accessible information available to the general public and consumers on the sustainability of the industry. Regular stock assessments are conducted at state and Commonwealth levels to monitor the health of the fisheries. The latest assessment identified five out of 115 species fished in NSW as being overfished and a further five as being 'growth overfished' (NSW Department of Primary Industries, 2015b, Flood, 2014) (Figure 19).

FIGURE 19. Fish stock status NSW since 2001 (From NSW Department of Primary Industries, 2015b)



4.4.2 Involvement of the NSW wild-catch Industry in stewardship activities

Many of the interviews we conducted during fieldwork made mention of a range of voluntary measures undertaken within the industry to improve local environmental health. Interview participants noted the involvement of professional fishers in monitoring environmental conditions (26% of participants, including 38% of fishers), experimenting with gear modifications to improve bycatch and maximise productivity and quality (23% of participants, 31% of fishers) and active engagement in stewardship activities, such as collection of litter, wildlife rescue and participation in environmental campaigns (36% of participants, 48% of fishers).

4.4.3 Involvement of the NSW wild-catch Industry in environmental management networks

Our interviews revealed that many participants think that one of the most significant ways in which the NSW professional fishing industry contributes to a healthy environment is through the accumulated environmental knowledge held by individual fishers and fishing families – some of whom have been working in particular waterways or sections of coast for multiple generations. Examples we uncovered included one family who had diaries spanning more than 100 years, documenting catches, weather and other environmental conditions for a lake system on the Mid North Coast. The ways in which knowledge such as this is shared with decision makers, scientists and the wider community is largely ad hoc and occurs in variety of formal and informal ways. The most common formal method by which environmental knowledge is shared is through involvement in research projects and environmental committees. Of the fishers we interviewed nearly half (48%) discussed having been actively involved in environmental or fisheries management committees, either currently or in the past. For example, many of the councils we interviewed involved professional fishers in their estuary or catchment management committees as a means of tapping into their knowledge of local waterways.

> **It's probably something the public don't realise – is that stewardship and advocacy that they do on the public's behalf which is often unrecognised. To give an example, Sydney Water wanted to decrease the quality of their effluent discharge and the professional fishers and the oyster industry were probably the two advocates for saying, no, that's not on. We need to keep it at the highest quality. So through those industries, we got a good outcome. If those industries weren't there, they would have easily got through. Decreased the water quality. But the public don't often make that link about their role as the stewards and eyes and ears.**
>
> *Council Natural Resources Manager (041214_1a) Central Coast – Hawkesbury*

We uncovered numerous examples of professional fishers working with a range of other groups in order to advocate for conservation or rehabilitation of degraded systems. In the Richmond River – a river facing significant environmental challenges – a local recreational fishing group had enlisted the help of a few knowledgeable professional fishers to gain their insight and advice on a project to rehabilitate a degraded wetland system.

> They (professional fishers and DPI) made a very, very hard – when I say "hard", a dedicated, long drawn-out approach right through the nineties, to restore the Tuckean... And anyway, for one reason and another, it just fell short of expectations, and after many hundreds of thousands of dollars were spent on lots of technical documents and economic research documents and everything else, it just didn't happen... So it's time to start it again, so in the last twelve months – we started in March last year, so what we have been doing in the last nine months or so is engaging and presenting all the information to all of the interested groups, like professional fishers... Whenever there's more information needed, if we're working on a particular presentation for a particular organisation and I'm lacking some information, [name withheld], who was a retired professional fisher, he, more often than not, has had the material we need, and he's been able to supply a lot of that material from his efforts in the mid-nineties.
>
> *Recreational fisher (170215_3) Far North Coast*

In the Illawarra, fishers have historically worked with conservation groups and statutory authorities to monitor concerns about water quality, particularly associated with the highly industrialised catchments around Wollongong.

> I did an assessment when Bob Carr was the Minister for Environment in the Wran and Unsworth Governments. I did a report for him into the – it was an essay of the composition of fallout that was going into the waters. I took figures from the then SPCC (State Pollution Control Commission) going back about 30 years... Which was the forerunner to the EPA and over a period of time... if you just took their figures and you applied it to the surface area of the lake, it was something like three tonnes of arsenic had actually fallen into the water over that period of time. Fell in the catchment, ran into the lake and it ended up destroying many parts of the lake and that's why ultimately the government created the Lake Illawarra Authority in 1987 to try to quell some of the public anxiety about these things. So to cut a long story short, it was environmental awareness and environmental activism back in the mid '80s by the fishing industry and other concerned people such as, in that instance, the South Coast Conservation Society, working together that caused the government to create the then Lake Illawarra Authority.
>
> *Fisher (071114_1) Mid North Coast*

Sydney-based environmental NGO OceanWatch regularly liaises with members of the industry as part of its work advocating for improvements in areas of environmental concern like acid sulphate soils, ports development, sewage treatment plant upgrades and river mediation.

> And of course, in that environmental space, fishermen, and we're their voice in this space, are always championing good quality, and fish habitat, and connectivity across the landscape, because it's one of the pins of their business, but it's also very much of public benefit to have those systems in good condition, and I would imagine that twenty-five years ago, when OceanWatch was created, I don't think there was anybody out there in the public space who was championing the cause of water quality and fish habitat.
>
> *OceanWatch staff member (110315_1) Sydney*

4.4.4 The level of community trust in the fishing industry to act in a sustainable manner (social licence)

Our fieldwork interviews revealed that those directly engaged in the industry have high levels of confidence in the sustainability of their industry and their practices. This was often coupled with a feeling of frustration that the level of regulatory and voluntary restrictions within the industry to ensure sustainability were not being recognised by the general public, with a push for even greater restrictions coming from some sections of the community.

> We're talking about Mother Nature. The problem is that while the professional fishing industry is limited, restricted, sustainable, everything else around us is all about growth, whether it be buildings, jobs, recreational fishing's got to grow, got to grow. Got to get bigger, got to get bigger. Professional industry is copping a whole lot of flak for being fixed, sustainable, never to get bigger, doing the right thing. Why are we under the pressure?... fish will keep growing back every year if we manage it sustainably and we can just do that forever.
>
> *Fisher (020615_1a) Central Coast – Hawkesbury*

Despite this frustration, there was only minor discussion of schemes that recognise the sustainability credentials of the industry, such as Marine Stewardship Council certification or localised branding campaigns (raised by 9% of fieldwork interview participants). Some felt these schemes were too expensive or an additional administrative burden on an already heavily regulated industry. Industry organisations such as the PFA and OceanWatch have been working towards ensuring greater consumer awareness of the sustainability of local caught products in NSW.[5]

The impacts of external environmental threats, such as habitat loss and pollution, on the sustainability of the industry were discussed by 19% of the interview participants. These were more commonly discussed in the Far North Coaststudy area, largely in relation to the poor health of the Richmond River. A number of participants (25%) noted past and present examples of poor practices by professional fishers that threaten the sustainability of the industry, as well as efforts to improve social licence. A further 15% discussed the problem of competing against illegal professional fishing by recreational anglers (or poaching) as a key environmental and economic threat to the industry.

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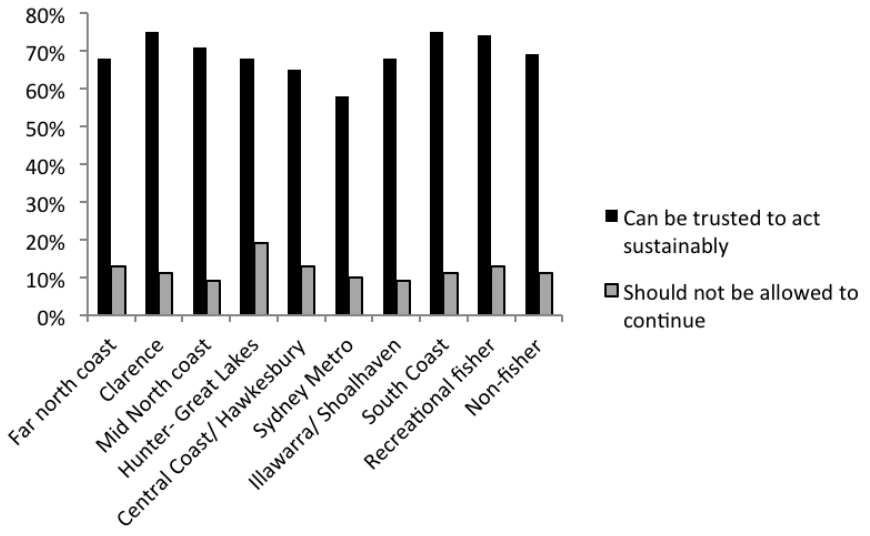
[5] For example see **http://www.oceanwatch.org.au**, **http://www.nswpfa.com.au/**.

It was clear from the interviews that most within and close to the industry feel they play important roles in ensuring the long-term sustainability of their local area and their local fisheries. The research sought to explore whether this confidence is reflected in community beliefs in relation to the industry. Given the importance of a healthy environment to community wellbeing, does the community trust the wild-catch industry to look after the best interests of this environment?

This question was explored through the general public questionnaire, which asked a number of questions focused on beliefs about the sustainability of the industry. The results indicate the NSW community has moderate level of trust of the industry acting in appropriate ways to sustain environmental health in the future. Sixty-seven percent of respondents overall indicated that they believed that the industry could be trusted to act in a sustainable manner. Seventy-two percent supported the continuation of the industry (Figure 20). While there were no significant differences across the study areas, support was highest in regional areas and lowest in the metropolitan areas of Sydney and the Central Coast. Levels of support were also relatively consistent amongst recreational fishers and non-fishers, with 69% of the recreational fishers surveyed indicating that they felt the local industry could be trusted to act sustainably and 87% supported the continuation of the industry.

FIGURE 20. General public questionnaire – percentage agreement with the statements 1) "I can rely on the local professional fishing industry to act in ways that will sustain fish populations for future generations" and 2) "The NSW professional fishing industry should not be allowed to continue, because its environmental costs outweigh its social and economic benefits".



4.4.5 Discussion

The impact of the professional fishing industry on the environment has been a key flash point in debates in many coastal towns about the appropriate allocation of fisheries resources across the professional and recreational sectors. Some recreational fishing groups and individuals periodically call for bans on professional netting, particularly within estuaries, believing the practices are unsustainable and environmentally destructive. They also claim that recreational fishing is a more environmentally benign and economically beneficial use of the resource (Collins, 2015). These debates polarise communities and undermine the relationships between the two groups with many professional fishers indicating to us in our interviews that they had been subject to abuse, vandalism and threats from recreational fishers and other members of the public. This conflict would also be a significant threat to the positive contributions of the wild-catch industry to local communities were further closures to undermine the ability of the industry to maintain a viable presence in these communities. This poor relationship with a small but vocal section of the recreational fishing industry has led many within the industry to believe that the wider public considers the industry to be 'plunderers' of fisheries resources. Yet our general public questionnaire and interviews indicate the industry has a relatively high level of support in the community, including amongst recreational fishers.

These results also indicate that there is a significant proportion of the community that is concerned about the sustainability of the industry. This is consistent with the *Let's Talk Fish* project, which found levels of trust in the industry were low (Mazur et al., 2014). Our interviews suggest that one of the key flashpoints occurs around coastal lakes and estuarine areas where professional fishers compete with a range of other users for access to the resource. This debate could benefit from independent, easily accessible information on the level of threat posed by professional fishing in estuarine areas being seen in context with other pressures within these systems. This would allow recreational fishers and the wider community to make their own assessments about the health of their local systems and the role that fishers play in maintaining it. A recent whole-of-system threat and risk assessment process for the Hawkesbury Shelf Bioregion, for example, considers professional fishing in that area to be only a moderate (and declining) environmental threat compared with concerns relating to increases in shipping, hydrological modifications, increased recreational use (e.g. boating infrastructure) and pollution (NSW Marine Estate Management Authority, 2016). Despite this, in recent years some recreational fishing groups have expended significant energies in their efforts to remove professional fishing from the Tuggerah Lakes and Hawkesbury/Pittwater areas. Many of the priority threats are enemies of both professional and recreational fishers and the energies of both groups may be better expended in seeking to address these threats.

4.5 INTEGRATED, CULTURALLY DIVERSE AND VIBRANT COMMUNITIES

Analysis of the research data identified a range of different ways the wild-catch fishing industry contributes to community life, integration, community harmony and celebrations. Table 27 outlines the main indicators and methods used to investigate the NSW professional fishing industry's contributions to integrated, culturally diverse and vibrant communities.

TABLE 27. Indicators and methods used to investigate the contributions of professional fishing to integrated, culturally diverse and vibrant communities

Contributions of the NSW wild-catch fishing industry		Indicator	Methods
Material	Contributions of the NSW wild-catch industry to the needs of a diverse community	Cultural significance of NSW seafood products	Qualitative interviews Social questionnaire – fish merchants
		Role of the fishing industry in providing opportunities for different socio-economic and cultural groups	
	Involvement in citizenship activities and community events	Contributions to cultural events	
		Sponsorship and donations	
Relational	Role of the NSW Industry in building and maintaining social networks (formal and informal) in local communities (social capital)	Contributions to social capital – bridging, bonding and linking	Qualitative interviews Social questionnaire – fish merchants
Subjective	Community awareness and beliefs in relation to the importance of the services provided by the fishing industry for community life	Importance of the role of the industry in community life	Qualitative interviews Social questionnaire – community

4.5.1 Contributions of the NSW wild-catch industry to the needs of a diverse community.

4.5.1.1 Cultural significance of NSW seafood products

The significance of seafood as a product associated with celebrations and major cultural events was explored through both the qualitative interviews and the social questionnaires. There was a great deal of discussion in the fieldwork interviews about the role of seafood in the cultural life of Australians from a diversity of ethnic backgrounds. Seafood was mentioned as being synonymous with key celebrations on the cultural calendar including Christmas, Easter and Lunar New Year (15%).

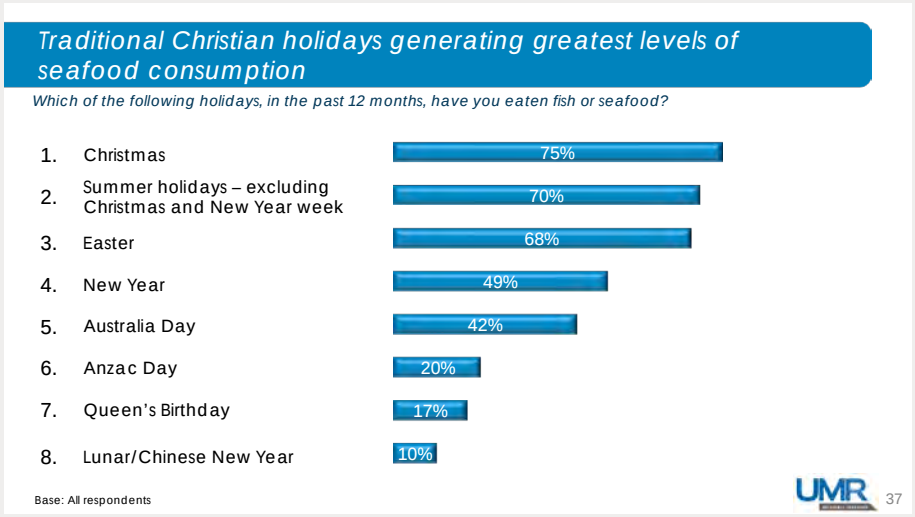
> **Good Friday is our single busiest day of the year here, and the Christmas, we open for 36 hours straight the day before Christmas. So, that's our busiest trading period, and it's amazing – you come down in the middle of the night, and it's just chocka with people... I'm a Kiwi, and we obviously eat a lot of seafood in New Zealand as well... But we don't have that association with the seafood at Christmas thing... when I started working here and saw this obsession with prawns at Christmas, it just amazed me because it's like one of the core foods for a lot of people... I guess it's also, maybe, a weather thing. People don't want to sit down and a roast, and turkey and ham, but prawns are kind of like the perfect celebration, easy to make, easy to eat food.**
>
> *Employee Sydney Fish Market (250315_1) Sydney*

Our fieldwork interviews with fish merchant businesses indicated that most put on extra staff to cope with the higher demand around holiday periods such as Christmas and Easter, and that these periods involved high turnover of sales and revenue. This illustrates some of the flow-on economic benefits of these associations between seafood and cultural events and celebrations.

The role of the wild-catch industry in providing for Indigenous cultural events and celebrations was also discussed by Indigenous interview participants. As previously discussed, seafood is an important cultural food for coastal Indigenous communities and often plays a role in celebrations, funerals and other important community events such as NAIDOC week events (Feary and Donaldson, 2015, NSW Office of Environment and Heritage, 2012).

The community survey supported these findings and revealed that NSW coastal residents have a strong association between major celebrations like Christmas and Easter and seafood consumption (Figure 21). The Christmas and summer holiday period can be viewed as the 'seafood season' with 75% of respondents indicating that they consumed seafood the previous Christmas and 70% the previous summer holiday period (excluding the Christmas and New Year week). Easter is also strongly associated with seafood – 68% of respondents indicated they had consumed seafood the previous Easter. There was very little variation in these figures across the eight study areas. The exception to this was the Sydney and Far North Coast study areas, which showed significantly fewer incidences of consumption of seafood over Easter than the other regions (59% and 45% respectively).

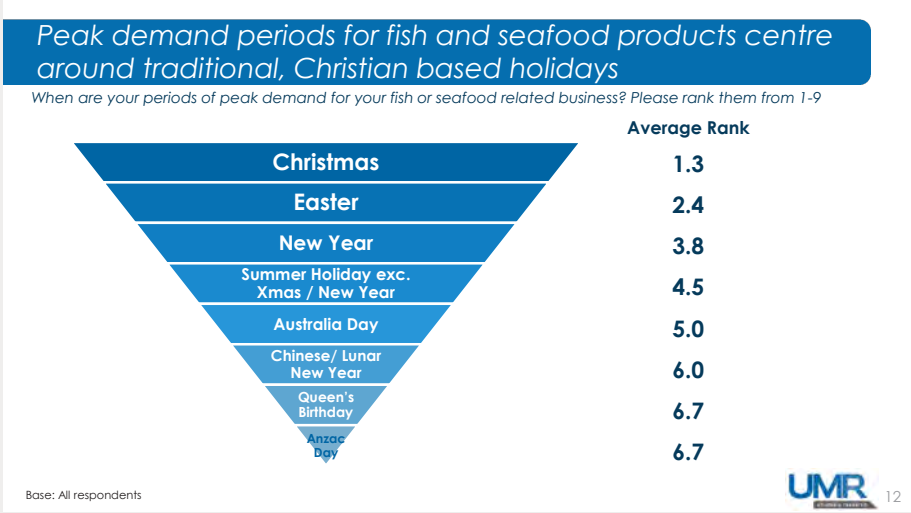
FIGURE 21. General public questionnaire responses – seafood and celebrations



These holiday periods, not surprisingly, are also the peak demand periods for NSW fish merchants (retailers and wholesalers). Christmas was consistently rated as the number one demand period for seafood sales across all the types of businesses surveyed (Figure 22). Whilst traditional Christianity-based holidays dominated, festivals of importance to other cultural groups within the community – such as Lunar New Year[6] – were also significant periods of seafood sales for NSW fish merchants.

[6] Lunar New Year is often called Chinese New Year in Australia, but since Vietnamese, Korean and other Asian groups also celebrate Lunar New Year as the most significant festive event of the year, it is more accurate to call it Lunar New Year.

FIGURE 22. Fish merchant questionnaire responses – seafood and celebrations, peak demand periods.



4.5.1.2 Role of the fishing industry in providing opportunities for different socio-economic and cultural groups

The fieldwork interviews indicated a number of ways in which the fishing industry contributes to both cultural and socio-economic diversity. In relation to cultural diversity, the contributions highlighted in the interviews were twofold. Firstly, the historical contribution of the industry to migration patterns of the last century was noted by 10% of interview participants. This included reference to Italian, Croatian and Vietnamese fishing families who migrated to NSW, bringing with them new traditions, tastes for seafood and ceremonies such as the 'blessing of the fleet' which are now long established rituals in Sydney, Ulladulla and, historically, a number of other NSW ports (Clarke, 2011, Puglisi and Puglisi Inglis, 2008).

> **We grew up coming here because you'll find that there's a lot of Sicilian Italians because geographically this area is very similar to the Aeolian Islands off the coast of Sicily. Years and years ago when they discovered the area, they all lived in Sydney and raised their families in Sydney but when they discovered this area they were very attracted to it, the fish stocks and the whole geography of the area, the shallow estuary which is great for the fish as far as that's concerned.**
> *Fisher (180914_1) Great Lakes – Hunter*

Secondly, the interview data revealed an increasing role for NSW professional fisheries in supplying the needs of a culturally diverse marketplace. Around a quarter of interview participants noted the role of the industry in providing seafood products to a culturally and ethnically diverse consumer base. The importance of seafood for different cultural groups in the community has opened new markets for NSW fishers and increased the popularity of a range of traditionally low value products. Demand for species such as Mud crab, Mullet, Sardines and Turban Fish have grown in response to the increasingly multicultural markets for seafood (22%).

> **Well, Mud crabs used to be worth bugger-all. Bring on the Chinese and Vietnamese and now can almost plot the price relative to the abundance of those cultures in Sydney. Seventy-five per cent of the market for Mud crabs in Sydney is Chinese and Vietnamese driven and the other bit is driven by the top-end restaurants down in Rockpool, Aria and all that sort of stuff, Flower Drum in Melbourne.**
>
> *Fisher and co-operative board member (041114_2) Mid North Coast*

The demand for live products from a growing Asian market, especially in Sydney, increases the importance of access to close, accessible fisheries and new approaches to transport and storage in order to ensure the product arrives in optimum condition. We spoke to fishers who are selling live prawns and crabs directly to restaurants in Chinatown, while others are catering to European and Middle Eastern markets that value smaller, oily pelagic fish. Other fishers have direct connections with Polynesian and Pacific Island communities that buy product like Mullet in bulk for family events and celebrations.

> **I've sold a lot of Mullet to Islanders. Tongans and Samoans, primarily. Big families. Buy a lot of Mullet from us and yeah, they just really enjoy that social aspect of being able to get together with their family and eat seafood.**
>
> *Fisher (091214_1) Illawarra – Shoalhaven*

As discussed in Section 4.2.2, the contribution of industry to providing food of cultural importance to Aboriginal Australians is also noteworthy.

The contributions of the wild-catch industry extend beyond cultural or ethnic diversity, however, to also include contribution to class or socio-economic diversity. An unexpectedly large number of interview participants discussed the value of the NSW wild-catch fishing industry in providing opportunities for socially disadvantaged groups, particularly men of all ages with low levels of education. Nearly half (46%) of participants noted the prevalence of men in the industry with minimal formal training or education, including a number with learning difficulties who would have otherwise severely limited their employment prospects. Some came from socially disadvantaged backgrounds, and this was especially noted in relation to deckhands with a history of drug or alcohol problems or criminal backgrounds (see Section 4.3.1). For others fishing was a career linked strongly with a desire to be engaged in physical, outdoors, largely autonomous work. These men often expressed an opinion that they would find more traditional forms of employment difficult or less rewarding.

> **I couldn't get a trade because I only went to Year 10, and to even get an apprenticeship when I left school, they really wanted Year 12. And all the people I know that went to Year 12 haven't really done nothing, because they just wasted another two years instead of working, I reckon. And unless you're going to go, after Year 12, go to uni and become real smart, I don't see why... I wasn't good at school. I wasn't bad, but... I like it (fishing). It interests me.**
>
> *Fisher (190914_3) Central Coast – Hawkesbury*

4.5.2 Role of the NSW Industry in building and maintaining social networks (formal and informal) in local communities (social capital)

4.5.2.1 Bridging social capital

Bridging social capital was discussed in interviews in terms of the support the industry feels it receives from the community, as well as the active role that fishers and fishing families play in community life (mentioned by 61% of participants). While this is often constrained by a need to be responsive to unpredictable weather and market conditions, fishers discussed the role they played in being members of sporting clubs and participating in community events. A commonly discussed form of bridging social capital came in the form of sponsorship and donations to community groups and individuals, sometimes in the form of cash donations from co-operatives but more commonly through in-kind support, including seafood trays or vouchers for raffles and donation of ice to sporting groups and community events. Other donations include free or discounted use of facilities such as slipways, jetties or fuel to groups such as the Volunteer Marine Rescue.

> **We provide ice, and we give them vouchers for their raffles and their fetes. We provide prawn trays and... the marine rescue is currently – I think we donate about $8,000 to the Marine Rescue, and that's in the form of forgiven rent for their moorings, and we give them fuel from time to time... We sponsor the lifesaver jet boat by keeping it fuelled up, and that, I think, runs at about $1,500 to $2,000 a year. Police Citizens Boys Club. We do trays, seafood trays for their raffles.**
>
> *Co-operative manager (180215_2a) Far North Coast*

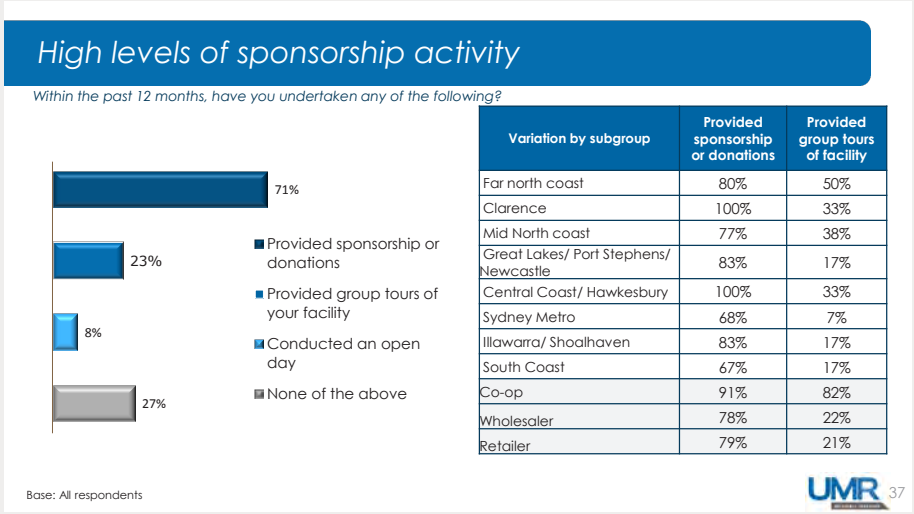
Fieldwork interviews also uncovered a range of informal contributions to community, through assistance in disaster response, especially flooding. As members of the community with ready access to reliable vessels, fishers are often involved in ferrying food supplies, clearing debris and providing advice on water movement in times of flood, especially in the Clarence and Hawkesbury Rivers where floods are frequent.

A major area of concern amongst interview participants related to poor public perceptions of the industry, sometimes referred to as 'social licence to operate' (65%). Concerns around social licence were especially relevant to relationships with recreational fishers in the community. Some fishers had personally experienced abuse, vandalism or negative comments from members of the public who perceived their activities as destructive and wasteful. This was particularly pronounced amongst estuary fishers, who were more likely to have direct interactions with other users on a regular basis.

> You cop heaps... I think the biggest problem is, they don't have an understanding of how and what we do, and I'm the first person to talk to people at the ramp – I give that much fish away to people at the ramp for bait, or a feed... just so they stop this negativity towards us... They just think we rape and pillage the local waterways, when our areas are proven sustainable, a lot of the methods are sustainable, hand-lining... no bycatch. The only damage you're doing to the environment is putting your anchor down, and there's a thousand boats off Sydney, amateurs that do that every day, and I gill-net, which is mesh netting... I'm not dragging the bottom. It's stationary, and I pick it up by hand, and that's it. If no fish swum that way for the night, well, I caught nothing.
>
> *Fisher (190914_3) Central Coast*

The social questionnaire of fish merchants indicated that these businesses play a role in bridging social capital through their active roles in community life in the form of sponsorship and donations on behalf of the fishing industry (Figure 23).

FIGURE 23. Fish merchant questionnaire responses – fish merchant's contributions to bridging social capital, through community involvement



Variation by subgroup	Provided sponsorship or donations	Provided group tours of facility
Far north coast	80%	50%
Clarence	100%	33%
Mid North coast	77%	38%
Great Lakes/ Port Stephens/ Newcastle	83%	17%
Central Coast/ Hawkesbury	100%	33%
Sydney Metro	68%	7%
Illawarra/ Shoalhaven	83%	17%
South Coast	67%	17%
Co-op	91%	82%
Wholesaler	78%	22%
Retailer	79%	21%

4.5.2.2 Bonding social capital

Of all the relationships discussed, relationships within the industry (bonding social capital) appear to be currently experiencing the greatest challenges. Bonding social capital, whilst referring to internal industry relations, is significant to wider community contributions because it influences the way the industry relates to and is perceived by those outside the industry. Industry contributions to community life may be more difficult, or limited, if the industry is unable to function cohesively or is consumed with internal conflict. Therefore the strength of bonding social capital relates directly to the strength of all other contributions to wellbeing.

Examples of bonding social capital were discussed at length (55% of participants), and most commonly related to the challenges the industry faces in presenting a unified front and working together on issues of concern. This was often related to the inherently competitive nature of fishing which discourages sharing of intellectual knowledge, as well as a long history of poor relationships with regulators that has lowered levels of trust not just with government but also with any fishers seen to have been involved in discussions or negotiations with government.

Notwithstanding the significant problems with bonding social capital being experienced by the industry, the roles of co-operatives and the annual Mullet run (see Box 6) in bringing fishers together were discussed as two examples that facilitate bonding social capital.

> **I spend 80 per cent of my time in the ocean, but when I go and chase Sea Mullet, I've got to go and work with seven other blokes that work in the river. Not one of them other blokes owns a prawn trawler. So we've all got to get and do our thing together. That's sometimes quite hard for eight people who work as individuals for 40 weeks of the year, and then have to... get on together real quick... Sometimes it doesn't happen, sometimes it does happen. Sometimes there's a bit of tension in the air at different times, so you just spread people out and it works better.**
>
> *Fisher (101014_3) Clarence*

Material contributions to bonding social capital included the provision of the services of the co-op, fish merchants and industry groups to the industry and on behalf of the industry. Just over half (58%) of the businesses surveyed had direct interaction with fishers as part of their business activities, and a number of these provide additional services to the wild-catch industry beyond simply marketing their products. This includes counselling (24%) and financial support (24%).

BOX 6. MULLET

Every year the Mullet begin their migration up the coast of NSW, travelling north to spawn. Year after year fishers from right along the NSW coast participate in the Mullet haul. Mullet featured in our analysis of all seven of the 'dimensions of community wellbeing'.

1. A resilient local economy: Mullet is one of the biggest fisheries in NSW in terms of volume. 'Value adding' is an important feature of the annual Mullet harvest whereby one fish is turned into multiple products that go to many different markets.
2. Community health and safety: Mullet is one of the richest sources of Omega 3 in the ocean. It has long been prized by Indigenous people for its taste, nutritional value and abundance. It is also valued by many others within local communities up and down the coast as an affordable and tasty fish.
3. Education and knowledge generation: The Mullet haul has traditionally been an important time of learning, particularly for Indigenous communities. Participating in the haul provided an opportunity to pass on traditional knowledge as well as practical skills in fishing for younger generations wishing to enter the industry.
4. A healthy environment: Mullet is a highly sustainable fisheries resource – it has been fished for generations right along the coast with catches remaining stable throughout that time
5. Integrated, culturally diverse, and vibrant communities: the annual Mullet haul is one of the few times that NSW fishers come together, to work together on the haul. This is an important time for those within the industry to connect and build bonding social capital.
6. Cultural heritage and community identity: Beach hauling is one of the oldest forms of fishing in NSW and has been practised by many generations of fishers since the early days of colonisation. Indigenous fishers have historically played an important role in this fishery, as 'spotters' or crew, with entire families getting involved in the haul and sorting the catch.
7. Leisure and recreation: The beach haul is an exciting and very visible public spectacle in NSW coastal areas every year around Easter, given it often takes places on popular public beaches. Many members of the NSW community have fond memories of assisting the beach haul crew land their catches. Today government regulation prevents active involvement of the public in beach hauling. The annual Mullet haul still draws a crowd in coastal towns, however.

In South West Rocks commercial fishermen hold an annual Good Friday Mullet BBQ. This event, known as the 'loaves and fishes', is well attended every year by the local community and tourists and includes displays on the historical importance of Mullet to South West Rocks history. Proceeds from the day are donated to the local surf lifesaving club.

We process the Mullet roe for export...The male fish are packed for domestic and export sales. When we do process the roe and remove the roe, the head's removed from the fish. That gets packaged for bait and we then have left either what we call a barrel which will be packed and sold both domestically and internationally, or we fillet those barrels and that is sold, again, to domestic and export markets So the beauty of this product is that it's essentially fully utilised.

Fish processor - Far North Coast

> I'll tell you a couple of things about Mullet. It's the second highest Omega 3 fatty acids out of any fish. You can grill, boil, roast, smoke, poach, curry fish, do it anyway you like. It's one of the most sustainably caught fish anywhere in the world and it's got one of the lowest pollutions of heavy metals and all that of any fish in the world.
> *Fish retailer - Nambucca*

> ... as a kid having the professional guys do the Mullet run and you're on the beach and then they call all the kids to help pull in the nets and then you get to chuck fish in. It just creates memories for people.
> *Council employee - Great Lakes - Hunter*

4.5.2.3 Linking social capital

Linking social capital was discussed by 57% of participants in the fieldwork interviews, with many examples cited of productive personal relationships with local council staff, fisheries officers, DPI research officers or other regulators or decision makers. While examples of poor relationships with Government, particularly the NSW DPI, were also raised (26%), linking social capital at a local level appears to be well developed in many regions, albeit in a largely informal manner.

The main means of formal involvement in decision-making processes by industry members is through participation in various committees (48% of fishers interviewed). Despite commonly cited challenges and frustrations of being involved in committees and forgoing income through reduced fishing time, NSW fishers have been, and continue to be, involved in a range of decision making or advisory bodies ranging from local-level estuary management committees through to state- and federal-level fisheries advisory bodies. This is often challenging for participants in formal decision making or advisory processes, as they often bear the brunt of any industry dissatisfaction with the outcomes.

> I've been the representative for the professional fishers and recreational fishers on the Hawkesbury-Nepean River Management Forum, and that was a committee to determine environmental flows for the Hawkesbury River, and to do that you had to understand the needs of Sydney, because of where those flows were going to come, because Sydney relies on Warragamba for its water supply, you had to understand all the dam systems, and evaluate how Sydney was going to continue to get its water, and the Hawkesbury was going to get its environmental flow. I was with that four years, and the report came out in 2004. I then went on to be on the board of the Hawkesbury-Nepean Catchment Management Authority. I sat on that board until 2010.
> *Fisher (041213_3) Central Coast – Hawkesbury*

Co-operatives and industry groups play an important role in facilitating linking social capital, including the Professional Fishermen's Association (PFA), and more recently the NSW Wild-Caught Fishers Coalition. None of these groups represents all of the NSW industry, but they work to benefit their members in a variety of ways, including representing them in negotiations with government, promoting the industry to consumers and participating in community events.

> We are that interpretive mechanism in that we can interpret the government's feedback to our members. Also we can turn our 'member speak' into 'government speak' to make it more professional... for the government to understand.
>
> *Industry representative (071014_1) Mid North Coast*

These organisations are not without their challenges, however, and there is a long history of dispute within the industry over who are the most appropriate groups or individuals to represent the interests of the industry.

As indicated in the following section, fish merchants such as wholesalers and retailers will also act as advocates for the industry on occasion as a way of facilitating improved social capital.

> Whenever... any perceived issue may arise... there is generally someone that will come from industry to address and attempt to mitigate it. We don't tend to have a broad sector body that oversees [things] – because fisheries are so fragmented, we've got so many different fisheries under the banner, if we were the Australian beef or dairy industry, you've got a united front, country-wide, to approach any of these issues... We don't. We're so fragmented that it's easy to be picked off government regulations and changes... In all honesty, because most of it's a cottage industry, they're too busy working. They don't have the time, and when you're third and fourth generational fishermen, that's all you basically know. They don't tend to be the sort of people who will come forward and really push for it. They'll ring us and say, "Listen, there's problems here," or whatever. "There's an environmental lobby group that are saying this, that we did this, or that this has occurred. It hasn't...Can you ring them?"
>
> *Wholesaler (160215_2) Far North Coast*

Of the fish merchants surveyed, 22% indicated that they have provided input into environmental or fisheries management decision-making processes, facilitating a potentially important form of linking social capital between the industry and decision makers. The results of the fieldwork interviews, however, suggest that these formal roles on committees are more frequently filled by the fishers themselves, or industry representative groups, rather than via co-operatives of fish merchants.

4.5.3 Discussion

The NSW wild-catch fishing industry provides valued services to a diverse community, especially the provision of seafood to assist in marking or celebrating important cultural events, and employment opportunities for disadvantaged members of regional communities. It is also actively involved in community life and in supporting local communities through sponsorships, donations and involvement in community events. All forms of social capital present challenges as well as opportunities for the industry. Concerns over a lack of cohesion within the industry were common amongst interview participants, as were concerns around community relations (social licence), and relationships with regulators, especially the DPI. Issues with bonding social capital, in particular, are of concern

given their ability to undermine all other industry contributions. It is unlikely that one central peak body will ever adequately represent the diversity of opinions, interest and fisheries that make up the NSW industry. There has been a long history of experimentation with a range of consultative models in NSW, with none securing the support of both industry and government (Stevens et al., 2012, Wilkinson, 2013). This may partially relate to the divide that exists between 'Group A' and 'Group B' fishers (see Section 5.1.1.3). The objectives and motivations of both groups appear to be quite different. Our research suggests that 'Group A' fishers are the most likely focus on lobbying for change which will maximise the potential for growth in profitability and productivity of the industry overall, as well as their individual businesses. 'Group B' fishers, however, express considerable dissatisfaction with efforts to improve business viability, given these efforts usually involve rationalisation and a move towards specialisation over the generalised fishing they favour.

The first step towards improving bonding social capital within the NSW industry may not be the development of a peak body, as is currently being pursued. Based on the findings of this Project, we would suggest the industry is experiencing what is known at 'lateral' or 'horizontal violence', which is defined as follows:

> **Lateral violence occurs within marginalised groups where members strike out at each other as a result of being oppressed. The oppressed become the oppressors of themselves and each other. Common behaviours that prevent positive change from occurring include gossiping, bullying, finger-pointing, backstabbing and shunning.**
> *(Kweykway Consulting, 2011)*

Therefore efforts to create a peak body should be secondary to industry-wide attempts to address issues of lateral violence. This may involve developing strategies which reduce feelings of marginalisation and isolation by addressing concerns around social licence and providing long-term security to industry participants. Current attempts to establish a peak body may also benefit from consideration of alternative models, such as dealing with fishers through regional economic bodies. It may also be useful to start with smaller more manageable consultative units or bodies and build up towards a central body as industry cohesion improves. This should be done in a way that recognises the needs and aspirations of both 'Group A' and 'Group B' fishers, without prioritising one group over another. For example, fees and charges associated with a peak body may disproportionately impact 'Group B' fishers due to their reduced capacity to pay higher charges and fees and therefore result in disproportionate membership. Any engagement strategy will also need to engage fishers who are time poor and may have low levels of literacy. Co-operatives and other fish merchants and wholesalers will play a crucial role in reaching these sections of the industry, particularly those in the 'Group B' category.

4.6 CULTURAL HERITAGE AND COMMUNITY IDENTITY

Table 27 outlines the main indicators and methods used to investigate the NSW professional fishing industry's contributions to cultural heritage and community identity. The cultural heritage value of the NSW wild-catch industry was a topic of interest to many interview participants. Most of the study areas visited had received some acknowledgement of the historical importance of the industry to their area, however this was generally limited to locally produced books or brochures. Public monuments or interpretation centres or guides exploring the heritage value of fishing were rare, as were highly circulated communications materials such as mass-produced books, documentaries or other published materials. This is an important area of development that would be of interest not just to industry but also to community groups, individuals or organisations interested in preserving the cultural heritage of the NSW coast.

TABLE 28. Indicators and methods used to investigate the contributions of professional fishing to cultural heritage and community identity

Contributions of the NSW wild-catch fishing industry		Indicator	Methods
Material	Contributions to the history of NSW coastal towns/regions	Historical role of the industry in regional growth and formation	Literature review Qualitative interviews
		Contributions to cultural heritage (e.g. infrastructure or artefacts)	
Relational	Contributions to cultural and community identity	Historical migration patterns associated with fishing	Literature review Qualitative interviews
		Historical role of fishing in Indigenous communities	
		Community identification with fishing heritage and sense of place as 'fishing villages'	
Subjective	Importance to the community of the contributions of the industry to a shared sense of community identity and to local cultural heritage	Levels of concern over loss of identity associated with decline in industry significance	Social questionnaire – community

4.6 Contributions to the history and community identity of NSW coastal towns/regions

Box 7 provides an overview of some of the key stages of the hisory of the NSW coastal fishing industry. The qualitative interviews explored ideas around three main indicators across all three wellbeing types (material, relational, subjective):

- Historical role of the industry in regional growth and formation
- Contributions to cultural heritage (e.g. infrastructure or artefacts)
- Community identification with fishing heritage and sense of place as 'fishing villages'.

Material contributions to community identity come largely in the form of historical artefacts linked with the development and growth of the area. Today the identity of many villages up and down the coast is in part defined by their professional jetties, wharves and rows of fishing boats tied up at the wharf. Eden, Bermagui, Ulladulla, Port Stephens, Laurieton, Coffs Harbour, Evans Head and Brunswick Head are examples of towns in which the professional fishing ports are central features – all being located in visible places in the heart, or close to the heart of the settlements and a feature of the town's physical identity. They are regularly visited by residents and visitors and are the focal point for celebrations and events. In Ballina, people entering the town are greeted by a giant prawn that immediately declares the close relationship between the town's identity and the wild-catch fishing industry. In Eden, the Killer Whale Museum is one of the most popular tourism attractions in the region. It is staffed by volunteers, some of whom were previously engaged in the fishing industry, and charts the history of the town from a whaling station through to a fishing town.

> **Our Killer Whale Museum it just gets a phenomenal amount of visitations. It's all done by volunteers and they're all getting old too. That's our biggest problem, all our volunteers who know it all who don't even have to refer to a book, most of them lived it. We've still got descendants of the Aboriginal Davidsons here [an original whaling family at the heart of the famous relationship between whalers and a local pod of killer whales]... So that family is still very much here and I think the last of the grandmas that can remember the whales coming in only died a few years ago.**
>
> *Tourism body representative and Councillor (040515_4) South Coast*

Part of community identity and the individual sense of identity for fishers involved in the NSW industry is the strong sense of tradition associated with multiple generations of family members involved in the industry. This was discussed by nearly half the participants in the fieldwork interviews. In many coastal towns we visited, suburbs, streets and sporting ovals are named after prominent members of these families. Many of the fishers we interviewed talked about fishing being 'in their blood', and the roles that key families played in the development of towns along the coast.

> **It's family following family, because it's just the way they're brought up, the way they live. My grandson comes down and swings around the boat and down the engine room with us and that, and it's just the way they grow up, you know? I'm hoping that he'll turn out to be a fisherman.**
>
> *Fisher (071014_2) Mid-North Coast*

BOX 7. THE HISTORY OF THE NSW WILD-CATCH INDUSTRY (1788-1980)

Non-Indigenous	Indigenous
1800s	
Professional fishing begins in Sydney Harbour to meet the needs of the colony. Fisheries Act 1865 - regulation of industry begins.	Pre –colonisation: Indigenous fishers participated in trade or barter of seafood products and shells. Informal participation of Indigenous fishers in professional fishing, trade and barter of seafood product with European settlers.
Early 1900s	
Improvements in refrigeration and transport leads to Government-backed expansion into new fishing grounds.  	
1930s	
Period of expansion—Danish seine fleet established targeting Salmon and Tuna. Narooma Cannery opens 1936. Establishment of new ocean prawn fishery contributes to growth of ports in Ballina, Evans Head and the Shoalhaven. Fisheries and Oyster Farmers Act 1935.	Aboriginal Protection Board provides boats to Indigenous communities to encourage participation in the industry and subsistence fishing for reserve communities.
1940s	
Sydney Fish Market established 1945. Thirteen co-operatives formed along NSW coast 1946-48.	Continued Indigenous involvement in the Industry as fishers, crew, and boat builders.
1950s	
Eden Cannery opens.	
1960s	
Narooma Cannery ceases production.	1966—Exemption from fishing licenses for Indigenous fishers removed.
1970s	
Number of licences peak at over 4000. Fisheries and Oysters (Amendment) Act 1979 - First step away from open access fisheries by allowing for intro-duction of restricted fisheries. Fishers required to derive the majority of their income from fishing (aimed to dis-courage 'part time' fishers). All product for Sydney area required to be sold through SFM.	Significant decline in Indigenous involvement in the industry.

BOX 7 (cont.) THE HISTORY OF THE NSW WILD-CATCH INDUSTRY (1980—PRESENT)

1980

Abalone becomes first restricted fishery in the state.

Period of major investment in the industry—upgrades in boats and expansion into new fisheries like gemfish and orange roughy, which quickly became over exploited. This led to shift towards a greater focus on sustainability in regulations, including Commonwealth structural adjustment of the South East Trawl Fishery.

NSW freeze on all new licenses (1988).

1990s

1994 Fisheries Management Act paves way for share managed fisheries. Lobster and Abalone become fully share managed fisheries (linked to quota), all others become 'restricted fisheries' (1996/97).

Deregulation of the co-op system—fishers able to trade outside co-ops and SFM.

Share allocation process—difficulties in verifying catch histories for Indigenous fishers e.g. common practice of distributing a proportion of the catch to the local community (cultural contributions) not recorded as professional catch.

2000s

Six marine parks established, including significant restrictions on commercial fishing access (1998-2005).

Environmental Impact Assessment of all major NSW fisheries (2001-2006).

30 NSW estuaries fully or partially closed to professional fishing through Recreational Fishing Havens (2004).

Share management implemented for remaining fisheries—although not linked to quota or fishing access.

Development of 'Pyrmont Pact' (2009) between then state Labor Government and now disbanded industry group, agreeing to move towards further structural adjustment.

More than 15 reviews or reports prepared since 1980s. Including:

- NSW Indigenous Fisheries Strategy and Implementation plan (2002), including actions designed to retain and encourage involvement of Indigenous people in professional fisheries.
- National Indigenous Fishing Principles (2004) recommend greater Indigenous involvement in professional fisheries.

Despite this Indigenous involvement continues to decline.

2009 Establishment of Aboriginal Fisheries Advisory Committee.

2010s

Independent review (Stevens Report) presented to new Liberal State Government (2012) and current reform process commences.

No explicit recommendations in relation to Indigenous professional fishing in the Stevens report.

4.6.1.1 Historical role of fishing in Indigenous communities

Since the earliest records of the colony of NSW, Indigenous people have played a role in professional fishing. Prior to that, trade and barter of seafood is likely to have also been common. As the new colony struggled to produce enough food to feed itself in the early 1790s, Indigenous women provided seafood to both the white colonists and the ailing Indigenous population struggling with new European diseases. Early records show that during that time Indigenous people began to 'come in' to the settlements physically (by taking up residence on the streets) and economically, by bartering their fish and game to settlers. The Botany Bay area, in particular, became known as a fishing community. This community was made up of both resident Indigenous communities and European fishers drawn to the area for its fishing and for the expertise provided by Indigenous people. This is one of the first examples of Indigenous and non-Indigenous people forming working and personal relationships and building communities together following colonisation (Goodall and Cadzow, 2009).

From a historical perspective, professional fishing has played a crucial role in supporting Indigenous communities along the NSW coast, not only as a source of employment and income for their fishers but also as a means of supplementing meagre rations provided by the Aboriginal Protection Board in missions or reserve communities, and later as high-quality food for people on very low incomes (Goodall, 1996, Bennett, 2007, NSW Office of Environment and Heritage, 2012, Schnierer and Egan, 2012). As colonial control over Indigenous people in NSW increased it was not uncommon for the Aboriginal Protection Board to provide boats and fishing gear to Indigenous communities and individuals to encourage both active participation in the NSW economy and the use of seafood products as an alternative food source to supplement government-issued rations (Goodall, 1996, Goodall and Cadzow, 2009, Egloff, 1981, NSW Office of Environment and Heritage, 2012, Feary and Donaldson, 2015). In the late 1800s Indigenous people in Moruya were described in Census information as "remarkably well off and can earn the same wages as Europeans" on account of the income earned through fishing operations (Feary and Donaldson, 2015). A number of reserves established around the turn of the 20th century on the South Coast were established by Aboriginal people as a base from which fishing operations could be conducted (Feary and Donaldson, 2015, Goodall, 1996). As a result, a number of NSW Indigenous communities have built up a strong cultural connection to the tradition of professional fishing (Schnierer and Egan, 2012, NSW Office of Environment and Heritage, 2012). Fishing played a critical role in the survival of many Indigenous families and communities on the coast of NSW and is inextricably linked to many personal histories as well as the histories of many of their settlements. See Box 8 for one such example in Wreck Bay on the South Coast of NSW.

The way in which Indigenous professional fishing is viewed by the wider community varies significantly, often depending on the level of connection to the Indigenous community. Many of those we interviewed within or closely connected to Indigenous communities look to professional fishing as another aspect of the deep cultural connection to fishing, to cultural foods and to Country in general. Two main areas of concern emerged from these interviews. Firstly, there was a great deal of

concern about the steady decline in Indigenous involvement in the professional fishing industry, with extensive discussion on the barriers and regulatory hurdles which had progressively restricted entry into the industry for Aboriginal people. Interview participants indicated high levels of stress and anxiety as a result of decline in Indigenous involvement in NSW professional fisheries. The second area of concern relates to wider issues around the recognition of cultural fishing rights.

Comments from non-Indigenous community members and fishers were not always supportive of recognising these cultural fishing rights. Interview participants who were not supportive expressed an understanding of culture as static and unchanging. They contended that modern fishing methods could not be considered cultural fishing because they were not consistent with pre-colonial fishing methods or materials. Others raised concerns about links between cultural fishing and illegal activities such as trading in drugs. Another form of disagreement with cultural fishing for Indigenous people was expressed in terms of non-Indigenous people also having strong feelings of connection with the ocean that they felt deserved equal recognition.

> **You've got a Yamaha outboard motor on the back of your boat, how's that traditional fishing? No, there's no such thing, not here anyway. There might be in the Arnhem Land, but not here. I'd say nowhere in New South Wales, on the coast.**
>
> *Community member/recreational fisher – (170914-1) Great Lakes – Hunter*

These attitudes are likely to be relatively common within the wider public and therefore pose a significant challenge in building community support for appropriate recognition of Indigenous fishing rights. Decisions about this area are in part questions of law, and will be decided through the court system without reference to community attitudes. Building support and understanding within the community for appropriate recognition of the historical and cultural value of fishing, including professional fishing, is, however, desirable for the long-term health of community relations.

BOX 8. WRECK BAY FISHING COMMUNITY

Wreck Bay is located south of Jervis Bay on the NSW South Coast. European settlers moved into the South Coast area, establishing farms and timber harvesting operations around the Shoalhaven River in the early 1800s. Disease, dislocation and conflict lead to a decline in the Indigenous population in the area, with only small camps remaining by the1840s. Towards the end of the 19th century it was common practice for the Office of Protector of the Aborigines to supply these encampments with fishing boats and gear, intended to be a means of subsistence and income. A small, intermittent encampment of Indigenous people was established in Wreck Bay sometime after 1914. The new community was made up of families closely linked through marriage and blood ties to people in nearby reserve communities and the waterway was regularly fished by Indigenous crews travelling along the coast. A 1922 census of the now permanent community at Wreck Bay counted 25 residents and all the males in the community were listed as 'fisherman', illustrating a strong economic reliance on fishing.

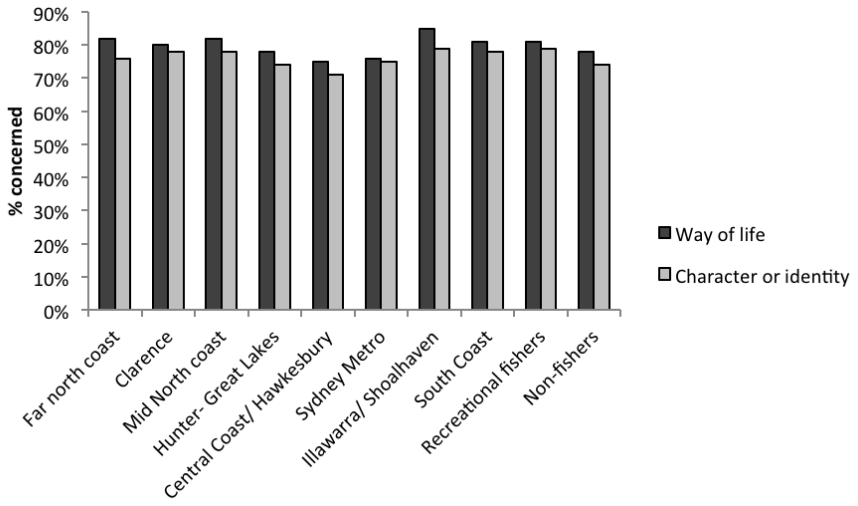
Seven or eight crews operated out of Wreck Bay during the peak fishing season, between Christmas and Easter. During the 1950s this was managed via rotation, each crew had the rights for 24 hours or until shooting its net, when it was the turn of the next crew. During the off months the men went to the timber mills or picked vegetables. During the Depression the lack of rations meant community members needed to provide alternative income and food sources. This included gathering Abalone which were bought for 'sixpence a pound' from 'a Chinaman who came down from Sydney'. Prominent Wreck Bay fisher, Charlie Ardler, earned the equivalent of $1.50 for a half day taking guests at a nearby guest house the fishing. Government reports in 1963 indicated the high standard of housekeeping and low levels of unemployment in the area.

In 1965 control of Wreck Bay transferred from the Welfare Board to the Department of Interior and the community became an 'open village' (i.e. open to non-Indigenous people). Despite this the community remains closely linked to its Indigenous and fishing heritage. The very existence of the Wreck Bay community today owes much to its involvement in professional fishing (Egloff, 1981, NSW Office of Environment and Heritage, 2012).

4.6.2 Importance to the community of the contributions of the industry to a shared sense of community identity and to local cultural heritage

The fieldwork interviews demonstrated that many people connected with the industry also feel a strong connection to the cultural heritage value of fishing and the importance of maintaining connections across multiple generations of fishing families. There was significant discussion about whether many villages and towns in NSW have retained their 'fishing village' identity. This was explored further through the community surveys by asking respondents whether they felt that the loss of the industry would have detrimental effects on the sense of identity amongst fishers and the community (Figure 21). Seventy-six percent of respondents were concerned about a loss of character or identity from further reductions in professional fishing. This high level of agreement was consistent across all the study areas, although slightly higher in regional centres and lower in the urban areas of Sydney and the Central Coast. A similar degree of concern (84%) was also indicated in the questionnaire of fish merchants.

FIGURE 24. General public questionnaire - percentage of respondents 'concerned' or 'very concerned' about the following possibilities 1) "Loss of professional fishing as a way of life if allowable catch or fishing areas are restricted" and 2) "Loss of the character or identity of NSW coastal communities if allowable catch or fishing areas are restricted"



4.6.3 Discussion

The cultural heritage value of the NSW fishing industry is visible in the jetties, wharves, co-operative buildings and old wooden vessels that are situated along its coast. Recognising and protecting these values is a concern not just for the industry but for the community as a whole, given many NSW coastal villages and towns owe their existence and growth in large part to the professional fishing industry. Much of the history of the industry is contained in the records and the stories of fishing families. We visited fishers with decades of accumulated photos, articles, and personal histories stored in their homes and in their memories. These tell the story not just of the industry but also of the towns in which the industry was born, and this is a story that is yet to be told in a comprehensive way in NSW. Our research shows that many within the community have a desire to capture and preserve the character and traditions of the many 'fishing villages' that are dotted along the NSW coast and this is an area where urgent work is required given the rapid pace of change that is being experienced in many of these communities. In addition, community-wide education on the importance of Indigenous and non-Indigenous fishing to the state's history would assist in building support for protecting modern expressions of these vital aspects of Indigenous culture.

4.7 LEISURE AND RECREATION

Table 29 outlines the main indicators and methods used to investigate the NSW professional fishing industry's contributions to leisure and recreation.

TABLE 29. Indicators and methods used to investigate the contributions of professional fishing to leisure and recreation

Contributions of the NSW wild-catch fishing industry		Indicator	Methods
Material	Contributions of the fishing industry to community recreation	Contributions of infrastructure for recreational users	Qualitative interviews Social questionnaire – fish merchants
		Contributions of bait for recreational fishing	Qualitative interviews Social questionnaire – community and fish merchants
Relational	Social connections and interactions between the wild-catch industry and recreational users	Contributions of fishing knowledge to recreational boaters and fishers	Qualitative interviews
Subjective	The level of importance recreational users put in the provision of local services and infrastructure by the fishing industry	Importance of local bait to recreational users	Social questionnaire – community

4.7.1 Contributions of the fishing industry to community recreation

4.7.1.1 Contributions of infrastructure for recreational users

Our fieldwork interviewees included a range of people involved in the provision and maintenance of infrastructure that services both professional and recreational users. They included professional operators of slipways, co-operatives and representatives of the NSW Government who have oversight of public infrastructure such as wharves, jetties and harbours. These interviews indicated that management of professional fishing ports and harbours on the NSW coast has become increasingly expensive and complex as environmental standards improve and conflict between different user groups increase. Community debates over whether professional fishing still plays an important role in ports originally established to service the industry are currently playing out up and down the coast, including Coffs Harbour, Port Macquarie and Wollongong.

> [A] couple of years ago we had one of our politicians who was trying to kick the trawlers and the fishing boats out of the harbour to make it into a marina. I was very surprised at how the community supported the professional industry and they wanted to leave this a working harbour, because that's what it's been I suppose since day dot it's been a working harbour. It was a good feeling to see the community get behind the fishermen and show their support... when we were fighting to leave it a working harbour one of the main things was that we leave it as a public access. We didn't want a marina, which was going to be fenced off and only limited people using it. The harbour's there for everyone to use, if it's professional, recreation or just public in general.
>
> *Fish retailer (190515_1) Illawarra – Shoalhaven*

The NSW wild-catch industry contributes to the provision of public infrastructure in a variety of ways. Often the industry participants, especially co-operatives, lease crown lands in areas suitable to maintain their operations. These port and harbour areas are often at the centre of the settlements due to fishing being one of the foundation industries of many NSW coastal towns and the historical reliance on shipping as the main form of transportation. Towns, therefore, built up around these ports over time (see Section 4.6). This means that many co-operatives are situated in what is now considered to be prime waterfront land. Lease fees associated with the land as well as fees charged for use of moorings and jetties are paid to the NSW Government but are not sufficient to meet the costs of maintenance and upgrades. The nature of these leases means that tenure is not secure for the industry and most co-operatives would struggle to compete in an open market for these locations if they were to be put out to tender. A recent example of this was seen in Port Macquarie where the co-operative has been forced to close despite strong support from the local community, including the local council. Its position was seen as highly desirable by other competitive interests and the co-operative was ultimately unable to compete. By way of contrast, the Bermagui co-op, which owns the land it occupies, has security of tenure and was able to redevelop its site, with assistance from Government grants, into a major tourism attraction for the town. The new building housing the Bermagui Co-operative is a physical expression of the interconnections between professional fishing and the tourism, hospitality and recreational boating sectors co-existing in the same space rather than competing or pushing each other out.

NSW ports and harbours undergo regular assessment to determine priorities for funding of maintenance and upgrades, including regular dredging works. The determination on priority areas is based in part by its level of importance and viability for professional fishing and shipping. Interviews with representatives from Crown Lands indicate that recreational use of many port areas is increasing over time and that there is a corresponding increase in pressure for greater security on wharves. Many wharves allocated for recreational vessels are not available for public use or access for this reason. Wharves and jetties associated with the professional industry, on the other hand, may have some public access restrictions placed on them due to occupational health and safety concerns. Port Stephens and Sydney Fish Market professional fishing wharves, for example, have restricted public access. However, the majority are still open to the public and are popular

locations for people to walk along and look at the boats. Recreational fishers also use these jetties and wharves as safe, accessible fishing platforms.

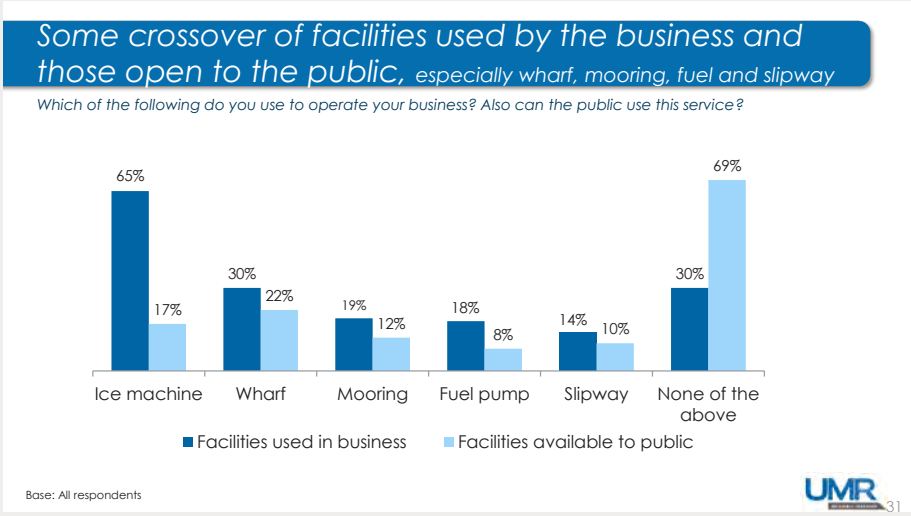
> **We know that licenced jetty, we can fence it off and whatever but we insist on leaving it open to the public because it's just making people realise where their fish come from. They always ask how long did the boat go out for. Is this a good catch? You know, they're the things that they ask... we're finding in December, January when there's a lot of tourists here, there'd be 20, 30 of them, people down on the jetties watching the boats unload, taking photos with their kids with tunas and stuff like that. We encourage it. We know that it's a fine line between OH&S too but we've just got to make sure that they're safe. We encourage it.**
>
> *Co-operative Manager (060515_1) South Coast*

Of particular note is the provision of slipways by the professional fishing industry, often co-operatives. The numbers of slipways in NSW have declined over the last few decades, despite an increase in the number of large recreational vessels on the water. While slipways now primarily cater for recreational vessels such as large yachts and cruisers, they are often managed, maintained and run (often at significant cost) by co-operatives and other businesses that service the professional wild-catch industry.

> **It's not a profitable organisation, the co-op. A co-operative is to give service at the right cost. We just need that little bit to... maintain –we probably need to spend fifty thousand dollars on the arms and the cradle [of the slipway] there. It's getting to that stage. And we need to collect that fifty thousand dollars, which we haven't got.**
>
> *Co-operative Board Member (270315_1) Illawarra – Shoalhaven*

The material contributions to recreational activities outlined above were also explored through the fish merchant questionnaire. As indicated in Figure 25, a number of larger fish merchant businesses (especially co-operatives) manage or own infrastructure, which is available for recreational users, including fishers and boaters. This is especially the case for wharfs, slipways, moorings and fuel. Ice machines are a common feature of fish merchant businesses. The public cannot usually buy ice directly from these businesses, but our qualitative research suggests that ice is one of the most significant in-kind contributions made to local community events and groups by fish merchants. Furthermore, in some locations, such as Eden, there are professional ice suppliers whose main year-round business is the professional fishing industry, but during summer they also supply the public and recreational fishers.

FIGURE 25. Fish merchant questionnaire – infrastructure available for public use



4.7.2 Contributions to recreational fishing

The qualitative interviews explored ideas around three main indicators across all three wellbeing types (material, relational, subjective):

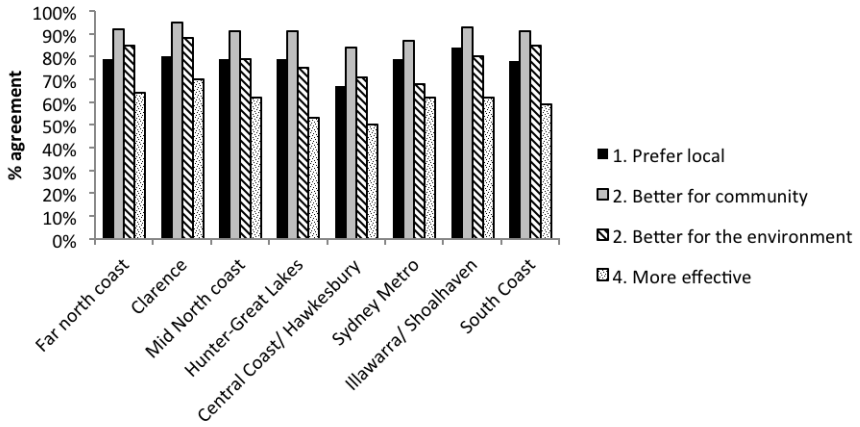
- Contributions of bait for recreational fishing (material)
- Contributions of fishing knowledge to recreational boaters and fishers (relational)
- Importance of local bait to recreational users (subjective).

The fieldwork interviews suggest that recreational fishing relies on professional fishing in a number of important ways. As we have seen in the preceding sections, the wild-catch industry provides a number of services to recreational fishers, including sharing knowledge (Section 4.3), working on improvements in water quality and environmental conditions that benefit both sectors (Section 4.4), and providing a range of infrastructure used by recreational boaters and fishers (see above). The most significant contribution made by the industry, however, is in through the provision of bait (see also Section 4.1). The importance of this market has led many within the industry to specialise in this area only, with some fishers commenting that they receive a higher price for their product as bait then they do if sold for human consumption. Australian recreational fishers have high expectations in relation to the quality of the bait they purchase.

> **If you don't sell human consumption [standard] for bait you will not last, you will go broke. They do because they try to think, Oh well, that stuff there if we can get it cheap we'd be able to put it in bait bags, but when people go in the shop for their bait they want top quality.**
>
> *Wholesaler (040515_2) South Coast*

Our questionnaires revealed that recreational fishers put a high value on access to local bait supplies, with 78% of recreational fishers across the state agreeing or strongly agreeing that they preferred local bait, even if it is more expensive. This support is primarily driven by a desire to support the local community (90% agree), with environmental benefits (79% agree) and beliefs around improved catches (60% agree) secondary motivations. These high levels of support for local bait were consistent across all the study areas, although they were slightly lower in the metropolitan regions of Sydney and the Central Coast (Figure 26).

FIGURE 26. General public questionnaire (recreational fishers) responses – percentage agreement with the following statements: 1) I prefer to use local bait even if it is more expensive, 2) It is better for my local community to purchase local bait than bait sourced from other countries, 3) It is better for the marine environment to purchase local bait for recreational fishing than bait sourced from other countries; and 4) I can catch more fish when I purchase local bait than bait sourced from other countries.



In addition, the fish merchant questionnaire indicated that 43% of fish merchants surveyed sold recreational bait, and 91% indicated that their customers had a strong preference for locally sourced bait.

4.7.3 Discussion

One of the biggest assets of the wild-catch industry is also one of its greatest threats – the location of key infrastructure on prime waterfront land. Increasing pressure for space for recreational infrastructure, including marinas, and the desire for development of waterfront land is making it increasingly difficult for co-operatives and professional vessels to maintain their historical presence in regional ports and harbours. Yet the results of this research have indicated that the presence of the industry is valuable in these areas in that it assists in maintaining public access, servicing recreational vessels through fuel provision, moorings and slipways, and adding to the character and appeal of an area. Furthermore, the cases of Bermagui and Newcastle co-operatives show that professional fishing can fit centrally within redeveloped waterfront areas and reflect contemporary community and professional interests.

Similarly, the divisive nature of resource access struggles between some sections of the recreational and professional fishing communities belies the fundamentally complementary way in which the two sectors actually exist. The strong desire amongst recreational fishers for locally sourced bait products points to a need to maintain and support the wild-catch industry across NSW.

4.8 Assessing the strength and importance of industry contributions to wellbeing

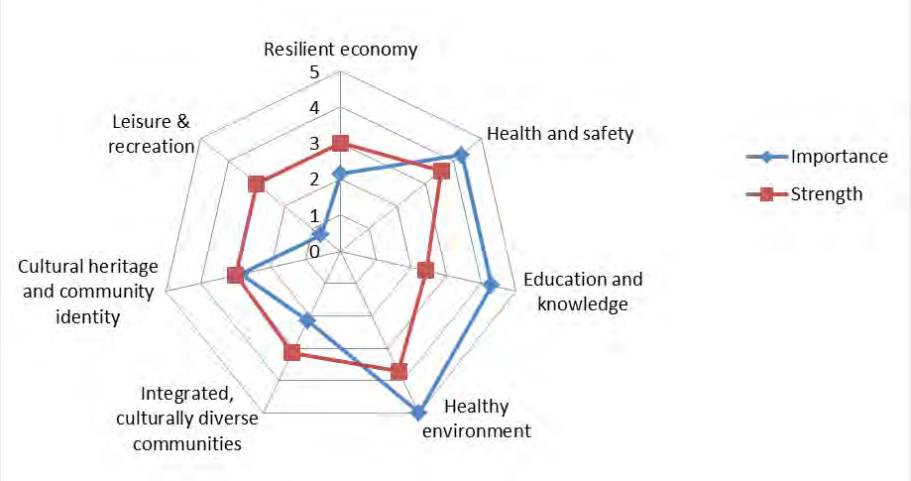
This research Project has identified an approach to measuring community wellbeing and has investigated each of the key component areas of wellbeing in relation to the NSW professional fishing industry and its associated community. As a mixture of economic and social indices, there is no "right" weighting in respect of the perceived importance of each of the attributes of community wellbeing. The research has contributed a framework to identify key socio-economic attributes. In this section we recognise that the values put on each attribute by various actors will likely differ and we seek to investigate this.

In the next section we present the results of trialling a new tool for assessing stakeholder perceptions of the strength and importance of industry contributions to community wellbeing. The tool was trialled at two workshops on our preliminary findings about the wellbeing contributions of the fishing industry: one for industry members and the other with government officers. Based on the project interviews and community questionnaire, the project research team then completed a ranking of community perceptions of the strength and importance of contributions. If the tool is to be used further in NSW for ongoing monitoring of social and economic contributions, or used outside NSW, it should be tested with larger groups of industry and government stakeholders, and with community representatives, rather than filled out on their behalf by researchers. Nevertheless, this trial run provides some useful pointers to which of the contributions are at highest risk, and to similarities and differences between the perceptions of stakeholder groups. It also indicates that with further development the tool could be a beneficial part of an ongoing methodology for monitoring the social and economic contributions the fishing industry makes to its communities.

4.8.1 Industry workshop

A workshop of industry representatives was conducted on the 14 March 2016. The Project results were summarised for the attendees and the workshop participants were asked to give each dimension of wellbeing a score out of 5 in order to rate both the importance of the industry's contribution to that dimension of wellbeing, and the strength of that contribution. The individual ratings were averaged to provide an overall industry assessment of strength and contribution (Figure 27). These scores allowed for the identification of priority areas in which intervention is needed to improve the strength of a set of contributions to bring it in line with their perceived importance.

FIGURE 27. Industry assessment of importance and strength of contributions (scores out of 5)



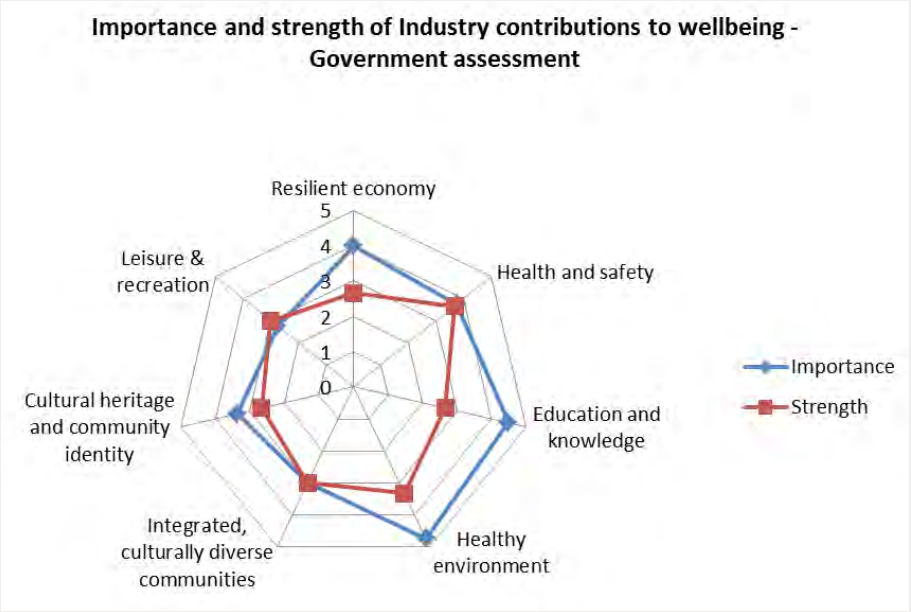
The most significant gap between importance and strength of a contribution from an industry perspective relates to education and knowledge generation. Industry contributions to this dimension of wellbeing are considered by industry to be one of its most important, but also one of its weakest. The main threats inhibiting the ability of the industry to maximise this contribution included: the lack of opportunities for new entrants; the ageing of the industry; and industry regulations limiting the ability of fishers to pass on their knowledge. That loss of knowledge in turn has the potential to undermine many of the other contributions of industry to coastal communities.

Workshop participants noted other areas of concern. These included community health and safety, which focused mainly on declines in the availability of local seafood. Identified threats to these contributions include the overall decline in the industry, the reform process, loss of resource access, and competition from imports. Industry contributions to a healthy environment were also believed to be threatened by upstream impacts, regulations that force shifts in effort, and disengagement or bad practices within the industry. Concerns relating to all forms of social capital are weakening the ability of the industry to meet its potential in contributing to integrated, culturally diverse communities. Finally, workshop participants believe that, relative to its size, the industry is making strong but not yet widely recognised contributions ('punching above its weight') to leisure, recreation and local economies.

4.8.2 Government workshop

A workshop of Government representatives was conducted on the 4 April 2016 in the same manner as the industry workshop. The most significant areas of concern (based on this government assessment) are industry contributions to a healthy environment and local economies, as well as education and knowledge generation (Figure 28). The managers who participated in this exercise rated all the industry contributions relatively consistently at a moderate strength but considered the contributions to these dimensions of wellbeing as the most important.

FIGURE 28. Government assessment of importance and strength of contributions (scores out of 5)



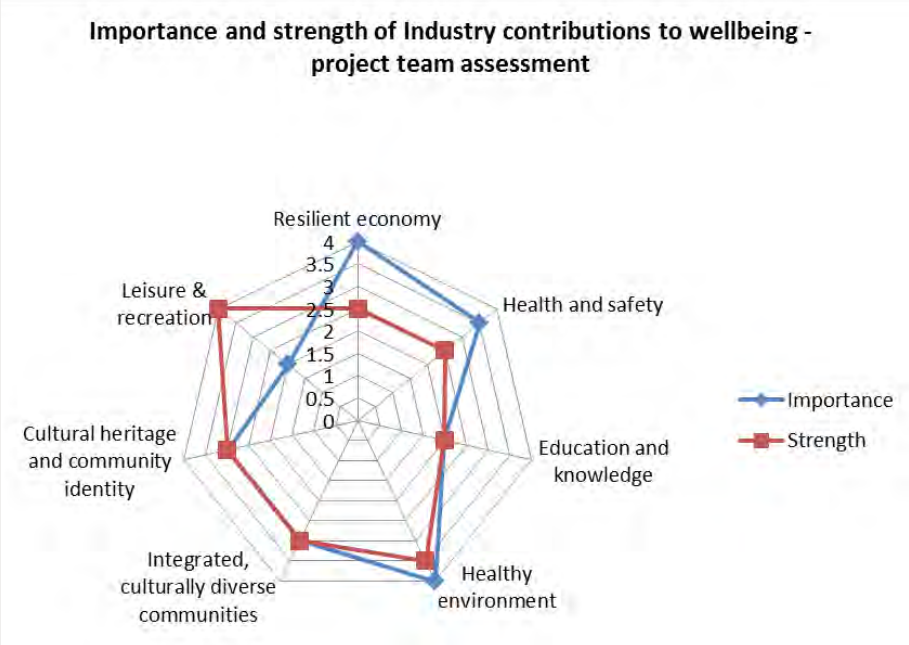
The perceived main threats inhibiting the ability of the industry to maximise these contributions were also fairly consistent and included:

- Problems with social licence
- Delays in the reform process due to resistance to change within the industry (managers indicated that they considered the reform necessary to counteract the 'race to fish' mentality and build the profitability of the industry)
- Lack of business knowledge and management skills and lack of effective marketing and communication strategies within the industry
- Internal industry division
- Political threats (i.e. changes in policy direction) and pressure from recreational fishing lobby groups
- Cheap imports
- Access restrictions
- An ageing industry without clear succession planning.

4.8.3 Community assessment (undertaken by project researchers)

There was no workshop with community representatives conducted as part of the second round of fieldwork, so the project team analysed the results of the community questionnaire and the fieldwork interviews as a proxy for community perceptions about the strength and importance of industry contributions to wellbeing. They determined that the community places the highest degree of importance on the economic and environmental contributions of the industry and has lower levels of awareness (and therefore belief in the importance) of the role of the industry in education and knowledge generation, and leisure and recreation. The project team surmised that community attitudes in relation to the strength of the contributions of industry to each dimension of wellbeing were consistently moderate, however contributions to leisure and recreation were particularly strong (Figure 29).

FIGURE 29. Project team assessment (on behalf of the NSW community) of importance and strength of contributions (scores out of 5)

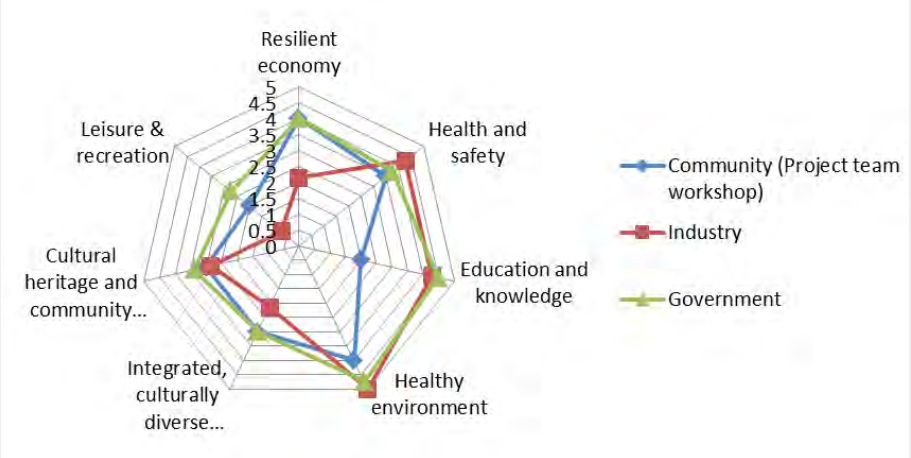


4.8.4 Discussion

Comparisons of the responses across these two workshops and the project team assessment indicate some striking and informative differences between assessments of the importance of industry contributions to each of the dimensions of wellbeing. Perhaps most significant in light of the current reform process aimed at improving the economic viability of the industry, was the industry's own low self-assessment of the importance of economic contributions in comparison to government and community assessments. This may be a reaction to the external pressure being put on industry due to the reform process required to address

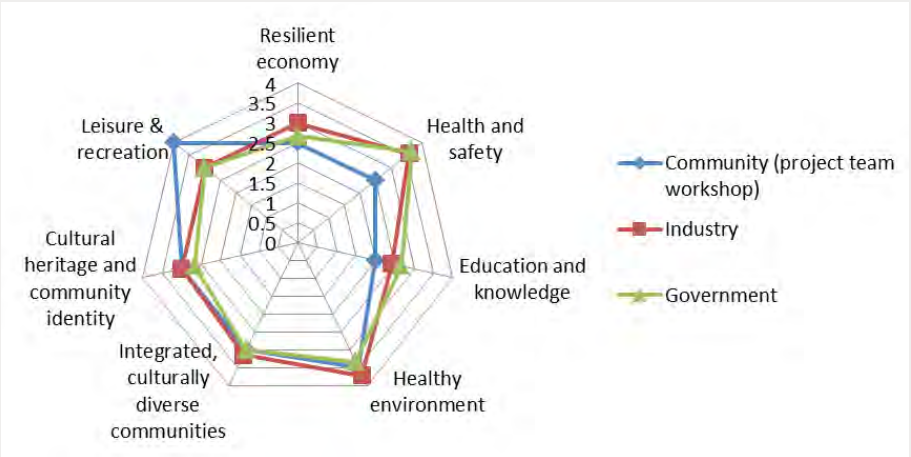
economic concerns identified in the previous reviews. There is no way to test this. Also significant is the low level of emphasis placed on the knowledge and learning provided by the industry to the community, despite both government and industry ranking these contributions as some of the most significant (Figure 30).

FIGURE 30. Comparison of community, industry and government assessments of importance of contributions (scores out of 5)



A similar analysis of the strength of contributions found that all three groups ranked the contributions relatively consistently. The rankings relating to health and safety were slightly lower in the community assessment than the industry and government assessments, reflecting the stronger preference for Australian over local products as was demonstrated in the general public questionnaire (Figure 31).

FIGURE 31. Comparison of community, industry and government assessments of strength of contributions (scores out of 5)



This comparative analysis is the first of its kind in NSW and enables the different perspectives held by industry, government and the community to be identified in an open context. The comparisons are communicative and can assist each of the parties to realise differences in worldview and also differences in priorities related to the roles of each of the sectors. For example, for DPI staff in their role as government managers, we would expect the objectives and responsibilities of the *Fisheries Management Act 1994* to influence their rankings of importance. There are also issues of exposure, with government and industry and the general public not having many opportunities to exchange their respective perspectives.

As a relatively independent tool this initial assessment has the potential to include community wellbeing within fishery management frameworks. It is recommended that the tool be further tested and then used on an annual or biannual basis to measure whether perceptions in relation to strength and importance of industry contributions change over time.

5. CONCLUSION

The objectives of this Project related to identification of the range of social and economic contributions of the NSW wild-catch industry to local communities in order to improve social and economic evaluation methods and thereby improve future assessments of fishery sustainability and viability.

The origins of this Project were in a sense within the professional fishing industry that the current valuation of the industry by government should not just be about dollars and cents, and that government involvement with the fishery sector significantly undervalues the width and depth of a range of societal contributions made in coastal rural communities in regional NSW. The research finds there is a suite of wellbeing contributions to rural and regional communities, as well as to fishing communities. The challenge is to keep these societal flows sustainable and viable, with fishery management conducted with awareness of its role in maintaining social wellbeing. The failure to recognise these wellbeing contributions risks serious damage to societal welfare.

NSW Government agencies are under legislative obligations in the *NSW Fisheries Management Act 1994* to adhere to the principles of Ecologically Sustainable Development that are defined in the *Protection of the Environment Administration Act 1991*. These guidelines address economic and environmental integration, include inter-generational equity, but omit intra-generational equity – one of the key ESD principles. This has led to poor processes and tools to include social aspects, such as community wellbeing, in fisheries management. Part of the reason for this omission may be that in fisheries management pursuing social wellbeing has been misinterpreted as proposing a social stock management objective, instead of stock management objectives, such as maximum sustained yield or maximum economic yield.

This project has demonstrated that at any point in implementing a fisheries management objective, community wellbeing can be measured across a range of its components. Not having sufficient awareness or processes to measure community wellbeing leaves the fisheries management process deficient in understanding community welfare, with implications for the stakeholders and government. In the case of NSW the long-term and slow industry reform processes towards improved stock management objectives have taken much longer than all parties envisaged. The call by industry for this project reflects that against such a policy background, lives are on hold, individual and community futures are uncertain, and people are interested in receiving more information to enable their transitioning into the future. We propose that this community wellbeing framework is a tool that can inform all parties in these difficult circumstances, especially if it is conducted periodically, revealing changes over time.

An example of the inadequacy of current regulations may be seen in current impact assessment processes which focus largely on ecological and economic impact and neglect wider social impacts (Voyer et al., 2012). Regulations managing fisheries are designed to address the behaviours of individual fishers but socio-economic impact assessment processes, when they are conducted, are usually focused on a regional scale and fail to account for all the relevant dimensions of community

wellbeing, including fishing community wellbeing. The Project has systematically and comprehensively identified a range of contributions and benefits flowing from the wild-catch professional fishing industry as well as highlighted potential threats to these contributions. This provides a useful framework from which regulators can frame social and economic impact assessment processes as well as a tool by which policies can be assessed against in order to investigate the extent to which they comply with all ESD components. This is of value in the NSW context, but is also likely to be applicable to other jurisdictions around the country and globally (see Section 7.2).

Recommendation: *Integrate the wellbeing framework into the management and industry reporting process by conducting annual or biannual reporting against each dimension of community wellbeing, and by formalising consideration of each dimension of community wellbeing in regulatory and socio-economic impact assessment processes.*

The following section outlines how these findings can be further translated into tangible outcomes that support, maintain and grow these contributions. It does so by outlining the top five challenges that will require industry and Government cooperation and effort to address.

5.1 Maintaining diversity and flexibility

The research outlined in this document clearly highlights the range of ways that the industry interrelates with and supports a broad diversity of other industries and community groups. The ability of the industry to remain flexible to changing conditions and respond quickly to new circumstances is essential to its long-term success, especially in the face of increased pressure from globalisation and a changing climate. Moreover, flexibility and adaptation are a necessary part of professional fishing in the particular NSW environmental context, particularly for 'Group B' fishers. While government and some sections of the industry have concentrated largely on consolidation of the industry as a means of growing business viability, alternative pathways to improved profitability may also be of value. The Project uncovered a range of ways fishers and the fishing industry in general are already adapting and innovating in order to develop new markets and gain maximum value for their products. The different market options available to fishers and co-operatives, including local supply chains, bait markets and links with tourism and hospitality businesses, could be the subject of future research in the links between recreational fishing, professional fishing and marine tourism. This will allow fishers and co-operatives to make informed choices as to the best possible way to maximise profits and grow overall industry contributions to a resilient local economy.

Flexibility is also required within government in relation to its understanding of how different sections of the industry view their own business viability and the importance of maximising profits. Our research revealed two main schools of thought, with 'Group A' fishers focusing on growing their businesses, maximising profits and creating employment and revenue for local communities. It is important

for these businesses that government regulation avoids inhibiting this growth as much as possible, within the limits imposed by sustainability considerations. This appears to be the primary focus of the current reform process. It is equally important however to recognise that are large proportion of the industry, the 'Group B' fishers, are less concerned with maximising profits but more with maintaining a sustainable living that allows them to continue in a profession with which they have strong ties and, for some, may be the only employment avenue available to them. Current and proposed regulations run the risk of disincentivising diversification of fishing interests for these fishers – many of whom rely on multiple endorsements across a number of fisheries. This may have significant consequence for the resilience of the industry and the communities they support (Aguilera et al., 2015). These small scale 'Group B' fishers constitute much of the fishing activity in NSW and therefore fisheries management models need to be responsive to the needs of both 'Group A' and 'Group B' fishers.

Recommendation: *Conduct market research into supply chains and interactions with the post-harvest sector, outlining the alternative marketing options available to fishers and tourism operators, including advice on accessing local markets and building connections with the tourism and hospitality industry.*

Recommendation: *Conduct psychological, anthropological and/or social research into fisher motivations, values, networks, communication preferences and business management approaches and how they might be better considered in the development of fisheries management models and effective engagement strategies (e.g. through a peak body or through regional economic bodies) building on the findings of Plowman and MacDonald (2013).*

5.2 Managing for inclusion not division

An overriding theme to emerge through the research results is the destructive impact of current debates that segregate and polarise users of coastal resources. Debates over resource allocation in some areas of the state have degenerated into toxic and bitter 'us versus them' feuds, undermining social cohesion and deflecting attention from more pressing issues of concern. Our data clearly demonstrates that recreational and professional fishing is not an 'either/or' proposition – both have socially and economically important roles to play in NSW communities, especially in regional areas, and furthermore they are interdependent. Similarly, tourism (including recreational fishing tourism) and professional fishing are not mutually exclusive but support each other. Management exercises and planning strategies should seek to develop and enhance areas of common ground rather than buying into simplistic arguments which pit one use against the other and call for one sector's contribution to be 'weighed up' against another. A key component of encouraging more inclusive debates lies in building all forms of social capital to enhance bonds within the industry, between the industry and the wider community, and between industry and government. This may require reassessing some aspects of fisheries regulation which have been designed primarily to manage environmental impacts without due consideration of social and economic impacts. This in turn, would require assessing social and economic

benefits from conservation efforts, so as to be able to evaluate them with respect to the contributions of professional fishing. It may also require reassessing the approach of attempting to handle user conflicts through excluding professional fishers from areas of water. The extent of exclusion is now threatening the viability of professional fishing in some areas, and our research clearly shows that this is not in recreational fishers' interests. Recreational fishers want to be able to buy fresh local seafood as well as catch their own, they want professional fishing to remain for the benefit of local economies and cultural heritage, and they rely on professional fishing for bait, other supplies and boating infrastructure.

Recommendation: *Develop strategies to build and enhance bonding social capital, in order to build industry resilience and cohesion. These would be most effective if they built on existing activities that facilitate bonding social capital (e.g. the annual Mullet haul and co-operative board meetings).*

Recommendation: *Develop strategies to build and enhance bridging social capital between industry and local communities, especially local environmental groups or recreational fishing clubs where there is mutual benefit in working together on issues of concern (e.g. habitat destruction, impediments to fish passage or water quality issues).*

Recommendation: *Develop a communication and engagement plan to address concerns around social licence, including providing targeted information to recreational fishers highlighting the results of this Project and the areas of mutual interest that exist between the professional and recreational sectors. In addition, develop general information about inshore fishing methods, statistics on environmental performance (including levels of bycatch), the value of the industry to local communities and the stories of local fishers to coastal residents, especially those residing in areas where fishing is a visible presence.*

Recommendation: *Develop strategies to build and enhance linking social capital between all layers of government and other sectoral groups. Consideration should be given to organising industry representation through regional economic networks, rather than only through fishing industry associations. These should include enhancing industry networks with environmental, regional development and tourism authorities to facilitate the development of mutually beneficial relationships aimed at improving environmental health of waterways and the growth of 'seafood' tourism. This tourism should include promoting seafood industry experiences as well as meals, for example, experiencing a Mullet haul or watching vessels unload at commercial wharves.*

Recommendation: *Deliver targeted counselling and mental and physical health support services, tailored to the needs of the professional fishing community as per King et al. (2014) to address the impacts of industry marginalisation and regulatory uncertainty.*

5.3 Supporting the transfer and growth of fishing knowledge

The NSW fishing industry is entering a period of significant opportunities but also significant challenges. One of the most fundamental tools required to meet the challenges and embrace the opportunities lies in the knowledge and experience held within an ageing and increasingly marginalised fishing industry. This knowledge is being lost as fishers exit the industry. This was the priority area of concerns for both industry and government in the workshops conducted in the second round of fieldwork for the Project. A fundamental challenge of the industry therefore lies in attracting and retaining new entrants, capturing the knowledge of existing and past fishers and supporting the relationships that allow for this knowledge to be shared and passed on between generations of fishers. This requires accepting that fishing largely operates on a system of informal and on-the-job training and that the knowledge held by fishers is closely guarded intellectual property. Teaching and mentoring requires a relationship of trust and mutual respect that is built up over time and cannot be taught in formal classroom settings. Therefore, significant efforts need to go into supporting and encouraging the establishment and maintenance of bonding social capital within the industry (see also Section 5.2). On the part of government, regulations could be redesigned to facilitate important relationships and support learning and capacity development within the industry, for example, through development of trainee licenses and removal of regulations that restrict crew involvement in fishing activities.

Recommendation: *Research and collate the environmental and social history of professional fishing in NSW with special focus on the environmental knowledge and oral histories of current and past members of the industry.*

Recommendation: *Develop opportunities for new entrants to enter the industry, within the relevant regulatory constraints on licence numbers and required share-holdings. These opportunities should aim at industry renewal as ageing fishers retire, for example, through trainee licences, a loans scheme or discounted licencing period to encourage new entrants to take up licences as they become available.*

Recommendation: *Support the ongoing delivery of the OceanWatch Master Fisherman program to develop and recognise the range of skills required to be a professional fisher in NSW, including small business management, regulatory knowledge and environmentally friendly fishing practices.*

Recommendation: *Develop a long-term strategy for ongoing training and mentoring of new entrants, including opportunities for informal learning with established fishers.*

5.4 Accountability and transparency

This research reveals that support for the NSW coastal fishing industry is largely predicated on trust in its sustainability. NSW consumers are keen to embrace their local industries but are inhibited by problems in discerning whether the products they buy are local and confusing messages about whether the industry is environmentally friendly and sustainable. This is partly a problem with internal industry practices requiring enhanced traceability and marketing around local products. It also lies in the lack of clear, easily accessible and independently verified information about the environmental health of NSW fisheries. It is crucial that information about environmental health and sustainability comes from a trusted independent source. The current Threat And Risk Assessment (TARA) process initiated by the NSW Marine Estate Management Authority uses an ecosystem-wide approach to assessing the key threats and risks to environmental, social and economic benefits derived across the entire marine estate (NSW Marine Estate Management Authority, 2016). It involves government agencies, independent experts and stakeholder consultation, and when completed it should provide a greater understanding of the extent to which the NSW professional fishing industry is meeting its sustainability objectives. Further research could be conducted by the NSW Government or industry groups to assess whether these results are seen as 'trustworthy' by the wider community, and the influence they have on community attitudes. As with debates over resource allocation, this information needs to be delivered in a way that recognises that the sustainability of our fisheries and the health of our oceans is a shared responsibility. Where issues of concern exist with current fisheries management, the response will often require efforts within the professional, recreational and cultural fishing sectors. Where wider environmental issues of concerns exist – such as around pollution and habitat damage – these sectors have considerable potential to be powerful allies in addressing these concerns.

Recommendation: *Develop and promote materials from trusted, independent bodies that clearly explain the environmental sustainability credentials of NSW fisheries, including the scale of the threats they pose in context with other environmental threats and challenges to address community confusion about the sustainability of the local industry (as per the current NSW Marine Estate Threat and Risk Assessment process).*

Recommendation: *Develop local branding strategies and traceability protocols and procedures to improve consumer awareness of seafood provenance, especially in wholesale, supermarket and hospitality (restaurant/takeaway) sectors, particularly in metropolitan areas.*

5.5 Considering culture

Fishing is not always thought of as a culturally important activity, but our research indicates that it has strongly supported cultural expression and growth historically and continues to do so in some sections of modern Australia. This is particularly strong amongst Indigenous Australians, where opportunities to embrace culture can also bring with it benefits to health, employment, education and overall wellbeing. At present efforts to manage Indigenous professional fishing are done largely separate to Indigenous cultural fishing and, perhaps most significantly, separate to a range of other state and Federal government policies which seek to improve wellbeing outcomes for Indigenous Australians, such as the Close the Gap initiative. In addition, cultural fishing is often viewed as a resource management and legal 'problem' rather than an opportunity to provide a range of economic, social and cultural benefits to communities experiencing disproportionate levels of social disadvantage.

The cultural importance of seafood to many other ethnic groups within the community was also highlighted in the project and provides significant potential to develop and enhance new and emerging markets, particularly for previously low-value species.

Recommendation: *Develop strategies aimed at maintaining Indigenous participation in the industry, to promote positive change for coastal Indigenous communities, considering the role that participation in professional fishing plays in cultural, social and economic activities of those communities.*

Recommendation: *Conduct a social and economic impact assessment of existing fisheries regulations with a view to revising restrictions that have disproportionately impacted on the wellbeing of NSW fishers and their ability to contribute to community wellbeing, especially in relation to impacts on Indigenous communities. This impact assessment should investigate how much and to what extent restriction or removal of restriction would impact on the wellbeing of NSW fishers and their ability to contribute to community wellbeing.*

Recommendation: *Develop a promotional campaign for NSW seafood targeted at residents and visitors, including from non-English speaking backgrounds, promoting culturally important or popular species such as Sardines, Mullet, Mud crab and Octopus.*

6. IMPLICATIONS

The Project results have a range of implications relevant to industry, local communities, managers, policy makers and other sectoral interest groups, including tourism bodies and recreational fishing groups. Primarily the results indicate that these key stakeholders need to think differently about assessing the 'worth' of the professional fishing industry to include wider community wellbeing objectives. We find that the industry does contribute a wide range of wellbeing values to their regions and that the current government framework does not sufficiently recognise these. Fisheries management information processes and policy initiatives should explicitly consider and discuss impacts on community wellbeing. The Project has delivered a framework for these discussions.

We highlight areas where networks could be enhanced to grow industry contributions to wellbeing, especially by building on the tourism potential of the seafood industry. We also suggest that management responses to resource allocation disputes which seek to exclude professional fishing in favour of recreational fishing may be counterproductive, given the interdependence and complementary elements of the two sectors. Finally, we suggest approaches by which government could remove hurdles which currently restrict or inhibit community contributions from industry reaching their full potential. For example, our workshops with both industry and government people identified concerns around succession planning and the loss of knowledge from an ageing industry as the highest priority area for action in this regard.

7. RECOMMENDATIONS

The principal recommendation (Recommendation 1) for this project involves greater consideration of community wellbeing in NSW Government reporting and socio-economic impact assessment processes. Subsequent recommendations are grouped under thematic areas and were assigned a level of priority (High, Medium or Low) by the Project team (Table 30).

TABLE 30. Recommendations arising from the Project outcomes

Recommended Action	Responsibility	Priority
Recommendation 1. Integrate the wellbeing framework into the management and industry reporting process by conducting annual or biannual reporting against each dimension of community wellbeing, and by formalising consideration of each dimension of community wellbeing in regulatory and socio-economic impact assessment processes.	DPI	High
Further research		
Recommendation 2. Conduct market research into supply chains and interactions with the post-harvest sector, outlining the alternative marketing options available to fishers and tourism operators, including advice on accessing local markets and building connections with the tourism and hospitality industry.	FRDC/ABARES	Medium
Recommendation 3. Conduct psychological, anthropological and/or social research into fisher motivations, values, networks, communication preferences and business management approaches, and how they might be better considered in the development of fisheries management models and effective engagement strategies (e.g. through a peak body or other means) building on the findings of Plowman and MacDonald (2013).	FRDC	Medium
Recommendation 4. Research and collate the environmental and social history of professional fishing in NSW with special focus on the environmental knowledge and oral histories of current and past members of the industry.	FRDC, Office of Environment and Heritage, Universities, historical societies, Mitchell Library, museums	High
Recommendation 5. Conduct a social and economic impact assessment of existing fisheries regulations with a view to revising restrictions that have disproportionately impacted on the wellbeing of NSW fishers and their ability to contribute to community wellbeing, especially in relation to impacts on Indigenous communities. This impact assessment should investigate how much and to what extent restriction or removal of restriction would impact on the wellbeing of NSW fishers and their ability to contribute to community wellbeing.	DPI	High
Strategy Development		
Recommendation 6. Develop strategies to build and enhance bonding social capital, in order to build industry resilience and cohesion. These would be most effective if they built on existing activities that facilitate bonding social capital (e.g. the annual Mullet haul and co-operative board meetings).	FRDC pilot, Industry take up and delivery	High

Recommendation 7. Develop strategies to build and enhance bridging social capital between industry and local communities, especially local environmental groups or recreational fishing clubs where there is mutual benefit in working together on issues of concern (e.g. habitat destruction, impediments to fish passage or water quality issues).	Industry, environmental groups, recreational fishing sector	Medium
Recommendation 8. Develop strategies to build and enhance linking social capital between all layers of government and other sectoral groups. Consideration should be given to organising industry representation through regional economic networks, rather than only through fishing industry associations. These should include enhancing industry networks with environmental, regional development and tourism authorities to facilitate the development of mutually beneficial relationships aimed at improving environmental health of waterways and the growth of 'seafood' tourism. This tourism should include promoting seafood industry experiences as well as meals, for example, experiencing a Mullet haul or watching vessels unload at commercial wharves.	Industry, NSW Regional Development bodies, DPI and Tourism bodies	Medium
Recommendation 9: Develop strategies aimed at maintaining Indigenous participation in the industry to promote positive change for coastal Indigenous communities, considering the role that participation in professional fishing plays in cultural, social and economic activities of those communities.	DPI, Indigenous fishing and community representatives, industry	High
Recommendation 10. Support the ongoing delivery of the OceanWatch Master Fisherman program to develop and recognise the range of skills required to be a professional fisher in NSW, including small business management, regulatory knowledge and environmentally friendly fishing practices.	Oceanwatch and related funding bodies	Medium
Recommendation 11. Develop opportunities for new entrants to enter the industry, within the relevant regulatory constraints on licence numbers and required share-holdings. These opportunities should aim at industry renewal as ageing fishers retire, for example, through trainee licences, a loans scheme or discounted licencing period to encourage new entrants to take up licences as they become available.	DPI	Medium
Recommendation 12. Develop a long-term strategy for ongoing training and mentoring of new entrants, including opportunities for informal learning with established fishers.	Industry in consultation with DPI	Medium
Communication		
Recommendation 13. Develop a communication and engagement plan to address concerns around social licence, including providing targeted information to recreational fishers highlighting the results of this Project and the areas of mutual interest that exists between the two sectors. In addition, develop general information about inshore fishing methods, statistics on environmental performance (including levels of bycatch), the value of the industry to local communities and the stories of local fishers to coastal residents, especially those residing in areas where fishing is a visible presence.	Project communication material	High
Recommendation 14. Develop and promote materials from trusted, independent bodies that clearly explain the environmental sustainability credentials of NSW fisheries, including the scale of the threats they pose in context with other environmental threats and challenges to address community confusion about the sustainability of the local industry (as per the current NSW Marine Estate Threat and Risk Assessment process)	DPI, MEMA	High-Medium (as TARA process progresses)

Recommendation 15. Develop local branding strategies and traceability protocols and procedures to improve consumer awareness of seafood provenance, especially in wholesale, supermarket and hospitality (restaurant/ takeaway) sectors, particularly in metropolitan areas.	Post-harvest sector	Medium
Recommendation 16. Develop a promotional campaign for NSW seafood targeted at residents and visitors, including from non-English speaking backgrounds, promoting culturally important or popular species such as Sardines, Mullet, Mud crab and Octopus.	Industry, post-harvest sector	Low
Support Services		
Recommendation 17. Deliver targeted counselling and mental and physical health support services, tailored to the needs of the professional fishing community as per King et al. (2014) to address the impacts of industry marginalisation and regulatory uncertainty.	DPI in conjunction with NSW Health	High

7.1 Ongoing methodological approach to monitoring contributions

The methodology employed by this Project can be adapted and rationalised to provide a cost effective long-term approach to monitoring the health of industry contributions to wellbeing over time. It is recommended that the framework of social wellbeing be maintained and a monitoring program implemented which involves two main components:

- Annually or biannually:
  - Qualitative assessment of the strength and importance of industry contributions conducted by workshops with representatives from industry, government and the wider community as per Section 5.8. The workshops should involve a preliminary briefing of the key concepts outlined in this document.
  - Indexing of catch and price data using DPI and SFM statistics to monitor trends over time, especially relating to non-SFM sales.
- 5-10 yearly:
  - Qualitative study to ascertain that the same areas of wellbeing are relevant. This could be much smaller and less resource-intensive than that undertaken in this study to establish the baseline.
  - Quantitative assessments through social and economic questionnaires of fishers, the general public, fish merchants and tourism bodies. Response rates to the economic questionnaire should improve once the industry reform has been completed and fishers are able to see (through this report) the way the results of the survey have been used and interpreted.

Table 31 outlines the main indicators that should be used in any ongoing assessment in order to ensure that they can be measured against the baseline data provided in this report. Specific questions to include in future questionnaires are included in Appendix 7.

TABLE 31. Indicators to be used for long-term monitoring

Dimension of wellbeing	Indicator	Method
A resilient local economy	GVP	Sydney Fish Market/ DPI, ABS input/ output
	Business profitability	Economic questionnaire
	Regional inputs	Economic questionnaire
	Beliefs about economic importance of the industry (including amongst recreational fishers)	Social questionnaire – coastal communities
	Use of seafood industry images in tourism promotion	Social questionnaire – Tourism and hospitality businesses
Community health and safety	Purchasing patterns – local seafood	Social questionnaire – community and fish merchants
	Seafood preferences – local seafood	
Education and knowledge generation	Education and training levels	Socio-economic questionnaire of fishers
	Opportunities for informal learning	Qualitative interviews
A healthy environment	Involvement in environmental stewardship activities	Qualitative interviews and socio-economic questionnaire of fishers
	Community trust in industry	Social questionnaire – community
Integrated, culturally diverse and vibrant communities	Social capital	Qualitative interviews
	Product Markets	Socio-economic questionnaire of fishers
	Importance of seafood for community celebrations	Social questionnaire – community
Cultural heritage and identity	Concern over loss of identity	Social questionnaire – community
Leisure and recreation	Importance of local bait	Social questionnaire – community

7.2 Applying the methodological approach in other jurisdictions

The indicators and methods outline in Table 15 are likely to be generally transferable to other jurisdictions in Australia and for similar societies overseas. However, for areas outside NSW it is recommended that a preliminary round of qualitative fieldwork be conducted to validate the applicability of the approach outlined in this report. That is, it should be checked that the seven dimensions of wellbeing identified here are relevant for other communities, and whether other dimensions should be added. In addition, the preliminary round of fieldwork should validate the kinds of contributions that local fishing industries make to those dimensions of wellbeing in the wider community.

8. EXTENSION AND ADOPTION

Extension and engagement strategies which were outlined in the original Project proposal include:

- Brochures/flyers for each of the regions, and
- One page policy summaries for Government bodies including local government and tourism bodies.

These documents are in the advanced stages of drafting and are attached to this draft report for comment and consideration. In addition, the workshops with industry and Government focused on desired communications outputs from the Project. These are summarised in Table 32.

It is also recommended that a follow-up evaluation of the effectiveness of the communication and extension materials be conducted in order to better understand whether the industry stakeholders are adequately equipped with resources for communication and engagement (i.e. to what extent have they used the resources developed). In addition it would be useful to test whether these materials were effective in improving local community awareness of local seafood industry contributions (i.e. were the messages successfully conveyed and accepted? Were they trusted?).

TABLE 32. Communication ideas from the Valuing Coastal Fisheries Project

Communication ideas for project team	Communication ideas for industry
Briefing for state and federal government ministers/MPs/department officials on Project results – focus on social and economic contributions to regional areas and the interdependence/coexistence of rec and pro fishing sectors.	Messages around sustainability of the industry, importance of healthy waterways – focusing especially on metro areas. Make industry a more visible advocate for the environment.
Brochure for each of eight regions – with case studies and stories that highlight fishers role in the community (humanise industry), pick a species and/or a fishing method to highlight i.e. make a local species the hero (e.g. Hawkesbury River Prawns, North Coast Mud crabs/prawns, Mullet, as an overall example).	Marketing especially around local place-based branding and quality of local product, benefits to local community i.e. 'support local' campaigns.
Targeted briefings/media releases for sections of the rec fishing media and regional media outlets focusing on the interdependence/coexistence of rec and pro fishing sectors, and the importance of both contributing to regional economies.	Campaigns that link the fishing industry with new sections of the community, main consumer base – e.g. an art competition that connects local artists with the industry and run the competition to portray some of the contributions of the industry to the region. Seek seed funding for competition (FRDC?), auction artworks and donate proceeds to local charities.
Joint industry/project 'launch'?	Relook at school-based programs.

8.1 Project coverage

Media coverage of the Project so far has included the following:

- A Project Facebook page **www.facebook.com/UTSValuingCoastalFisheries**
- A Project webpage: **www.uts.edu.au/about/faculty-arts-and-social-sciences/what-we-do/research-projects/valuing-coastal-fisheries**
- Newcastle Herald: **www.theherald.com.au/story/2562001/commercial-fishing-study-to-cast-off/**
- Port Stephens Examiner: **www.portstephensexaminer.com.au/story/2566516/researchers-delve-into-role-of-fishing-in-port-stephens/?cs=12**
- The Northern Star (25 Feb 2015): **http://www.northernstar.com.au/news/fishing-industry-fightback/2554397/**
- Great Lakes Advocate (12 Nov 2014): **http://www.greatlakesadvocate.com.au/story/2688743/two-year-study-into-commercial-fishing/?cs=12**
- Manning River Times (5 Nov 2014): **http://www.manningrivertimes.com.au/story/2674497/commercial-fishing-focus-of-financial-study/?cs=1467**
- The Daily Examiner (8 Oct 2014): **http://m.dailyexaminer.com.au/news/study-into-effects-of-fishing-on-communities-will-/2412873/**
- ABC Country Hour (1 Oct 2014): **http://www.abc.net.au/news/2014-10-01/fishing-value-survey/5781714**
- The Bay Post (10 May 2015): **https://www.batemansbaypost.com.au/** [online article, no longer available]
- The Bay Post (7 May 2015): **https://www.batemansbaypost.com.au/** [online article, no longer available]
- The Narooma News (5 May 2015): **http://www.naroomanewsonline.com.au/story/3057053/southern-nsw-commercial-fishing-focus-of-research/?cs=12**
- ABC Local Radio interviews x 2: Kate Barclay (7 May 2015), Michelle Voyer (12 May 2015)
- WIN news TV news (19 May 2015)

9. PROJECT MATERIALS DEVELOPED

- Flyers for the general public (attached)
- One-page policy summaries (attached)

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APPENDICES

Appendix 1. History of the NSW professional fishing industry

The NSW fishing industry, common with many other fisheries, has been in an almost constant state of reform and restructure for close to 150 years, with significant changes to fishing methods, gear and vessels since its beginnings not long after colonisation. Trade and barter of seafood products amongst Indigenous communities is known to have occurred both prior to and after colonisation. In the earliest days of settlement, when the new colony was struggling to feed itself, trade of fish and other seafood with Indigenous women in the Sydney area helped to sustain the European settlers and likely prevented starvation (Bennett, 2007, NSW Office of Environment and Heritage, 2012, Goodall and Cadzow, 2009). European fishermen quickly began to involve themselves in the industry too, with professional fishing to service the Sydney market emerging around the Port Jackson area not long after colonisation (Goodall and Cadzow, 2009). Concerns about overfishing in Sydney Harbour were raised as early as the mid-1800s, leading to the enactment to a number of pieces of legislation in the latter half of the century that established controls on effort and gear, the establishment of a fishing and boat licence system, as well as the supervision of fisheries by inspectors (Wilkinson, 1997, Howard, 2012). Despite these controls, these early stages of the fishing industry were largely characterised by a focus on expansion. With improvements in transport and refrigeration technology in the late 1800s, the industry was able to move out into more distant fishing grounds (Wilkinson, 1997, Clarke, 2011). Efforts to grow the industry also included prospecting for new species, such as prawns and oysters. A research centre and a fish hatchery were established by the Government to investigate options of expanding existing fisheries through the exploration of new trawling grounds and the acclimatisation of new species (Leadbitter, 2011, Wilkinson, 1997).

From its earliest origins the professional fishing industry in NSW has been characterised by small-scale fishing, as illustrated by the following quote from the 1911–1912 Royal Commission on Food Supplies and Prices:

> **The most notable characteristic of the fishing industry, as at present conducted, is a lack of organisation along professional lines... In New South Wales, and indeed in Australia generally, professional fishing is the Cinderella of our industries. Capital and labour alike have passed it by for the more profitable avenues of investment and employment. Fishing in this state is done principally by men who work individually, or in groups of two or three on the share system. For the most part they have comparatively little capital invested in the industry... Living, as the majority do, in the out-of-the-way villages, their standard of living is not high, and their material wants are few.**
>
> *(Royal Commission on Food Supplies and Prices 1911-1912 cited in Wilkinson, 1997 p. 15)*

The NSW Government did, however, attempt on a number of occasions to expand the industry into industrial-scale operations. In 1914 it established its own State Trawling Industry, with associated retail outlets. The fleet consisted of at least six steam trawlers, which targeted fish to feed the growing popularity of fish and chips. This venture was ultimately unsuccessful, with the business and associated vessels eventually split up and sold off to private owners (Wilkinson, 1997). The decline of the steam trawler fleet was followed by a growth in Danish Seine netting in the 1930s, targeting pelagic fish such as Tuna and Salmon. This was in response to the establishment of two canneries on the South Coast of NSW in 1930s (Narooma) and 1950s (Eden). This period was the most successful attempt in NSW to establish industrial-scale fish harvesting and processing, with these fisheries becoming the most significant contributors to the NSW industry in terms of catch in the mid-1900s. The expansion of the Danish Seine netting fleet also resulted in the establishment of a new ocean prawn fishery in NSW, contributing significantly to the growth of a number of minor ports, such as Evans Head, Ballina and the Shoalhaven. The use of Danish Seine trawlers began to decline, however, in the 1960s and 1970s as seiners began converting to newly developed light otter trawl gear and smaller, diesel powered vessels (Wilkinson, 1997). The Narooma cannery closed its doors in the 1960s, heralding the beginning of the end for large-scale fish processing in NSW (Pacey, 2001)

The 1980s was a period of major investment in the industry as fishers upgraded vessels to lighter gear and larger boats in order to exploit new, and more profitable fishing grounds, particularly mid- and deep-water species (Wilkinson, 1997). These species were quickly overexploited, however, and stocks of species such as Gemfish and Bluefin tuna declined significantly by the end of the decade. The Commonwealth Government had taken control of all fisheries outside the three nautical mile limit in 1952 but began to take a much more active role in fisheries management from the 1980s. Concerns over stock levels drove the Commonwealth Government to take control of the trawl fisheries in NSW, Victoria, Tasmania and South Australia – limiting the number of vessels permitted within an area subsequently known as the South East Trawl Fishery, and later, introducing Individual Transferable Quotas (ITQs) for all species within that fishery (Wilkinson, 1997). Around the same time, the Australian Government imposed a freeze on new entrants into all Commonwealth fisheries.

During this period of expansion and growth, the NSW State Government aimed to manage the market system through a series of co-operatives across the state and the Sydney Fish Market. Fishers were required to trade through this system if they wished to access the Sydney Market up until the late 1990s (Wilkinson, 1997).

Overall the focus of fisheries management began to shift in the late 1970s and 1980s toward a greater emphasis on sustainability and consolidation rather than expansion and growth. The more recent history of professional fishing in NSW is one of decline (Leadbitter, 2011, Stevens et al., 2012). Across NSW it began to be acknowledged that fishing licences had been granted with few restrictions and that over-allocation was disadvantaging full-time professional fishers and the long-term sustainability of the fisheries. A legislative amendment in 1979 paved the way for a movement away from open-access fisheries by providing for the restriction

of participants in a fishery. The first fishery to become a restricted fishery was Abalone in 1980, when the number of licences was reduced from 131 down to 59, in order to protect both the stock and the incomes of the fishermen. Around the same time the cost of a fishing licence was increased from $2 per annum to $100 per annum (Wilkinson, 1997).

Following a change of NSW Government in 1988, further changes to fisheries management were introduced, including a freeze on all new licences and the first of many attempts by Government to introduce property rights in the form of quota to NSW licenced fishers (Wilkinson, 1997). These changes culminated in the declaration of the *1994 Fisheries Management Act,* which sought to introduce a share management scheme to provide property rights across all fisheries. This right was designed to be defined and tradeable and to allow internal adjustment with initial allocation based primarily on catch history. This involved the issuing of endorsements based on the historical activity of individual fishers (what they were catching in which fisheries), with the number of shares allocated based on previous catch records (how much they were catching) (Schnierer and Egan, 2012, Stevens et al., 2012, Wilkinson, 2013). Minimum requirements for shareholdings were set so that fishers required a certain number of shares to obtain particular endorsements. Once shares were allocated across each sector, these could be traded between fishers so that individuals would be able to purchase additional shares to allow them to meet the minimum requirements for a desired endorsement.

In practice, only Lobster and Abalone were placed under full share management initially (1996), with the others declared as 'restricted fisheries' in 1997 (Stevens et al., 2012). These remaining fisheries did not become share managed until 2004. However, unlike Lobster and Abalone, the shares were not linked to quota or fishing access (i.e. outputs like catch or inputs such as time or gear). In addition, the process was criticised as being 'excessive' due to generous qualification criteria. A review by Stevens et al (2012) concluded that this has resulted in insecure, low-value shares. They determined that while the majority of fish in NSW are caught by small number of licence holders, these licence holders do not currently hold sufficient shares to be able to maintain that catch if share management were to be linked to input/output controls.

Despite the acknowledged over-allocation of shares in the original share management process, some NSW fishers still felt aggrieved by the criteria used to judge the number of shares or the endorsements they received. They felt this process did not recognise the diverse interests of many NSW fishers who might have previously have worked in a variety of fisheries periodically according to weather, seasons or market conditions. This may have resulted in small catch histories across a large number of fisheries (Howard, 2012). The process was considered particularly inadequate by Indigenous people involved in the industry, many of whom experienced considerable issues associated with validating their catch history. The number of Aboriginal fishers had already dropped significantly after 1966 when an exemption to the requirement to hold a licence was repealed. Numbers of Indigenous professional fishers further declined in response to share management as many felt significantly disadvantaged by the administrative and legal processes associated with validating catch history. This was partially related

to minimal or incomplete record keeping but also to the practice of 'customary contributions' whereby a portion of an Indigenous professional fishers catch was shared amongst community members and not reported as professional catch. This practice was not recognised in the share allocation process and therefore it was felt that allocation based on catch histories did not adequately represent the actual historical catch of the fishers involved (Schnierer and Egan, 2012).

Further compounding the issues relating to share management were restrictions on access to fishing grounds. The 2000s saw a significant reduction in professional fishing access through the expansion of the NSW marine park network and the establishment of recreational fishing havens (where all professional fishing is banned) in 30 NSW estuaries. As stated in the Stevens review, only nine of the 24 most productive estuaries in NSW now remain completely open to professional fishing:

> **Of the 690 water bodies in NSW, 113 were available to professional fishing in 2001 and of these, 24 supplied 95% of all fish caught professionally. Of the 24, 7 are now RFHs and 8 have excluded professional fishing to some degree by the creation of RFHs or Marine Parks or other closures.**
>
> *(Stevens et al., 2012 p. 5)*

At the same time as significant reductions in fishing access were being implemented, legislative changes to the *NSW Environmental Planning and Assessment Act 1979,* made in December 2000, also required the development and implementation of fisheries management strategies and associated environmental assessments for each major fishing activity in NSW. Over the following six years Environmental Impact Assessments (and an associated fishery management strategy) were prepared for each fishing activity in NSW. This EIS process was also necessary to comply with the requirements of Commonwealth legislation that fisheries assessments be conducted in order to ensure they are 'demonstrably sustainable' in order for the product to enter into export markets(NSW Department of Primary Industries, 2012).

Despite these significant changes, it was acknowledged by the Department that the process was incomplete. In 2009 the Department of Primary Industries and the then peak Industry Group, the NSW Seafood Industry Advisory Committee (SIAC), agreed to a set of principals by which they would move towards completion of the share management process. Known as the 'Pyrmont Pact' the agreement committed the industry and the department to continue to work together to achieve a range of objectives, including tradeable input/output controls (Schnierer and Egan, 2012).

A number of attempts were made in the wake of the Pyrmont Pact to consolidate the industry with a stated objective of removing 100% of inactive fishing businesses from the industry and 50% of active businesses (Wilkinson, 2013). These attempts include offering exit grants (2010) and increasing the costs associated with being involved in the industry through fisheries management cost recovery mechanisms (1997, 2001, 2004, 2009 and 2011). In 1994 the cost of a licence was $416. Subsequent fee hikes allowed for a reduced fee for secondary fisheries, however this was abolished in 2011 when a flat rate of $839 began to be charged for every

fishery that a fisher operated in. This significantly increased the costs associated with being involved in multiple fisheries.

These combined approaches at consolidation had led to a reduction in licence numbers to 1,100 (down from 2,100 in 1994 when the *Fisheries Management Act* was introduced). Despite this, concerns remained that there was an unacceptably high number of operators in the industry, with special concern about latent (or inactive) effort. In response to this, in 2012 the incoming state Liberal Government committed to delivering on an election pledge to retire an 'independently assessed number' of fishing businesses and bring in property rights to full effect through share management. The first step in this process was to commission an independent review of the current state of the industry in NSW, chaired by Richard Stevens (the Stevens Report) (Wilkinson, 2013, Stevens et al., 2012).

The main focus of the Stevens Report was to develop recommendations to improve the viability of professional fishing operations to a more profitable level, with a secondary objective on ensuring the long-term sustainability of NSW fish stocks. This is a secondary consideration because much of the state's fisheries are now considered to be at their maximum limit of exploitation, with few opportunities for further expansion of existing catches. The Stevens report therefore determined the best opportunities for improvement in business viability, while maintaining current levels of sustainability, was to decrease the number of businesses accessing the resource. This was proposed to be managed by linking shareholdings with quota or effort (Stevens et al., 2012). The most controversial aspect of the subsequent reform package, which built on the recommendation of the Stevens report as well as the advice of an independent groups of experts, was a requirement that fishers who wish to remain in the industry be required to purchase additional shares (from inactive or retiring fishers) in order to maintain existing catches. Concerns about the associated costs to business owners has led to considerable opposition to the current reform process from large sections of the industry. This is despite a seemingly high level of support for reform in the consultation processes around the original Pyrmont Pact (NSW Department of Industry and Investment, 2010).

Appendix 2. Literature review of quality of life indicators of community and individual wellbeing

Reference	Quality of Life Indicators
Quality of Life Indicators (Stiglitz et al., 2009)	> Health: the length and quality of people's lives. > Education: e.g. school enrolment, education expenditure, graduation rates, years of schooling. > Personal activities: How people spend their time and the nature of their personal activities, including Paid employment, unpaid domestic work, Commuting time, Leisure time – quantity and quality, participation in cultural events and housing. > Political voice and governance: Encompasses the ability to participate as full citizens, have a say in the framing of policies, dissent without fear. Indicators include level of trust in public institutions and levels of political participation, presence of free press. > Social connections (social capital): e.g. membership in associations, levels of civic and political engagement, membership and voluntary work in organisations/religious groups, relationships with family members and neighbours and means of getting news and information. > Environmental conditions effects on human health directly and indirectly, environmental services such as clean water/recreation areas, environmental amenities. > Personal insecurity: things that put at risk the individual crime, accidents, natural disasters – impact of bereavement and fear on subjective wellbeing. Economic insecurity: uncertainty about future material conditions through risks such as unemployment, illness and old age.
Nussbaum's core capabilities (Nussbaum, 2003, Nussbaum, 2000)	> Life: being able to live to the end of a human life of normal length (i.e. not dying prematurely). > Bodily health: being able to have good health, including reproductive health, to be adequately nourished, to have adequate shelter. > Bodily integrity: to be able to move freely from place to place, secure from violence, having opportunities for sexual satisfaction and for choice in matters of reproduction. > Sense: imagination and thought: to be able to use senses/thoughts/imagination in a way that is informed and cultivated by adequate education. Use in connection to experiencing producing works and events of one's own choosing, protected by guarantees of freedom of expression/religion, etc. > Emotions: being able to have attachments to things/people without fear or anxiety. Supporting forms of human association that can be shown to be crucial in their development. > Practical reason: being able to engage in critical reflection about the planning of one's life (entails protection for liberty of conscience/religion). > Affiliation: to be able to live with and toward others, show concern for others, to engage in social interaction (protecting this capability means protecting institutions that constitute and nourish such forms of affiliation, and also protecting the freedom of assembly and political speech) and being free of discrimination and humiliation. > Other species: living with concern for non-human world. > Play: be able to laugh, play and enjoy recreational activities. > Control over one's environment: being able to participate in political choices that govern one's life, including protections of free speech, and being able to hold property and having property and employment rights on an equal basis with others.

City of Sydney Community Wellbeing Indicator framework (Partridge et al., 2011)	> Healthy, safe and inclusive communities: > Personal health and wellbeing > Community connectedness > Early childhood > Personal and community safety > Lifelong learning > Service availability > Housing > Income and wealth. > Culturally rich and vibrant communities: > Arts and cultural activities > Creative industries, Cultural diversity, Leisure and recreation. > Democratic and engaged communities: > Community engagement > citizenship > Elections. > Representation and democracy.	> Dynamic resilient local economies: > economic activity > diversity and prosperity > employment and education of city residents > productivity and innovation. > Sustainable environments: > Open space > Transport > Air and noise > Energy and greenhouse > Urban ecology > Water > Consumption, waste and resource recovery.
New Zealand Quality of Life Project (New Zealand Quality of Life Project, 2007)	> People > Knowledge and skills > Economic standard of living > Housing > Health, > Safety > Social connectedness	
OECD Betterlife Index (OECD, 2013)	> Income and wealth > Availability and quality of jobs > Housing > Physical and mental health > Education and skills > Work-life balance > Civic engagement > Social connections > Quality of the natural environment > Living in a secure environment > Subjective wellbeing/life satisfaction.	

Appendix 3. The NSW fishery economic survey

This report summarises the methods and results of an economic survey of operators in the NSW coastal professional wild-catch fisheries. As part of the current study a state-wide economic survey was distributed by mail to the 989 professional fishing businesses operating in the 2012-13 financial year and analysed by region as well as by fishery. The purpose of the survey was to collect data on costs and income in order to determine the contribution of fishing businesses to regional economies.

Fishing operator survey

The economic survey had 57 responses from 989 professional fishing businesses contacted (5.8%) by mail, of which 46 responses (4.7%) were deemed useable, due to a range of quality omitted data and protocols to protect fish confidentiality. However as a representation of total revenue, 50 responses accounted for 10.47% of state-wide revenue of $8,550,288. The original proposal committed to producing an analysis of eight regions covering the whole NSW coast. However, due to the low response rate the input-output (IO) model was revised and the analysis to cover seven regions (see Table 4).

A sample of businesses is normally assumed to be representative of the businesses in the different fisheries. However, the results are from a diverse range of businesses and, as such, averages should be interpreted with caution. As indicated above, the sample businesses have a higher level of activity and there is likely an unknown degree of respondent bias arising from more active businesses replying to the survey than non-respondents.

Appraising economic viability

Fishing enterprise viability can be estimated through accounting data collected in a survey. This gives an accounting view of a firm's individual performance, but is not good for measuring performance across different businesses in the fishing industry or between industries. Economists adjust accounting data to gain more useful industry economic performance measures.

While it's desirable to calculate economic profit for each fishery in NSW, the limited survey response required fisheries to be combined. Our results are for businesses with the following endorsements: businesses fishing estuary general (EG), ocean trap and line (OTL) and ocean haul (OH); businesses fishing EG and estuary prawn trawl (EPT); OTL and Rock Lobster (RL) businesses; and businesses fishing OTL and ocean prawn trawl (OPT). We are able to identify the businesses that fish within each endorsement and we have grouped them on this basis in order to estimate the performance of the various fisheries without breaching confidentiality protocols.

The residual of Total Revenue less Operating Costs is Operating Profit. Depreciation and the opportunity cost of capital are deducted to give economic profit or loss (ABARES, 2013, Econsearch 2013, 2014). In the study 7% opportunity cost of capital was included in costs and an estimate of the opportunity cost of labour, including unpaid labour, was made. Fisheries management charges and licences are included in operational costs even though they are not necessarily a factor of production, being a transfer payment from industry to government in respect of

access and management services. The recoverable portion of management costs are treated as management fees and we exclude from the analysis other costs of management that are born by the government (ABARES, 2013). Depreciation was calculated on a straight-line basis using information provided in the survey on the current market values, the original or replacement cost and the age of capital items attributable to each fishing business.

NSW fisheries profitability results

There were a total of 57 surveys returned from operators in the NSW coastal professional wild-catch fisheries. Of these, 46 were completed validly, the others omitting business information or having five or less survey returns (confidentiality restriction). The survey replies were divided into four operating groups for analysis: businesses fishing EG, OTL and OH; businesses fishing EG and EPT; businesses fishing OTL and RL; and businesses fishing OTL and OPT. Fewer than five survey responses were from the Abalone sector and were not included in the profitability analysis due to confidentiality, but have been included in the regional analysis. We report the business revenue by fishery grouping in Table 1.

TABLE 1: Respondent numbers, average business revenue and range of revenues for the four operating groups in the NSW fishery (Source: Economic Questionnaire, 2014).

Vessel category	Respondent numbers	Average revenue ($)
EG/OTL/OH	11	121,149
EG & EPT	16	98,996
OTL & RL	7	310,616
OTL & OPT	12	190,969
Total	**46**	**161,364**

The variety of business categories and activity levels among fishers are evident. The majority of the survey respondents engage in EG and EPT fishing with 16 of the 46 (34%) businesses operating in this group.

Accounting measures

The survey accounting revenues and cost results are reported in Table 2.

TABLE 2: The accounting revenues and costs for a representative fishery in each of four operating groups (Source: Economic Questionnaire, 2014)

$	EG/OTL/OH	EG & EPT	OTL & RL	OTL & OPT	Average vessel
Gross revenue	121,149	98,996	310,616	190,969	161,364
Direct costs*	63,120	51,456	181,567	124,173	93,679
Indirect costs**	28,855	27,512	110,531	38,534	43,664
Total costs	91,975	78,968	292,097	162,707	137,342
Gross operating profit	29,174	20,027	18,519	28,263	24,021
These costs include:					
*Wages	8,439	14,028	99,660	33,840	31,390
*Interest	5,535	3,555	16,246	5,757	6,556
$	EG/OTL/OH	EG & EPT	OTL & RL	OTL & OPT	Average vessel
Gross revenue	100%	100%	100%	100%	100%
Direct costs*	52%	52%	58%	65%	58%
Indirect costs**	24%	28%	36%	20%	27%
Total costs	76%	80%	94%	85%	85%
Gross operating profit	24%	20%	6%	15%	15%

The results show that direct operating expenses, such as bait, fuel, boat repairs, fishing gear repairs, freight costs and wages to employees are 52%, 52%, 58% and 65% of revenue in the four activity groups – EG/OTL/OH, EG/EPT, OTL/RL and OTL/OPT, respectively. Indirect costs such as boat and vehicle registrations, insurance, fishery management charges, rates, bank and business administration expenses were 24%, 28%, 36% and 20% of revenue, respectively, making total operational costs 76%, 80%, 94%, 30% and 85% of total revenue.

The wages recorded are for both owner operators and employees. Where wages provided in the survey responses did not also cover those of the owner operator, such were imputed on the basis of information provided on fishing income as well as fishing effort. Wages accounted for 7% of revenue for EG/OTL/OH businesses, 14% for EG & EPT business, 32% for OTL & RL businesses and 18% for OTL & OPT businesses. Operating profit in each of the four activity groups is estimated as 24%, 20%, 6% and 15% of revenue respectively. Conclusions on long-run viability are difficult to draw from accounting data alone and hence certain economic adjustments have to be made to determine more meaningful profitability results such as an economic rate of return.

Economic results

The economic survey results include adjustments to give the economic depreciation, the imputed cost of labour and opportunity cost of capital are reported in Table 3.

TABLE 3: Results of the Economic Survey of the NSW Coastal Professional Wild-Catch Fisheries in the financial year 2012–2013, by fishing activity group (Source: Economic Questionnaire, 2014)

		EG/OTL/ OH	EG & EPT	OTL & RL	OTL & OPT	Average vessel
	Observations	10	16	7	12	46
(1)	Gross revenue	121,149	98,996	310,616	190,969	161,364
	Less costs					
	Cooperative Commission	5,158	6,253	11,248	10,850	8,013
	Bait	3,488	661	15,399	5,876	4,973
	Boat fuel	11,561	5,569	25,299	30,387	16,588
	Repairs and maintenance	10,318	4,138	8,807	12,245	8,399
	Gear replacement	3,270	3,116	6,811	6,191	4,545
	Protective clothing/other	1,559	1,071	1,440	942	1,202
	Vehicle fuel	3,851	4,546	7,209	3,328	4,481
	Freight	2,890	2,346	1,346	9,795	4,298
	Labour - paid	8,439	14,028	99,660	33,840	31,390
(2)	Labour - unpaid	12,587	9,729	4,347	10,720	9,791
(3)	**Total variable costs**	**63,120**	**51,456**	**181,567**	**124,173**	**93,679**
	Boat registration	1,843	1,395	2,962	2,961	2,156
	Vehicle registration & repair	2,549	2,955	3,555	2,104	2,702
	Insurance	3,213	1,668	7,262	7,009	4,306
	Management costs	5,607	4,131	12,188	3,324	5,497
	Licence fees	1,177	1,828	2,227	734	1,454
	Accounting, legal & litigation	1,477	1,091	3,109	1,834	1,689
	Telephone & power	3,568	5,434	9,916	3,130	5,102
	Rates and Rent	2,150	1,220	1,125	2,661	1,796
	Bank charges	173	457	702	352	404
	Building/plant repair	494	2,544	6,328	833	2,221
	Vehicle repair	1,032	1,615	391	1,182	1,180
	Travel	461	463	2,245	1,120	915
	Memberships/other	309	609	978	2,584	1,126
(4)	*Interest*	5,535	3,555	16,246	5,757	**6,556**
(5)	*Leasing*	300	163	41,688	4,132	**7,711**
(6)	**Total fixed costs**	**28,855**	**27,512**	**110,531**	**38,534**	**43,664**
(7)	**Total boat cash costs (3+6)**	**91,975**	**78,968**	**292,097**	**162,707**	**137,342**
	Boat Gross Margin (1-3)	**58,029**	**47,540**	**129,050**	**66,797**	**67,685**
(2)	Unpaid labour	12,587	9,729	4,347	10,720	9,791
	Gross operating surplus (1-7+2)	**41,761**	**29,756**	**22,866**	**38,982**	**33,813**
(8)	**Boat cash income (1-7)**	**29,174**	**20,027**	**18,519**	**28,263**	**22,379**
(9)	Depreciation (Economic)	20,493	21,743	34,073	17,997	22,384
(10)	**Boat Business Profit (8-9)**	**8,681**	**-1,716**	**-15,554**	**10,266**	**627**
(11)	**Profit at full equity (10+4+5)**	**14,516**	**2,001**	**42,380**	**20,154**	**12,363**

(12)	**Boat capital**	**106,760**	**111,745**	**255,594**	**177,951**	**176,664**
	Licence value*	**5,501**	**5,194**	**38,627**	**13,468**	**10,320**
(13)	**Total Capital**	**112,261**	**116,939**	**294,221**	**191,419**	**186,984**
	Rate of return on boat capital (11/12*100)	**13.6%**	**1.8%**	**16.6%**	**11.3%**	**7.0%**
	Rate of return on total capital (11/13*100)	**12.9%**	**1.7%**	**14.4%**	**10.5%**	**6.6%**
(8)	**Boat cash income (1-7)**	**29,174**	**20,027**	**18,519**	**28,263**	**22,379**
(2)	Unpaid labour	12,587	9,729	4,347	10,720	9,791
	Opportunity cost of capital (7%)	7,858	8,186	20,595	13,399	13,089
(9)	Depreciation	20,493	21,743	34,073	17,997	22,384
	plus interest, leasing and management fees					
(4)	Interest	5,535	3,555	16,246	5,757	6,556
(5)	Leasing	300	163	41,688	4,132	7,711
	Management fees	5,607	4,131	12,188	3,324	**4,800**
(14)	**Net economic returns**	**-322**	**-11,782**	**29625**	**-642**	**-3,831**
	Economic rate of return to capital (14/13*100)	**-0.29%**	**-10.08%**	**10.07%**	**-0.34%**	**-2.05%**

Due to lack of information, the average "licence value" for each endorsement type was imputed. This was done by firstly calculating the total number of shares per endorsement type, which was then used to find an average number of shares for same. This average number of shares per endorsement was then multiplied by an average price per share (at 2012–13 levels) to give an average licence value for each of the activity groups. It is important to note the values have been estimated conservatively and may under-represent the true value of NSW fishing licences.

The results indicate that the profitability in businesses that fish OTL and RL is the highest, returning a surplus over all costs equivalent to 10% of capital. The survey replies noted that RL quota was not available to buy and has increased in value since the time of the survey. The EG/OTL/OH and OTL and OPT businesses are just short of a zero rate of return, which indicates they are covering opportunity costs and effectively earning a normal return to capital. Businesses fishing EG and EPT had the lowest economic performance (–10.1%), not covering all opportunity costs, though fishers indicate that these fisheries are subject to annual fluctuation in the environment, especially with estuary prawn fishers awaiting flood waters etc. The average rate of return over all fishing groups was 2.1% return to capital.

Limitations of the analysis

The main limitation of the study relates to the low response rates. The survey had 57 responses from 989 professional fishing businesses contacted, of which 46 responses (4.7%) were deemed useable. Due to the low response rates a study of the original ABS regions was not feasible. As such study regions were combined, giving the seven final study regions.

A second issue presented itself in the form of licence values. As licence value data was not available from the survey responses collected, it was necessary to impute such values in order to calculate both accounting and economic rates of return to capital. These values have been estimated on a conservative basis, but the imputation of such is nonetheless an important point to note.

In calculating both the accounting profitability and economic results, it was necessary to adjust for depreciation. Survey respondents were asked to provide depreciation data in their response, however many omitted this information or appeared to calculate it on an accounting basis, which may result in much of the assets value being written off in the first few years of ownership. Such a measure may fail to take into consideration the true value of the asset being consumed annually. It was therefore necessary to calculate an economic estimate of depreciation based on information provided by respondents regarding original cost, residual value and asset age.

Unpaid labour is an important input in many fishing businesses, however it is difficult to estimate in monetary terms. Values for unpaid labour have been imputed on the basis of information regarding the numbers of staff and unpaid hours worked. Labour costs are imputed from questions in the survey regarding days fished and unpaid days worked by the fishers and his family in the fishing industry. Award wages for miscellaneous employment were used to calculate an imputed value of labour. The basis of imputation was for an annual average wage of $35,963 ($691.60 per week) imputed on a daily basis from ABS data (ABS 2013). The number of unpaid hours per year per fishing business has then been assigned a value using the miscellaneous award wage. It is important to note that given the life style nature of the fisheries, unpaid labour estimates may under-represent the value of unpaid labour.

Finally the data provided covers the 2012-2013 financial year only and inferences from such for other time periods may potentially under-represent the degree of inter-annual variation found in some of the fisheries. Accounting and economic data does not indicate whether the levels of economic activity are sustainable, which depends on the fish resource.

Demographics of those who replied to the economic survey

The majority of survey respondents were male (94%) with only two respondents being female (4%) and one respondent not providing any details in terms of demographics (2%). Of the 50 respondents, the majority (74%) claimed to be of Anglo-European descent. The remainder claimed to be of Indigenous (4%), Mediterranean (8%) and other descent.

The ages of respondents ranged from 28 years to 78 years. The average age of female respondents was 73 years, whilst the male respondents had an average age of 50 years. The total average age was 51 years old. In terms of education, 28% of respondents had completed an industry or business course. Those with Trade or TAFE certificates accounted for 26% of the sample, whilst those who had obtained an undergraduate degree amounted to 24% of those surveyed. Approximately 10% had completed Year 10, while 8% and 2% had completed Year 12 and Year 7, respectively.

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Appendix 4. Regional economic impacts of the catching and secondary sector in NSW

The section examines the regional economic modelling for both catching and secondary sectors in NSW seafood industry.

Background- Regional Expenditure flows

In Table 1 the seven areas for the regional economic analysis are presented. The response rates of from the economic survey by region are shown.

TABLE 1: Response rate and representation in terms of revenue by region (Source: Economic Questionnaire, 2014)

ABS	UTS study region	Responses	Representation
Richmond Valley	Far North Coast	6	13.31%
Tweed Valley			
Clarence Valley	Clarence	4	3.86%
Coffs Harbour			
Coffs Harbour	Mid North Coast	9	10.56%
Kempsey – Nambucca			
Laurieton – Bonnie Hills			
Port Macquarie – East			
Taree Gloucester	Great lakes – Port Stephens – Newcastle	11	8.16%
Great Lakes			
Port Stephens			
Newcastle			
Lake Macquarie	Lake Macquarie – Sydney	9	7.42%
Wyong			
Gosford – Dural – Wisemans Ferry			
Sydney			
Illawarra	Illawarra – Shoalhaven	5	26.55%
Shoalhaven			
Batemans – Tuross Head	South Coast	6	21.44%
Narooma – Eden			
Total		50	10.47%

The business data from the survey was combined with the state-wide catch revenue estimate of $81.7 million to determine regional revenues and associated input costs. In order to account for income and expenditure flows between the various study regions, as well as those flows leaving the state of NSW, it was necessary to adjust the regional level revenues to reflect any such movements.

The adjustments have been made as per Table 5 below using the information on expenditures between regions gathered in the economic business surveys.

TABLE 2: Income and expenditure flows between regions (Source: Economic Questionnaire, 2014).

UTS No	UTS study region	Total population revenue ($)	Net flow adjustments ($)	Adjusted revenue ($)
1	Far North Coast	6,591,901	-555,731	6,036,170
2	Clarence	14,578,073	-508,606	14,069,467
3	Mid North Coast	11,762,108	-2,675,941	9,086,167
4	Great lakes – Port Stephens – Newcastle	20,180,047	-289,761	19,890,286
5	Lake Macquarie – Sydney	12,279,330	2,242,751	14,522,080
7	Illawarra – Shoalhaven	7,969,985	-524,613	7,445,371
8	South Coast	8,341,491	47,335	8,388,826
	Total	**81,702,933**	**-2,264,565**	**79,438,368**

Table 2 shows that a total of approximately $2.3m was spent outside NSW, the majority of this going to Queensland and Victoria. Another $2.2m was received in revenue by the Lake Macquarie – Sydney region from the other six regions, all of which apart from the South Coast region displayed a negative outflow of revenues.

These expenditure flows represent spending on items such as bait, boat expenses and repairs, freight, fuel and oil, leasing fees, marketing and vehicle expenses. The largest within NSW expenditure movements were for fuel and oil amounting to approximately $2.6m. This was followed by boat repairs and leasing fees, which amounted to a state-wide expenditure of $1.6m and $1.3m respectively. Freight and marketing also accounted for large flows of expenditure within the NSW fishing industry with $1.2m spent on freight and a $1.1m spent on marketing. Fishing gear and bait accounted for a combined total of $1.7m. Finally miscellaneous expenses accounted for approximately $1.1m.

Regional economic impacts for the catching sector

This approach measures the economic benefits at the point of first sale, as opposed to subsequent economic activity in the processing, wholesale and retailing of seafood which are the secondary sector, which will be addressed later. For the primary catching sector, a production approach can be used to measure the benefits that go the whole NSW economy from the fishing activity and then the indirect benefits to the community from the inputs sourced from the community, in producing the catch. The results of the economic survey are used to estimate the level of inputs used in the fishing process, with this data being inputted into a regional economic model of the NSW economy. The report of this regional economic modelling by Western Research Institute (WRI) is reported in Appendix 11.4b. The available regional data can support an analysis down to seven coastal areas of NSW, as described in Table 4.

The economic impacts of professional fishing on the respective regions

Regional economics is sometimes referred to as input-output modelling. From the revenue obtained by industry, there is an initial expenditure on inputs in the general economy which produces an amount of economic output across the economy. The output can be measured for different areas, such as for the seven coastal areas in this study and then for the whole NSW economy. In Table 3 the results of the regional economic analysis are presented for each regional area along the NSW coast. The whole NSW results cover all the areas and account for economic activity between areas, not calculated in each region or by adding those regions (the all regions column).

TABLE 3: The economic impacts of professional fishing on the respective regions (Source: WRI, Appendix 11.4b).

Regions	Far North Coast	Clarence	Mid North Coast	Great Lakes	Central Coast	Illawarra	South Coast	All Regions	NSW
Initial expenditure ($m)	6.22	12.00	8.39	13.28	13.59	5.92	6.25	65.66	65.66
Output ($m)	11.87	26.35	19.34	42.06	41.50	15.53	14.16	170.81	219.21
Value Added ($m)	4.45	12.32	8.57	22.49	18.62	7.43	7.63	81.50	104.85
Household income ($m)	2.48	5.55	3.97	9.42	10.30	3.43	3.38	38.54	50.85
Employment(no.)	95	238	154	310	209	121	152	1,279	1,403

As illustrated in Table 2, in NSW the total value of fish revenue from catch sales at point of first sale was $79.4m. From this sales revenue, the initial expenditure is $65.66m was made in NSW and in the regional economies, as the expenditure does not include profit and depreciation. The WRI model of the NSW economy then indicates this expenditure by wild-catch fish production leads $219.2m of economic output in the general NSW economy. From Table 3 it can be seen that

Results from the economic modelling showed the greatest increase in Gross Regional Product (GRP) (also known as 'value added') in the regions of Great Lakes ($22.5m), followed by the Central Coast ($18.6m) and Clarence ($12.3m), with a total increase in GRP for all regions of $81.50m. Household income had the highest impacts in the Central Coast ($10.3m) followed closely by Great Lakes ($9.42m). The greatest levels of employment were seen in the regions Great Lakes (310), Clarence (238) and the Central Coast (209), with a total of approximately 1,279 FTE achieved across all regions. (WRI report Appendix 11.4b)

The gross value added to the whole NSW economy is $104m arising from the fishing industry activity in the NSW economy. The value added is the output, less the intermediate consumption (i.e. the cost of materials, supplies and services used to produce final goods or services). The fishing industry in NSW also leads to the generation of $50.85m in household income and 1,403 full-time equivalent (FTE) jobs. The total estimates are made up of the initial stimulus, plus the flow-ons as reported in Table 4.

TABLE 4: The initial and flow-on economic impacts of professional fishing on the Total NSW (Source: WRI, Appendix 11.4b).

Expenditure by region ($65.5m)	Output ($m)	Value added ($m)	Household income ($m)	Employment (no.)
Initial	79.44	34.82	17.44	1000.1
Flow-on	139.77	70.03	33.40	402.8
Total impact	**219.21**	**104.85**	**50.85**	**1402.9**
Type II multiplier	2.76	3.01	2.92	1.4

For the total employment of 1,403 TFE, 1,000 of these are associated with wild-catch fishing businesses, while the 403 are FTE jobs in the community supplying these fish catchers. The total impact can be related as a ratio of the initial impacts and is referred to a Type II multiplier. For example for output, $291.21/$79.44 gives a Type II output multiplier of 2.76. The value added Type II added value and income multipliers are 3 and 2.92 and the Type II employment multiplier 1.4 for all NSW respectively. These indicate the dimensions of multiplication in the general economy associated with the wild-catch production. The regional results for all regions are presented in Table 5, summarised from the WRI report in Appendix 11.4b.

TABLE 5: An overview of the output, value added, household income and employment in the seven areas of the NSW Coast in the regional study (Adapted from WRI results Appendix 11.4b)

1. Far North Coast Expenditure by region ($6.22m)	Output ($m)	Value added ($m)	Household income ($m)	Employment (no.)
Initial	*6.04*	*1.5*	*1.32*	*77.04*
Flow-on	*5.83*	*2.94*	*1.16*	*18.32*
Total Impact	**11.87**	**4.45**	**2.48**	**95.36**
2. Clarence **Expenditure by region ($12m)**	**Output ($m)**	**Value added ($m)**	**Household income ($m)**	**Employment (no.)**
Initial	*14.07*	*6.07*	*3.1*	*196.79*
Flow-on	*12.28*	*6.25*	*2.45*	*40.87*
Total Impact	**26.35**	**12.32**	**5.55**	**237.66**
3. Mid North Coast **Expenditure by region ($8.39m)**	**Output ($m)**	**Value added ($m)**	**Household income ($m)**	**Employment (no.)**
Initial	*9.09*	*3.19*	*2*	*121.75*
Flow-on	*10.25*	*5.38*	*1.98*	*31.9*
Total Impact	**19.34**	**8.57**	**3.97**	**153.65**
4. Great Lakes **Expenditure by region ($13.28m)**	**Output ($m)**	**Value added ($m)**	**Household income ($m)**	**Employment (no.)**
Initial	*19.89*	*11.32*	*4.09*	*239.74*
Flow-on	*22.17*	*11.17*	*5.33*	*70.38*
Total Impact	**42.06**	**22.49**	**9.42**	**310.12**

5. Central Coast and Sydney Expenditure by region ($13.59m)	Output ($m)	Value added ($m)	Household income ($m)	Employment (no.)
Initial	*14.52*	*4.56*	*2.98*	*135.04*
Flow-on	*26.98*	*14.06*	*7.32*	*73.51*
Total Impact	**41.5**	**18.62**	**10.3**	**208.55**
6. Illawarra **Expenditure by region ($5.92m)**	**Output ($m)**	**Value added ($m)**	**Household income ($m)**	**Employment (no.)**
Initial	*7.45*	*3.54*	*1.79*	*98.07*
Flow-on	*8.08*	*3.89*	*1.64*	*23.2*
Total Impact	**15.53**	**7.43**	**3.43**	**121.27**
7. South Coast **Expenditure by region ($6.25m)**	**Output ($m)**	**Value added ($m)**	**Household income ($m)**	**Employment (no.)**
Initial	*7.45*	*3.54*	*1.79*	*98.07*
Flow-on	*8.08*	*3.89*	*1.64*	*23.2*
Total Impact	**15.53**	**7.43**	**3.43**	**121.27**
Total all regions **Expenditure by region ($65.65m)**	**Output ($m)**	**Value added ($m)**	**Household income ($m)**	**Employment (no.)**
Initial	*79.45*	*34.9*	*17.48*	*1000.09*
Flow-on	*91.37*	*46.6*	*21.06*	*278.66*
Total Impact	**170.81**	**81.51**	**38.53**	**1278.75**
Total all NSW **Expenditure by region ($65.65m)**	**Output ($m)**	**Value added ($m)**	**Household income ($m)**	**Employment (no.)**
Initial	*79.44*	*34.82*	*17.44*	*1000.1*
Flow-on	*139.77*	*70.03*	*33.4*	*402.8*
Total Impact	**219.21**	**104.85**	**50.85**	**1,402.90**

In Table 6 the Type II ratios are the multipliers and are given by the ratios of total output/initial output in a given region. The ratio shows how the economy in each region responds to the additional stimulus from professional fishing. Ratios are shown for added value, Household income and employment. The higher the ratio the more induced effect there is from a regional economy relative to the stimulus.

TABLE 6: An overview of the Type II multiplier ratios for output, value added, household income and employment in the seven area of the NSW Coast in the regional study (Adapted from WRI results Appendix 11.4b).

Output ($m)	Initial	Total	Type II ratio
1. Far North Coast	1	1.97	1.965
2. Clarence	1	1.87	1.873
3. Mid North Coast	1	2.13	2.128
4. Great Lakes	1	2.11	2.115
5. Central Coast and Sydney	1	2.86	2.858
6. Illawarra	1	2.08	2.085
7. South Coast	1	1.69	1.688
Total all regions	1	2.15	2.150

Household Income ($m)	Initial	Total	Type II ratio
1. Far North Coast	1.32	2.48	1.88
2. Clarence	3.1	5.55	1.79
3. Mid North Coast	2	3.97	1.99
4. Great Lakes	4.09	9.42	2.30
5. Central Coast and Sydney	2.98	10.30	3.46
6. Illawarra	1.79	3.43	1.92
7. South Coast	2.2	3.38	1.54
Total all regions	17.48	38.53	2.20

Value Added ($m)	Initial	Total	Type II ratio
1. Far North Coast	1.5	4.45	2.97
2. Clarence	6.07	12.32	2.03
3. Mid North Coast	3.19	8.57	2.69
4. Great Lakes	11.32	22.49	1.99
5. Central Coast and Sydney	4.56	18.62	4.08
6. Illawarra	3.54	7.43	2.10
7. South Coast	4.72	7.63	1.62
Total all regions	34.9	81.51	2.34

Employment (no.)	Initial	Total	Type II ratio
1. Far North Coast	77.04	95.4	1.24
2. Clarence	196.79	237.7	1.21
3. Mid North Coast	121.75	153.7	1.26
4. Great Lakes	239.74	310.1	1.29
5. Central Coast and Sydney	135.04	208.6	1.54
6. Illawarra	98.07	121.3	1.24
7. South Coast	131.66	152.1	1.16
Total all regions	1000.1	1,278.8	1.28

For each of the four measures, region 5 has highest economic induced effects, whereas on the South Coast and in the Clarence region, the economy has lower type II ratio reflected lower induced effects. Input-output multipliers can be used to estimate the economic impacts of an increase or decrease in spending in an economy.

Discussion of the catching sector results for all NSW

The economic significance of an industry, such as professional fishing, can be measured in terms of direct and indirect effects. The direct effects from the initial expenditure are a measure of the value of output of the industry itself, the number of people employed and the income they receive. The indirect effects, or flow-ons reflect induced indirect responses in the economy[7].

[7] Flow-ons can be divided into production-induced and consumption-induced effects in the economy. Production-induced effects are the industry's purchase of goods and services from other industries. Consumption-induced effects arise from the spending of household income received as payment for labour.

The multipliers indicate the size of those impacts relative to the level of sales to final demand. The Type II ratios reflects the relationship between the total impact (direct and indirect) to the direct effect. The calculation of multipliers from fishing will only include the linkage effects that occur back through the supply of inputs to fishermen and not any effects downstream toward the consumer. In the next section we examine the impacts from the secondary sector seafood activity.

Estimates of the regional impacts of the secondary sector

The secondary sector includes fish receivers, processors, wholesalers and retailers. The volume of fish reduces in the secondary sector due to fish cleaning and processing and the value of the finished product increases along the supply chain to the retailer. In NSW the secondary chain can be short, as seen in selling prawns at the co-op, or longer when considering a final packaged fish in a retail supermarket or export market has been through several marketing intermediaries. Overall, however, the marketing chains tend to be short due to the perishable nature of the seafood product. There is no monitoring or data available on the prices at different points in the NSW seafood sector supply chain and hence it is not possible to accurately estimate a total value for the seafood processing, wholesaling and retailing sector in NSW. In this Project we draw on previous site, or port specific estimates, to provide a state-wide estimate.

The previous studies involving regional economics and the wild-catch and seafood sector in NSW are (Tamblyn and Powell, 1988; Powell et al., 1988; Harrison 2010). Regional studies have been completed in other states (Econsearch 2013) and also international reviews (Kelsey et al. 2013). There are two scenarios in the NSW site-specific regional seafood studies noted above. One is where fish are landed and have little processing (Tamblyn and Powell, 1988; Powell et al., 1988) and the other is where fish are further processed as in the Northern Rivers (Harrison 2010). In estimating the state-wide secondary sector estimates, we use the ratio of primary to secondary output in the past studies to generate a low and a high imputed output value for the secondary sector. These ratios for low were 0.99 of the primary output value (Tamblyn and Powell, 1988; Powell et al., 1988) and for high were 1.29 (Harrison 2010). Other adjustment factors are reported in Table 7.

TABLE 7: The adjustment factors used to impute low and high values of the secondary sector from the primary sector estimates.

All NSW	Output ($m)	Added value ($m)	Income ($m)	Employment (FTE)
Low adjustment factor	0.99	1.06	1.31	1.35
High adjustment factor	1.29	1.38	1.70	1.75

The estimated lower and higher secondary sector estimates are presented in Table 8.

TABLE 8: The regional primary catching sector with retail and processing estimates (low and high).

All NSW	Output ($m)	Added Value ($m)	Income ($m)	Employment (FTE)
Catching sector	219.10	104.50	50.90	1,402.90
Retail and processing (est.) low	217.03	110.60	66.50	1,887.90
Total (est.) low	**436.13**	**215.06**	**117.40**	**3,290.80**
Retail and processing (est.) high	282.14	143.73	86.45	2,454.24
Total (est.) high	**501.24**	**248.23**	**137.35**	**3,857.14**

The secondary sector estimates in Table 8 show that for the year 2012–13 the state-wide estimates of both the catching and secondary sector are an output between $436m and $501m; added value between $215m and $248m; and household income between $117m and $137m; and the sectors employ between 3,291 and 3,857 FTE jobs across NSW. This would translate into many more part-time and casual jobs across the fishing and secondary industries in NSW. These estimates do not include aquaculture.

The current study indicates that professional fishing and the secondary seafood sector have a likely output in 2012/13 of between $436m and $501m, with an estimated 3,291 and 3,857 full-time jobs across NSW. The estimates likely exceed those of the 2016 NSW DPI netsite (NSW Department of Primary Industries 2012), which states: "The seafood industry, which includes aquaculture and oyster farmers is a vibrant industry which generates over half a billion dollars of economic activity each year, employing more than 4,000 people." The life style and family nature of many part-time fishing businesses leads to many different persons being represented in full-time equivalent employment estimates.

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Appendix 5. Economic evaluation of NSW coastal professional fisheries: A report by the Western Research Institute (WRI)

> See attached separate document.

ECONOMIC EVALUATION OF NSW COASTAL COMMERCIAL FISHERIES

2016

CONTENTS

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Prepared for University of Technology Sydney, the Australian National Centre for Ocean Resources and Security and ENVision Environmental Consulting

6th April 2016

14 020/ NSW Commercial Fisheries/Report

ECONOMIC IMPACT OF COASTAL COMMERCIAL FISHERIES

INTRODUCTION

The University of Technology Sydney (UTS) was funded by the Fisheries Research and Development Corporation (FRDC) to undertake the Social and Economic Evaluation of NSW Coastal Commercial Wild-Catch Fisheries project. This research is being completed in conjunction with the Australian National Centre for Ocean Resources and Security (ANCORS) and ENVision Environmental Consulting. As part of this project, UTS has commissioned the Western Research Institute (WRI) to undertake research on the economic impact of commercial fisheries on NSW coastal economies.

Economic modelling undertaken by WRI utilised operational and financial data, collected from surveys with commercial fishing operators (provided by ANCORS) to estimate the economic impacts of commercial fishing on regional coastal economies and at the NSW State level. Modelling was undertaken for the financial year 2012/13. The study modelled regional estimates for the fish catching side of the industry and does not include the secondary seafood processing, wholesale and retail sector, which was not part of the wild catch fishing businesses survey.

The following regions were modelled

- Far North Coast
- Clarence
- Mid North Coast
- Great Lakes
- Central Coast
- Illawarra
- South Coast
- NSW

The resulting economic impacts were reported in terms of output, value added, household income and full time equivalent (FTE) employment.

Results from the economic modelling showed the greatest increase in Gross Regional Product (GRP) (also known as ‘value added’) in the regions of Great Lakes ($22.5m), followed by the Central Coast ($18.6m) and Clarence ($12.3m), with a total increase in GRP for all regions of $81.50 million.

Household income had the highest impacts in the Central Coast ($10.3m) followed closely by Great Lakes ($9.42m).

The greatest levels of employment were seen in the regions Great Lakes (310), Clarence (238) and the Central Coast (209), with a total of approximately 1,279 FTE achieved across all regions.

ECONOMIC IMPACT OF COASTAL COMMERCIAL FISHERIES

The economic impacts of commercial fishing on the respective regions were as follows:

Regions	Far North Coast	Clarence	Mid North Coast	Great Lakes	Central Coast	Illawarra	South Coast	All Regions	NSW
Initial Expenditure ($m)	6.22	12.0	8.39	13.28	13.59	5.92	6.25	65.66	65.66
Output ($m)	11.87	26.35	19.34	42.06	41.50	15.53	14.16	170.81	219.21
Value Added ($m)	4.45	12.32	8.57	22.49	18.62	7.43	7.63	81.50	104.85
Household income ($m)	2.48	5.55	3.97	9.42	10.30	3.43	3.38	38.54	50.85
Employment (no.)	95	238	154	310	209	121	152	1,278.75	1,403

Note: The totals for NSW include expenditure made between the coastal regions and other regions within NSW and interstate. Therefore, the totals (initial plus flow-ons) for All Regions will not sum to the total for NSW.

METHODOLOGY

WRI undertook an economic modelling to understand the economic impact of commercial fisheries in NSW. Modelling was undertaken through input-output analysis, which provides a detailed picture of the structure of a regional economy at a point in time, and can be used to estimate the contribution or impact of a particular sector of the economy or individual organisation including flow-on or multiplier effects.

Geographic scope

The regions for which the economic impacts were assessed were defined in consultation with the project coordinator at UTS and ANCORS and were based on the Department of Primary Industries (DPI) classification of regions. In order to account for the varying size of regions, possible overlap between them, expenditure patterns of commercial fishers and difficulties in collecting the data, the regions have been defined at various levels of Australian Bureau of Statistics (ABS) statistical geography as in the table below. The respective study areas were delineated based on a recreational fishing economic impact study that WRI undertook in 2013.

Figure 1. Broader Study regions

Broader Region	Region	Statistical Area Level
1. Far North Coast	Tweed Valley and Richmond Valley Costal	SA3
2. Clarence	Clarence Valley	SA3
3. Mid North Coast	Coffs Harbour Kempsey-Nambucca Port Macquarie East, West & Laurieton & Bonny Hills	SA3 SA3 SA2
4. Great Lakes	Taree – Gloucester Great Lakes Port Stephens Newcastle	SA3 SA3 SA3 SA3
5. Central Coast	Lake Macquarie East & West Wyong Gosford & Dural - Wisemans Ferry	SA3 SA3 SA3

	Sydney Northern Beaches • Sydney North Sydney/Hornsby • Sydney Ryde • Sydney Inner West • Sydney Eastern Suburbs • Sutherland • Sydney – City and Inner South • Sydney – Inner South West	Metropolitan SA4s
6. Illawarra	Illawarra Shoalhaven	SA4 SA3
7. South Coast	Batemans Bay, Batemans Bay - South, Eurobodalla Hinterland, Broulee - Tomakin, Moruya - Tuross Head Narooma – Bermagui Bega-Tathra, Eden, Bega-Eden Hinterland	SA2 SA2 SA2
8. NSW		State

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Data collection

In order to estimate the economic contribution of the commercial fisheries in NSW coastal regions, WRI used financial data provided by UTS and ANCORS. The financial data was collected via a paper based survey which was distributed in September 2014 and remained open for responses until September 2015. The survey and regional modelling was based on the financial year 2012-13. Surveys collected data on commercial fishing costs and income.

Impact analysis

To estimate the economic contribution of the commercial fisheries in NSW, the relevant expenditure items were allocated to industries in the input-output tables, based on the sectoral allocation table used in the 2013 study (see appendix 2).

Reporting

The economic impact of commercial fisheries has been reported as a sum of:

- Initial impacts: defined as the value of the immediate changes in the respective region as a result of the commercial fisheries; and
- Flow-on impacts: defined as the value of changes in the regional economy in the course of an additional round of spending after the initial impact occurred.

The impact of commercial fisheries was estimated in terms of:

- Output, the value of goods and services that are produced within an establishment that become available for use outside that establishment, plus any goods and services produced for the organisation's own final use. Output is equal to total revenue plus any internal consumption.
- Value added, the amount by which the value of an article is increased at each step of its production, exclusive of its initial cost. Value added is equal to gross output minus intermediate inputs and is equivalent to the contribution to gross regional product (GRP - the local equivalent of gross domestic product). That is, value added is the difference between the costs of production (excluding the compensation of employees, gross operating surplus, taxes and imports) and the value of sales turnover. Value added sums the value added components of production through the supply chain, while initial expenditure includes multiple counting of expenditure through the supply chain. Value added is the most reliable measure of the actual value of production.
- Income, measuring the benefit received by regional households from economic activity. It typically refers to compensation of employees but can also include income in return for productive activity such as the gross mixed income of unincorporated enterprises, gross operating surplus on dwellings owned by persons, and property income receivable and transfers receivable such as social assistance benefits and non-life insurance claims.
- Full-time equivalent employment, a measure of the workload of an employed person in a given location that makes workloads comparable across different types of employment (part-time, full time and casual).

Assumptions

In the case of economic impacts by commercial fisheries, the expenditure modelled includes:

- Fixed and variable costs by commercial fisheries (profits and depreciation payments by operators are not considered)
- Revenues generated within each regional economy were apportioned over the sectors in which the income was received from. It was assumed that revenues were received from as follows: 5% are exports from the state, 10% to local households, 20% local retail and 65% whole sale and then retail via Sydney fish market.
- Full-Time Equivalent (FTE) Employment was unknown, therefore each regions FTE was calculated using the 'Labour Paid' component of expenditure and dividing by the Compensation of Employees (COE) output generated for the Agriculture sector within the IO tables to find the average COE per FTE.

RESULTS

The results of the Industry Significance impact analysis are presented in the tables as follows.

Far North Coast

Initial expenditure in the Far North Coast region by commercial fishers was $6.22 million. Total impacts, including initial and flow-on impacts, were as follows:

- Total output for the region is $11.87 million
- Value added initial impact was $1.5 million, with a total impact of $4.45
- Household income initial impact was $1.32 million, with total impact of $2.48 million
- Initial Full Time Equivalent (FTE) is 77.0, generating 95.3 FTE for the regional economy.

Table 1. Far North Coast

Expenditure by region ($m)	**6.22**			
	Output ($m)	**Value added ($m)**	**Household income ($m)**	**Employment (no.)**
Initial	6.04	1.50	1.32	77.04
Flow-on	5.83	2.94	1.16	18.32
Total Impact	11.87	4.45	2.48	95.36

Clarence

Initial expenditure in the Clarence region by commercial fishers was $12.0 million. Total impacts, including initial and flow-on impacts, were as follow:

- Total output for the region is $26.35 million
- Value added initial impact was $6.07 million, with a total impact of $12.32 million
- Household income initial impact was $3.10 million, with total impact of $5.55 million
- Across the regions, Clarence generated the second greatest level of Initial Full Time Equivalent (FTE) of 196.8, contributing 237.7 FTE to the regional economy.

Table 2. Clarence

Expenditure by region ($m)	**12.0**			
	Output ($m)	**Value added ($m)**	**Household income ($m)**	**Employment (no.)**
Initial	14.07	6.07	3.10	196.79
Flow-on	12.28	6.25	2.45	40.87
Total Impact	26.35	12.32	5.55	237.66

Mid North Coast

Initial expenditure in the Mid North Coast region by commercial fishers was $8.39 million. Total impacts, including initial and flow-on impacts, were as follows:

- Total output for the region is $19.34 million
- Value added initial impact was $3.19 million, with a total impact of $8.57 million
- Household income initial impact was $2.00 million, with total impact of $3.97 million
- Initial Full Time Equivalent (FTE) is 121.7, generating 153.6 FTE for the regional economy.

Table 3. Mid North Coast

Expenditure by region ($m)	**8.39**			
	Output ($m)	**Value added ($m)**	**Household income ($m)**	**Employment (no.)**
Initial	9.09	3.19	2.00	121.75
Flow-on	10.25	5.38	1.98	31.90
Total Impact	19.34	8.57	3.97	153.65

Great Lakes

Initial expenditure in the Great Lakes region by commercial fishers was $13.28 million, the second largest for the regions. Total impacts, including initial and flow-on impacts, were as follows:

- Total output for the region is $42.06 million
- Value added initial impact was $11.32 million, with a total impact of $22.49 million
- Household income initial impact was $4.09 million, with total impact of $9.42 million
- Across the regions, Great Lakes generated the greatest level of Initial Full Time Equivalent (FTE) of 239.7, contributing 310.1 FTE to the regional economy.

Table 4. Great Lakes – Port Stephens and Newcastle

Expenditure by region ($m)	**13.28**			
	Output ($m)	**Value added ($m)**	**Household income ($m)**	**Employment (no.)**
Initial	19.89	11.32	4.09	239.74
Flow-on	22.17	11.17	5.33	70.38
Total Impact	42.06	22.49	9.42	310.12

Central Coast

Initial expenditure in the Central Coast region by commercial fishers was $13.59 million. The Central Coast had the largest amount of expenditure across the regions. Total impacts, including initial and flow-on impacts, were as follows:

- Total output for the region is $41.50 million
- Value added initial impact was $4.56 million, with a total impact of $18.62 million
- Household income initial impact was $2.98 million, with total impact of $10.30 million
- Initial Full Time Equivalent (FTE) is 135.0, generating 208.5 FTE for the regional economy.

Table 5. Central Coast and Sydney Metro

Expenditure by region ($m)	**13.59**			
	Output ($m)	**Value added ($m)**	**Household income ($m)**	**Employment (no.)**
Initial	14.52	4.56	2.98	135.04
Flow-on	26.98	14.06	7.32	73.51
Total Impact	41.50	18.62	10.30	208.55

Illawarra

Initial expenditure in the Illawarra region by commercial fishers was $5.92 million. Total impacts, including initial and flow-on impacts, were as follows:

- Total output for the region is $15.53 million
- Value added initial impact was $3.54 million, with a total impact of $7.43 million
- Household income initial impact was $1.79 million, with total impact of $3.43 million
- Initial Full Time Equivalent (FTE) is 98.07, generating 121.27 FTE for the regional economy.

Table 6. Illawarra

Expenditure by region ($m)	**5.92**			
	Output ($m)	**Value added ($m)**	**Household income ($m)**	**Employment (no.)**
Initial	7.45	3.54	1.79	98.07
Flow-on	8.08	3.89	1.64	23.20
Total Impact	15.53	7.43	3.43	121.27

South Coast

Initial expenditure in the South Coast region by commercial fishers was $6.25 million. Total impacts, including initial and flow-on impacts, were as follows:

- Total output for the region is $14.16 million
- Value added initial impact was $4.72 million, with a total impact of $7.63 million
- Household income initial impact was $2.20 million, with total impact of $3.38 million
- Initial Full Time Equivalent (FTE) is 131.7, generating 152.1 FTE for the regional economy.

Table 7. South Coast

Expenditure by region ($m)	**6.25**			
	Output ($m)	**Value added ($m)**	**Household income ($m)**	**Employment (no.)**
Initial	8.39	4.72	2.20	131.66
Flow-on	5.78	2.91	1.18	20.48
Total Impact	14.16	7.63	3.38	152.14

All Regions

Initial total combined expenditure by the regions was $65.66 million. Total impacts, including initial and flow-on by commercial fishers, is estimated to have generated the following across the regional economy:

- A total of $170.81million in output for the regional economy
- Value added initial impact was $34.9 million, with a total impact of $81.50 million
- Household income initial impact was $17.48 million, with total impact of $38.54 million
- Initial Full Time Equivalent (FTE) is 1000.0, generating approximately 1,278.75 FTE for the regional economy.

Table 8. Total all regions

Expenditure by region ($m)	**65.66**			
	Output ($m)	**Value added ($m)**	**Household income ($m)**	**Employment (no.)**
Initial	79.44	34.90	17.48	1000.09
Flow-on	91.38	46.59	21.06	278.66
Total Impact	170.81	81.50	38.54	1,278.75

Note. Totals for NSW include expenditure made interstate and inland. Therefore, the expenditure for all regions will not sum to the total expenditure for NSW.

NSW

At the NSW state level, total impacts, including initial and flow-on by commercial fishers is estimated to have generated the following:

- The total impact for the state due to the Commercial Fishing Industry was approximately $219 million in output
- $104.85 million in value added
- $50.85 million in household income
- Approximately 1,403 (FTE) jobs in NSW.

Table 9. NSW

Expenditure by region ($m)	**65.66**			
	Output ($m)	**Value added ($m)**	**Household income ($m)**	**Employment (no.)**
Initial	79.44	34.82	17.44	1000.10
Flow-on	139.77	70.03	33.40	402.80
Total Impact	219.21	104.85	50.85	1,402.90

Note. Totals for NSW include expenditure made interstate and inland. Therefore, the expenditure for all regions will not sum to the total expenditure for NSW.

SUMMARY OF TABLES

Table 10. Summary of Regional Tables				
Expenditure by Far North Coast ($m)	**6.22**			
	Output ($m)	**Value added ($m)**	**Household income ($m)**	**Employment (no.)**
Intial	6.04	1.50	1.32	77.04
Flow-on	5.83	2.94	1.16	18.32
Total	11.87	4.45	2.48	95.36
Expenditure by Clarence ($m)	**12.00**			
	Output ($m)	**Value added ($m)**	**Household income ($m)**	**Employment (no.)**
Intial	14.07	6.07	3.10	196.79
Flow-on	12.28	6.25	2.45	40.87
Total	26.35	12.32	5.55	237.66
Expenditure by Mid North Coast ($m)	**8.39**			
	Output ($m)	**Value added ($m)**	**Household income ($m)**	**Employment (no.)**
Intial	9.09	3.19	2.00	121.75
Flow-on	10.25	5.38	1.98	31.90
Total	19.34	8.57	3.97	153.65
Expenditure by Great Lakes ($m)	**13.28**			
	Output ($m)	**Value added ($m)**	**Household income ($m)**	**Employment (no.)**
Intial	19.89	11.32	4.09	239.74
Flow-on	22.17	11.17	5.33	70.38
Total	42.06	22.49	9.42	310.12
Expenditure by Central Coast ($m)	**13.59**			
	Output ($m)	**Value added ($m)**	**Household income ($m)**	**Employment (no.)**
Intial	14.52	4.56	2.98	135.04
Flow-on	26.98	14.06	7.32	73.51
Total	41.50	18.62	10.30	208.55
Expenditure by Illawarra ($m)	**5.92**			
	Output ($m)	**Value added ($m)**	**Household income ($m)**	**Employment (no.)**
Intial	7.45	3.54	1.79	98.07
Flow-on	8.08	3.89	1.64	23.20
Total	15.53	7.43	3.43	121.27
Expenditure by South Coast ($m)	**6.25**			
	Output ($m)	**Value added ($m)**	**Household income ($m)**	**Employment (no.)**
Intial	8.39	4.72	2.20	131.66
Flow-on	5.78	2.91	1.18	20.48
Total	14.16	7.63	3.38	152.14
Expenditure by all regions ($m)	**65.66**			
	Output ($m)	**Value added ($m)**	**Household income ($m)**	**Employment (no.)**
Intial	79.44	34.90	17.48	1000.09
Flow-on	91.38	46.59	21.06	278.66
Total	170.81	81.50	38.54	1,278.75
Expenditure by NSW ($m)	**65.66**			
	Output ($m)	**Value added ($m)**	**Household income ($m)**	**Employment (no.)**
Intial	79.44	34.82	17.44	1000.10
Flow-on	139.77	70.03	33.40	402.80
Total	219.21	104.85	50.85	1,402.90

Note. Totals for NSW include expenditure made interstate and inland. Therefore, the expenditure for all regions will not sum to the total expenditure for NSW.

CONCLUSION

At the NSW State level, commercial fishing generated approximately $105 million in Value added (GRP), $51 million in additional household income and total full-time equivalent employment of 1,403.

At the regional level, results from the economic modelling showed the greatest increase in GRP in the regions of Great Lakes ($22.5m), followed by the Central Coast ($18.6m) and Clarence ($12.3m), with a total increase in GRP for all regions of $81.50 million.

Household income had the highest impacts in the Central Coast ($10.3m) followed closely by Great Lakes ($9.42m). The largest employment impacts were seen in the Great Lakes (310), Clarence (238) and the Central Coast (209) regions, with a total of approximately 1,279 FTE achieved across all regions.

Table 11. Impacts	Far North Coast	Clarence	Mid North Coast	Great Lakes	Central Coast	Illawarra	South Coast	All Regions	NSW
Initial Expenditure ($m)	6.22	12.0	8.39	13.28	13.59	5.92	6.25	65.66	65.66
Output ($m)	11.87	26.35	19.34	42.06	41.50	15.53	14.16	170.81	219.21
Value Added ($m)	4.45	12.32	8.57	22.49	18.62	7.43	7.63	81.50	104.85
Household income ($m)	2.48	5.55	3.97	9.42	10.30	3.43	3.38	38.54	50.85
Employment (no.)	95	238	154	310	209	121	152	1,278	1,403

Note: The totals for NSW include expenditure made between the coastal regions and other regions within NSW and interstate. Therefore, the totals (initial plus flow-on) for All Regions will not sum to the total for NSW.

APPENDIX 1: INPUT-OUTPUT ANALYSIS

Inter-industry models can be used for economic impact analysis, to estimate the benefits or costs generated by new initiatives on each and every sector of an economy. For example, if there is a change in the purchasing or sales pattern of any industry, the flow-on or multiplier effects on upstream industries can be calculated. Input-output modelling is one method of inter-industry modelling.

Constructing the Tables

The input-output tables for this project were extracted from the Australian Bureau of Statistics (ABS) 2009/10 national input-output table using the Generation of Regional Input-Output Tables (GRIT) technique. The national table was adjusted to represent New South Wales and the subsequent study regions using detailed data from:

- 2011 Census;
- 2012/13 National State Accounts for New South Wales (ABS Cat No 5220.0);
- Australian Demographic Statistics (ABS Cat No 3101.0);
- Quarterly data on employment by industry sector (ABS cat. no. 6291.0.55.003); and
- Australian Industry data (ABS Cat No 8155.0).

The tables created were for financial year 2012/13.

The tables for this project have been constructed using the GRIT technique developed by Professor Guy West and Professor Rod Jensen of the University of Queensland. The GRIT technique, which uses both national Australian Bureau of Statistics data and local superior data concerning the industry in question, is the most reputable method of input-output table construction in Australia and indeed elsewhere in the world.

GRIT uses a series of non-survey steps to produce a prototype regional table from the national table, but provides the opportunity at various stages for the insertion of superior data. The system is “variable interference” in that the analyst is able to determine the extent to which they interfere with the mechanical processes by introducing primary or other superior data.

The GRIT system is designed to produce regional tables that are:

- Consistent in accounting terms with each other and with the national table;
- Capable of calculations to a reasonable degree of holistic accuracy; and
- Capable of being updated with minimum effort as new data becomes available.

The GRIT technique is basically a hybrid method of deriving state and regional input-output tables from the national input-output table while at the same time allowing for the insertion of superior data at various stages in the construction of the tables.

Marginal Coefficients Model

One of the main limitations of input-output tables is the assumption of linear coefficients. To address this problem and the associated problem of overestimation, the input-output analysis undertaken for the Commercial Fisheries incorporates the marginal coefficients model which attempts to overcome the limitations of traditional input-output analysis by removing the assumption of linear coefficients for the household sector. As is well documented in literature, the household sector is the dominant component of multiplier effects in an input-output table so using marginal income coefficients for the household sector only provides a more accurate estimate of the multiplier effects and provides results closer to those of a computable general equilibrium (CGE) model. This provides more accurate estimates of the significance of impacts associated with Commercial Fisheries, than would be possible with traditional input-output analysis.

The impacts are measured in terms of industry value added, gross regional product, household income and full-time equivalent jobs. All impacts are measured in either dollar terms or full-time equivalent employment terms and as a percentage of the regional economy.

Industry Significance

Input-output tables are frequently used to provide estimates of the significance of a particular industry or organisation in terms of its contribution to the economy. This is done by examining the effects of the organisation shutting down and ceasing all economic activities. This method provides an estimate of the level of economic activity that can be attributed to that particular organisation, in this case the wild-catch commercial fishing industry. The Industry Significance approach was used to model the operations of commercial fishing.

Operational data was used to construct a new sector in the input-output table representing the commercial fishing operations in the respective coastal economies. Adjustments were made to the original Agriculture, Forestry & Fishing sector to reflect this division.

Location quotients

Since expenditure items may not be produced locally, a location quotients matrix was applied in the model. This process effectively removes a proportion of total expenditure that represents expenditure made on imports into the relevant region.

Note: In calculating the economic impact of Commercial Fisheries it should be noted that the Australian Bureau of Statistics applies a confidentiality technique to its Census data tables. The technique involves small random adjustments to the data which help prevent the disclosure of any identifiable data[1].

[1] For further information about the confidentiality technique adopted by the Australian Bureau of Statistics please refer to the following web address: http://www.abs.gov.au/websitedbs/censushome.nsf/home/factsheetsccd?opendocument&navpos=450

APPENDIX 2: ALLOCATION OF EXPENDITURE ITEMS

Expenditure Item	Proportion allocated	Allocation to Industry
Cooperative Commission	25% 25% 25% 25%	Agriculture, Forestry & Fishing Wholesale Trade Retail Trade Finance and Insurance
Bait	100%	Agriculture, Forestry & Fishing
Boat fuel	100%	Petroleum, Coal, Chemical and Associated Product Manufacture
Repairs and maintenance	100%	Transport Equipment Manufacturing
Gear replacement	50% 50%	Textile, Clothing, Footwear & Leather Manufacturing Other Manufacturing
Protective clothing	100%	Textile, Clothing, Footwear & Leather Manufacturing
Vehicle fuel	75% 25%	Petroleum, Coal, Chemical and Associated Product Manufacture Transport, Postal and Warehousing
Freight	100%	Transport, Postal and Warehousing
Boat registration	100%	Public Administration & Safety
Brokerage	100%	Finance & Insurance
Vehicle registration	100%	Public Administration & Safety
Insurance	100%	Finance & Insurance
Management costs	75% 25%	Professional, Scientific and Technical Services Finance and Insurance
Licence fees	100%	Public Administration & Safety
Accounting and legal	75% 25%	Professional, Scientific and Technical Services Finance and Insurance
Litigation	100%	Professional, Scientific and Technical Services
Telephone etc.	100%	Information, Media and Communications
Power	100%	Electricity, Gas & Water Supply

Rates and Rent	50% 50%	Rental, Hiring, and Real Estate Services Public Administration and Safety
Bank charges	100%	Finance and Insurance
Building/plant repair	100%	Construction
Vehicle repair	100%	Personal and Other Services
Travel	50% 50%	Petroleum, Coal, Chemical and Associated Product Manufacture Transport, Postal and Warehousing
Memberships	100%	Professional, Scientific and Technical Services
Interest	100%	Finance and Insurance
Leasing	100%	Rental, Hiring, and Real Estate Services
Other	4%	Apportioned across 26 sectors

WESTERN RESEARCH INSTITUTE

WRI is a regional development research organisation located in Bathurst, New South Wales. WRI holds a wealth of knowledge on employment, business development and investment issues affecting regional Australia. It has worked with Commonwealth, State and Local Governments and industry groups on numerous investment and development programs in regional areas. WRI has strong credentials in business and commercial market consulting and applied economic modelling including input-output analysis, shift-share, agribusiness and regional socio-economic surveys and analysis.

Mr Alistair Maclennan – Acting General Manager

BA Political Economy, First Class Honours (UNE)

Having served in a variety of parliamentary, public service and private sector roles, Alistair brings a wealth of research experience to WRI. Alistair has well developed skills in data analysis, economics and business, and has a wide understanding of government. In addition, Alistair also has experience in policy development in the energy sector, where he engaged with industry, government agencies and NGOs to inform policy. Alistair's experience in engaging with clients, stakeholders and the public assists WRI to fully understand its client's needs and provide tailored research.

Ms Danielle Ranshaw – Senior Research Consultant

BEc&Fin NSW

Danielle's experience in project management in the information technology sector combined with qualifications in economics and finance provides a solid background for WRI projects. With skills in systems design and development, Danielle has been able to extend WRI's capability in developing robust and increasingly complex systems to support research fieldwork. Additionally, Danielle has extensive experience in business process analysis, performance planning and review, report writing and project planning.

Ms Rebecca Hood – Senior Research Officer

BBus (Fin/Acc) With Distinction CSU

After working in the Financial Services Industry for several years coupled with a degree in Finance and Accounting from Charles Sturt University, Rebecca brings strong skills in finance, economics, business and accounting to WRI projects. Rebecca's extensive experience in the finance field and her high level understanding of current market knowledge gives Rebecca a solid understanding of the financial needs of regional and rural Australia. Having prior experience with local councils and retail, Rebecca also brings a robust understanding of the needs of regional businesses in our local economy to her role at WRI.

Ms Wai Matthews – Research Officer

BBus (Fin/Eco) CSU

With a background in Business Administration and Bookkeeping, Wai brings to WRI strong experience and knowledge in local business operations, management and finance. Wai has great interest in economic issues affecting regional areas which led to her attaining an internship with the NSW Department of Industry as an Economic Analyst. As an intern, Wai has gained a wealth of knowledge and experience in data analytics and reporting as well as a good understanding of government. Wai is currently undertaking Post Graduate study in Applied Statistics to further her skills.

Ms Dale Curran – Executive Officer

BA ANU

Dale is responsible for all administrative processes at WRI including executive support, finance, management of the Board of Directors and maintenance of policies. She has worked in a variety of roles at WRI, including Fieldwork Supervisor and Research Assistant, and has worked on several community and business surveys. Dale brings a high level of organisational skill to her role as Executive Officer.

Ms Elspeth Morris - Administration Officer

Dip BusMgt Adv Dip HospMgt

Joining WRI in a maternity relief role, Elspeth brings with her over 20 years of workplace experience in hospitality, banking and administration roles including;

- Development of social media policy and profiles
- Development of document templates and maintain document registers, development of

policies and collaboration on risk management analyses
- Draft and publishing of internal business documents, as well as branding and marketing materials.

Elspeth is experienced in fleet reporting and management and general office management; Including tracking and cost-centre journaling of expenses to program budgets and budget monitoring, general administrative duties and direct supervision of administration staff.

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Appendix 6. Changes in NSW seafood marketing and regional impacts

Professional fishing activity in NSW produces fish in a range of regional areas with community benefits from this landed catch. There is then secondary economic value generated in the economy from the processing, wholesaling and retail sector with the product being consumed by the final consumer as in Figure 1.

FIGURE 1: A simple overview of the primary and secondary values associated with the professional fish catch.

When measuring the economic activity in the "seafood sector", that is the primary and secondary sector combined, there is no one source of information for the activity in the secondary sector. The involvement of government in the catching sector requires catch logbooks that provide data on catch. This can be valued at the point of first sale and gives reliable estimates of the value of landed catch. When fishers are surveyed as to their costs of production, then the economic activity associated with the fish production can be estimated through regional economic modelling.

The secondary sector commerce takes place in the food processing, wholesale and retail industries. While the quantity of fish produced at the point of first sale is known, this is reduced by processing to different product forms and there are no accurate sales statistics. In the secondary sector, prices are also vary greatly due to different product forms (gilled and gutted, fillets, processed forms, etc) and also quality factors can bring great diversity to prices at the retail level.

Historically the fish catching and secondary sectors have been viewed separately, but there can be incentives for businesses to become vertically integrated across the production and secondary sector to gain profitability for the integrated entity. There are potentially opportunities to gain high prices from niche production and marketing strategies (for example, high quality handling of a given species for a niche market).

The Sydney Fish market and price data for regional industry analysis

Prior to deregulation in the mid-1990s professional fishers in co-operatives were required to send product via the NSW Fish Marketing Authority, now Sydney Fish Market Ltd (SFM). The system involved freight costs to transport fish to Sydney and also fees for cooperatives, and sales commissions when auctioned at the SFM. With deregulation, fishers could sell to licenced fish receivers (LFRs) at port and outside of the SFM system. However, the volume of species caught by professional fishers often exceeds the capacity for consumption in a regional port and fishers

have to send fish to Sydney for sale in this city market which can sell larger volumes of fish. In this Project we accessed the available sales data provided by SFM to examine the influence of SFM.

The price from the SFM is publically available via co-operatives and reports and informs producers and fish buyers in the Sydney market and also those in fish marketing along the NSW coast. SFM market prices are effectively a benchmark of the "price at point of first sale" for fish trading both inside and outside of the actual SFM floor. Electronic information systems have made this information more accessible.

Contact with SFM in May 2015 established for the financial year period 2011/12, that "for the species of strategic importance to SFM (a total of thirty species accounting for approximately 70% of NSW reported catch in that year), found 39% of the landed NSW product was traded through SFM" (Source: personal communication, Gus Dannoun, SFM).

The Project requested data on the volumes and sales prices of the different species originating in NSW from SFM sold during the 2012–13 period for comparisons with state-wide landed catch for each species.[8] In comparing what SFM sells from landed catch in NSW, we had to deduct fish species in NSW sourced from Commonwealth fisheries (for example, south east fishery and east coast tuna quota species). The comparison also assumed that for a given quantity of a species landed in an NSW DPI fishery, that if that amount or more was sold by SFM, then the fish had all come from the logbooks. This is not always the case, hence our maximum approach below.

Across all 270 species the comparison showed that the *maximum* that SFM could sell of fish recorded in NSW DPI logbooks, was 41% by volume and 46% by value as reported in Table 1.

TABLE 1: The volume and value of fish species caught in NSW DPI fisheries presumed sold in SFM, plus other species where the quantity sold in Sydney exceeds the production recorded by DPI

SFM	DPI log books	SFM	SFM	Total NSW	SFM
Volume (t)	Volume (t)	% by Volume	Value ($m)	Value ($m)	% by Value
3,935	10,965	36%	$30.0	$69.9	42.9%
2,842	954	-	$6.2	$9.2	
Max that SFM is selling in 2012-13					
3,935			30.0		
954			6.2		
4,889	**11,919**	**41%**	**$36.2**	**$79.1**	**46%**

[8] Thanks to SFM senior staff Mr Bryan Skepper and Mr Gus Dannoun for their assistance.

In line one of Table 1 there are species for which the total volume caught as declared in logbooks exceeds the sales of these species in SFM. We assume that the fish produced are those sold in SFM. The second line indicates 940t of fish produced for which SFM sells in excess of that amount, being sourced from outside NSW DPI fisheries. Summating the two lines gives both a volume and value estimate that is the maximum possible sales by SFM. That is 41% by volume or 46% by value. This result is similar to the internal SFM analysis, (39% by volume) in 2011–12 figure quoted above.

The actual percentage sold by SFM would likely be below 41%, as explained above. As a cross check, the responses from the 50 businesses in the current survey indicated that the businesses surveyed sold 28.6% of total revenue via SFM, as indicated in Table 2.

TABLE 2: The percentage of total business revenue between different sales avenues for NSW professional fishing businesses surveyed in 2012-13 (Source: economic questionnaire in this study)

Local coop	Local sales	Other region/ SFM	Ex-NSW
42.5%	20.4%	28.6%	8.5%

Discussion of these results indicates a trend over the post de-regulation period of more product being marketed in the regions rather than through Sydney.

The SFM price

Given the history of fish marketing in NSW the SFM price has always been the subject of discussion in the industry. The SFM price is a reference point for fishers in the regions and provides information on current prices. When a fisher sends fish to the SFM they may have to pay local co-operative fees, and will have freight costs and commissions at SFM. The fishers, or regional co-operative manager can generally estimate an envisaged price net of these commissions, from the price at first sale, and uses this in marketing decision making as shown in Figure 2.

FIGURE 2: The SFM price and the primary and secondary sectors

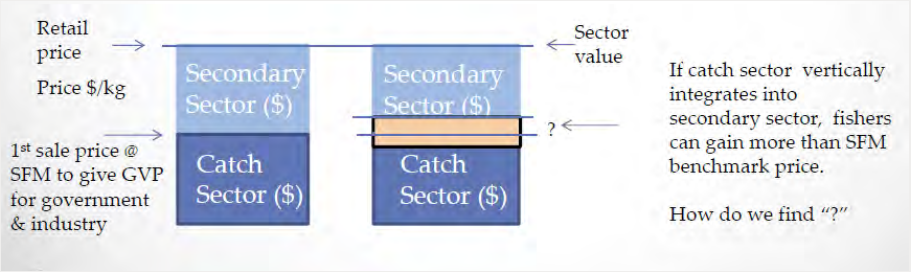


Figure 2 shows that in selling a fish locally, the fisher can not only avoid these freight and commission costs, but can also gain benefits from becoming part of the retail side of the supply chain. This means that the price at point of first sale outside of the SFM is not readily determined, as the fisher is enjoying some of the surplus that normally goes to businesses in the secondary sector.

When we come to estimate a gross value of the NSW professional fishing industry catch, there is one measure of the gross value of production (catch price at point of first sale) (see Figure 2). There is then the further gross value of the secondary sector (net volume after processing final secondary price). The sector-wide approach is that the SFM price imputed across all catch produced provides a GVP at first sale in the catching sector. This GVP total is used in the regional modelling of the catching sector.

For the 60-70% of catch that is not sold via SFM, not having freights costs, co-operative or SFM commissions means there are more net receipts remaining in the regional communities increasing regional community benefits, presumably at the cost of the Sydney retail sector, who likely substitute with fish from elsewhere nationally, and use imports. It is apparent that the pattern of retail sales in the secondary sector has been altered by the marketing outside of the SFM. This may not necessarily increase the total value of the NSW seafood sector derived from local catch, but is an alteration in the beneficiaries of the sales, and where there is vertical integration there is an opportunity for wild-catch fishers to reduce commissions and freight costs and increase net income from both the primary and secondary sector. Interviews confirm fishers vertically integrating forward to sell frozen fish and bait in the retail sector. On the South Coast the complexity of fish marketing is seen in that while the SFM price is informative for decisions, a fisher may prefer to keep supply to a loyal local customer at a lower price, for period of time, rather than take a "one off" higher net price available in Sydney and risk breaking their local business relationship. Co-operatives tells a similar story is respect of fishers having to trust that a good co-operative will gain the fisher a price better than the net SFM price.

Examples of marketing adding value in the regions

The secondary sector of the seafood industry has seen an increasing number of marketing arrangements developing outside the Sydney market. In our study we found a range of alternative marketing arrangements that can add value in the secondary sector and hence have the potential to provide wild-catch fishers with a higher than net SFM price. The following comparisons show the non-SFM marketing taking place. This devolution has given fishers the capacity to gain more than the SFM price net of commissions and freight. We used the comparison of DPI catch data and records of volumes of sales in SFM to prepare Table 3.

TABLE 3: Comparison of the volumes of different species catch sold at SFM, indicating the percentage not being marketed via SFM

Species	NSW DPI catch (t)	SFM sales (t)	Non SFM sales (t)	Non SFM as % of DPI catch
King Prawns	651	220	430	66%
School Prawns	917	289	627	68%
Sea Mullet	2,423	107	2,315	96%
East Coast School Whiting	906	332	573	63%
Australian Sardine	228	32	196.2	86%
Whitebait	119	36	83	70%
Australian Salmon	1,866	107	1,237	66%
Mulloway	76	40	36	47%

Table 3 shows the species that generally tend not to be used in the SFM marketing chain. We discussed the marketing of these species with fishers, co-operatives and private sector seafood marketers to determine the benefit to the region and the wild-catch fishers of having alternative marketing channels to add value. Each species is addressed below, avoiding confidentiality concerns of those interviewed, by not citing prices or disclosing product margins, but giving illustrative principles of how added value in marketing takes place.

Box 1 – Species remaining in the regions

King Prawns – are produced at various ports in northern NSW with 430t, (66%) being sold outside SFM. Co-operatives and private sector buyers can increase returns by controlling inventory e.g. avoiding sending too many to markets, including SFM, when catches are plentiful and will reduce prices. Inventory control uses freezing to buy and hold product until prices are higher. Fishers in regional area can benefit from this through receiving more than net SFM price. Niche markets in live prawns are also an option. Holding inventory is not costless, but can be advantageous.

School Prawns – are produced in a range of estuaries in NSW and some 627t (68%) are traded outside of SFM. They are sold in roughly a 50:50 ratio between through retail for human consumption or used as bait by recreational fishers. The proportion used for retail, versus bait, may change with variations in the size of the School Prawn (e.g., Pittwater large and Clarence smaller). Selling as bait in small packages adds value and high margins at the wholesale and retail levels.

Sea Mullet – produced in northern NSW is almost totally marketed outside of SFM (2,315t, 96%). The whole Mullet is used for fillets, roe is exported for a high price and entrails for professional and recreational fishing bait. Considerable seasonal employment generated with considerable associated processing, wholesaling and retailing activity.

Eastern School Whiting – some 573t (63%) are traded outside of the SFM system. They now meet an export market to Asia and are sold as a breaded product in the domestic retail market, with benefits to processors, wholesalers and retailers.

Australian Sardine – a popular recreational fishing bait with 196t (86%) outside SFM. They benefit wholesalers, packers and retailers with producers in the north and south of the state. Industry indicates the demand for NSW sardines as a "local" recreational fishing bait exceeds the supply and forms a segment of the retail bait market which bring the majority of sardine/pilchard like species from interstate sources.

Whitebait – Sandy sprat (83t, 70%) has uses similar to the sardine.

Australian Salmon – is produced in the south of the state with 1,237t (66%) not going to SFM. It is used for human consumption, professional fishing bait and some recreational fishing bait/burley.

Mulloway – produced in coastal areas with 36t (47%) being traded outside SFM. Often supplied as a table fish growing in popularity for its eating qualities when handled well. Sold in regional retail shops and outlets.

In summary, there has been a trend in alternative marketing channels to SFM and regional fishers and seafood sector businesses such as processors, wholesalers and retailers have been involved in these added value developments. The fishers have thus gained income, relative to the net of freight and commissions SFM price. The private sector has been entering the secondary sector, but the legacy of co-operatives is a background issue that is still being resolved.

Co-operatives – a mixed bag

The NSW fish marketing system had a government regulated co-operative system and this was deregulated in the mid-1990s. Since then co-operatives which operate locally under board of shareholders etc., have had mixed fortunes. The co-operatives have been examined in two reports (GHD Hassal 2009; GHD 2014). Both reports indicate a significant decline in the number of co-operatives and the variation in the success of co-operatives, often related to their size (number of members), governance structure and the effectiveness of management. Where co-operatives close, the fishers face the impacts of less infrastructure, higher costs for service provision and lower prices due to less competition. However it is likely a transitional process as private companies or other co-operatives may come along. GHD (2014) suggest that "Rationalisation of NSW fishing cooperatives is likely to be beneficial in the longer term, particularly if it enables services to be maintained in regions where cooperatives are facing ongoing challenges to remain viable."

Discussion with fishers and seafood sector indicates that the issue is the running of seafood sector businesses, with some of the co-operatives being poorly run and not being able to adapt under the weight of successive impacts. The replies to the economic survey indicated that several co-operatives were having problems in meeting fixed costs, such as the local government rates incurred in holding "water front" sites. The current restructuring/reform process will increase the pressures on seafood marketing businesses and some poorly positioned co-operatives are less able to meet these impacts than others, which have sounder business fundamentals and better management practices. However we have seen the innovation taking place in marketing with the primary and the secondary sector, which bodes well for the long run health of seafood enterprises.

Appendix 7. Results of the social questionnaires conducted by UMR

NSW Tourism Operators Survey Research Report

22 December 2015

UNIVERSITY OF TECHNOLOGY SYDNEY

UMR strategic research

Contents


Executive Summary

Key findings

Business focus and demand peaks

Although around a third (33%) stated catering to all demographic/ profile segments and half (50%) stated catering to visitors from any location, including overseas, their local region and town remains a key area of focus and source of trade (33% and 23% respectively).

Peak periods in order of demand include Christmas, followed by Easter and Summer Holidays, and to a slightly lesser extent, New Year.

Understanding of 'locally' sourced seafood

The term 'local' seafood is strongly associated with their region (65%) or town (20%) - and to an even greater extent than observed for either consumers or fish merchants.

Attitudes and perceptions regarding the contribution of commercial fishing/ seafood to tourism

Tourism operators are distinctly of the opinion that access to and consumption of local seafood is central to the local tourism experience. Furthermore, commercial fishing is considered pivotal to the local tourism economy. There is low level of concern about any associated environmental impact.

Key findings

Although most are also supportive of aquaculture, levels of agreement regarding the positive contribution to tourism and the economy are lower than those observed in relation to commercial fishing (driven by some extent it appears, to lack of knowledge).

Restaurant specific – seafood source and sales

Fish and seafood are key restaurant menu items with most featuring permanently on menus. The source of this seafood in terms of location and wild-catch versus aquaculture, ranged by item.

Service provided and promotions undertaken related to the seafood industry

Half of those surveyed had previously undertaken some form of promotional activity that featured the seafood industry. This included advertising local seafood-specific or local fresh produce events, and utilising print and digital formats (e.g. videos, social media and blogs). Focus of images was mostly on seafood, then aquaculture or fishing vessels.

Advice to tourists on where to access seafood (84% often/always) was very common followed by cross-promotional activity with outlets (58% often/always).

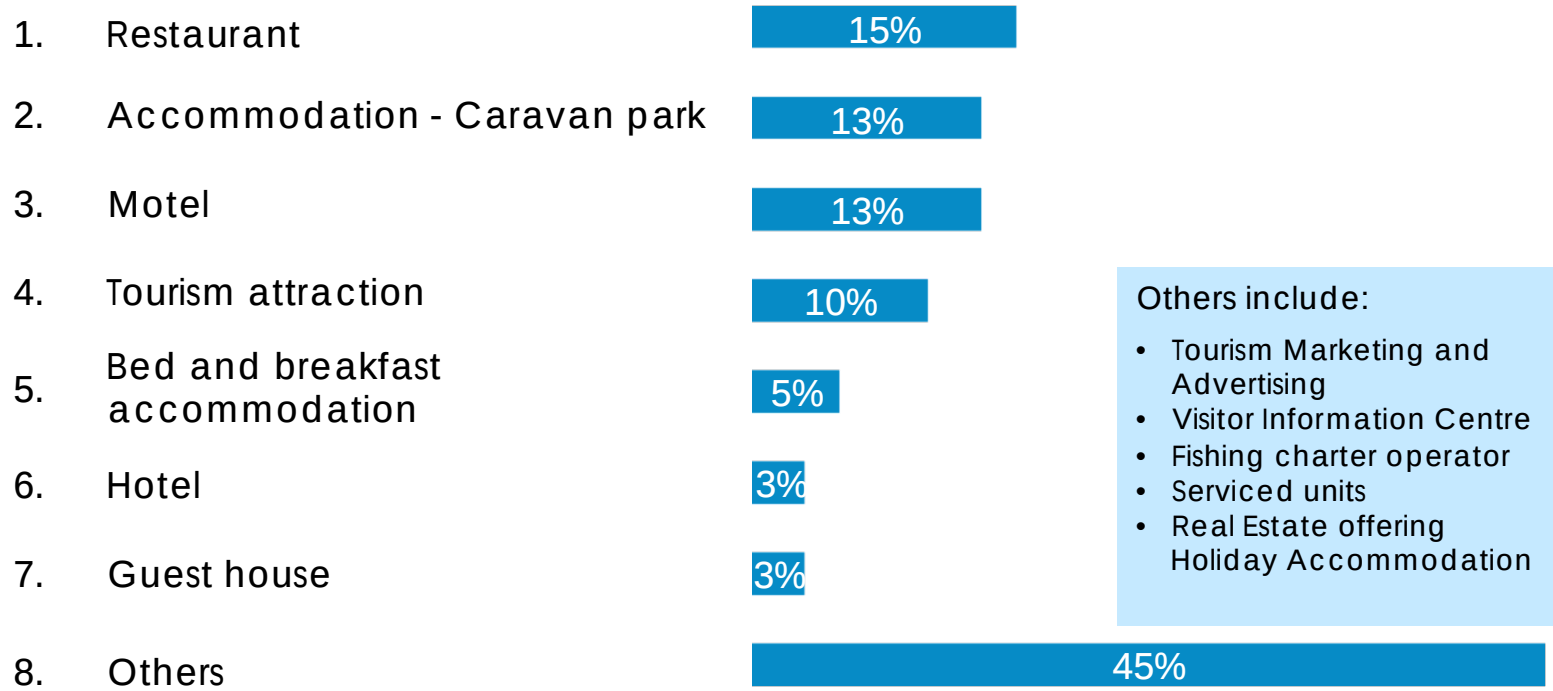
Methodology and sample profile

Research Base:

- n=40 completed interviews, via online survey link
- Average survey length 10 minutes
- NSW tourism operators focussed sample. Sample was provided by UTS (i.e. contact was made with a range of regional tourism organisations who were asked to assist in distributing the survey to their membership or through their networks and onto B&Bs, Hotels, Guest houses, Motels, Restaurants, Caravan Parks and Tourism Attractions).
- Fieldwork: 28th October – 14th December 2015
- Data is unweighted
- Maximum theoretical margin of error at 95% confidence level: ± 15.5%

Business types surveyed

What best describes the type of business you own/ operate?

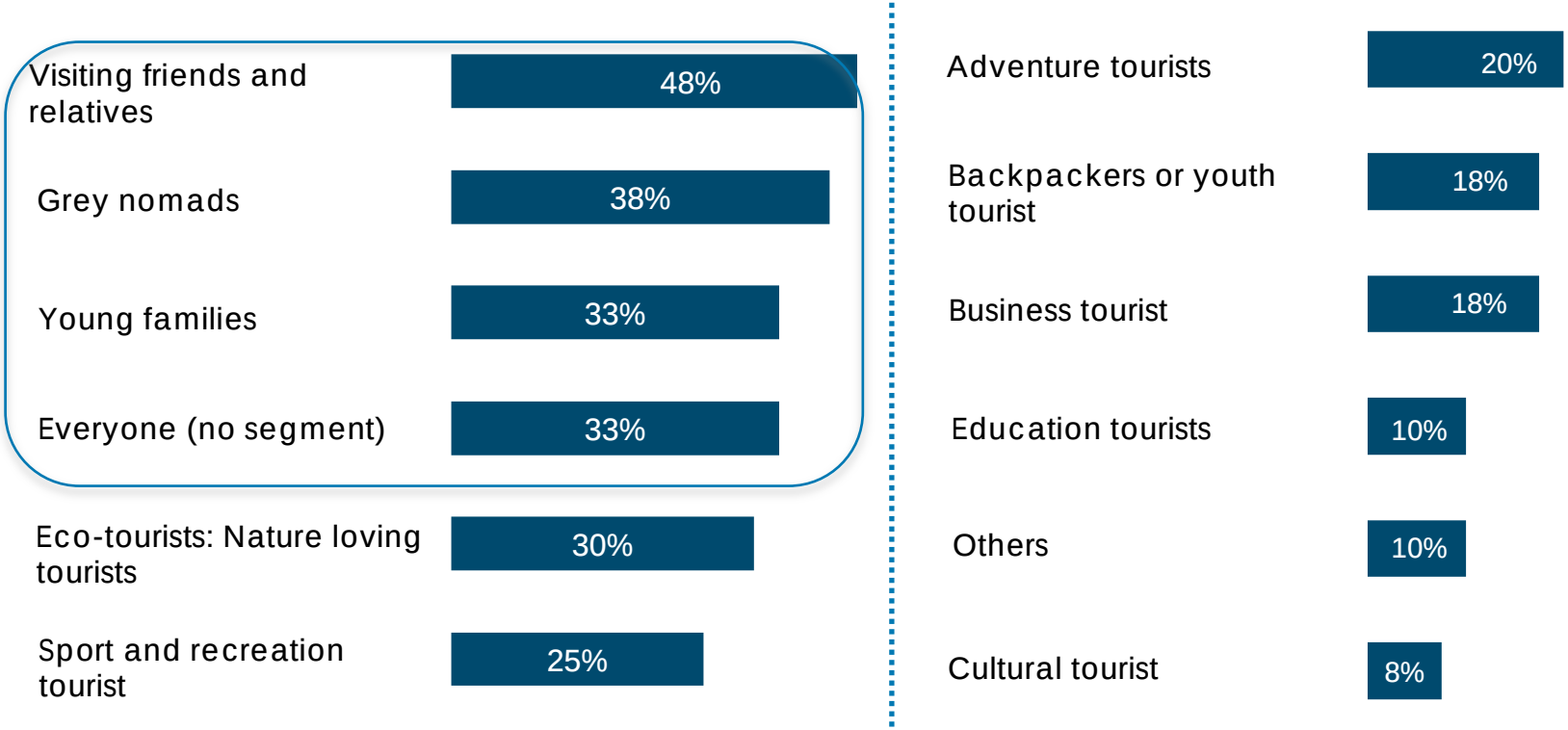


Base: All respondents

Business focus and demand peaks

The most common demographic segment catered to included visiting family and friends, followed by older Australians and Young families

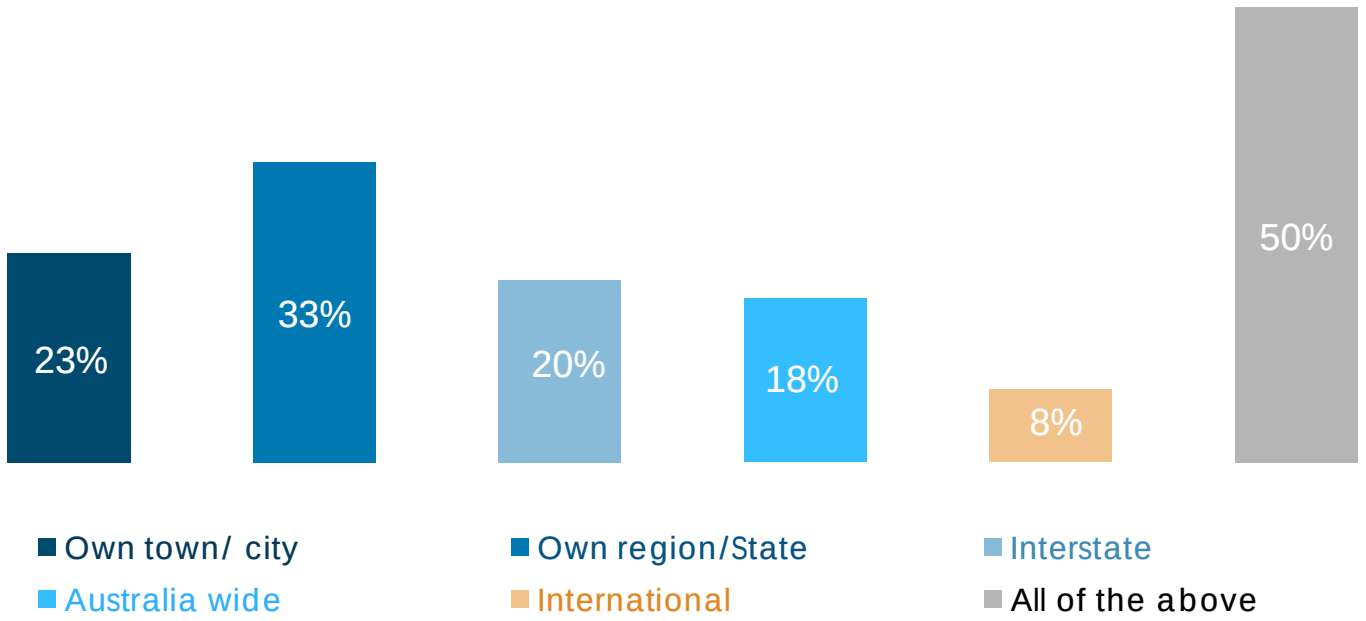
Which of the below describes the primary demographic segment you cater to in your business:



Base: All respondents

Although most catered to 'all' visitors, a local focus (own state or closer afield) was apparent

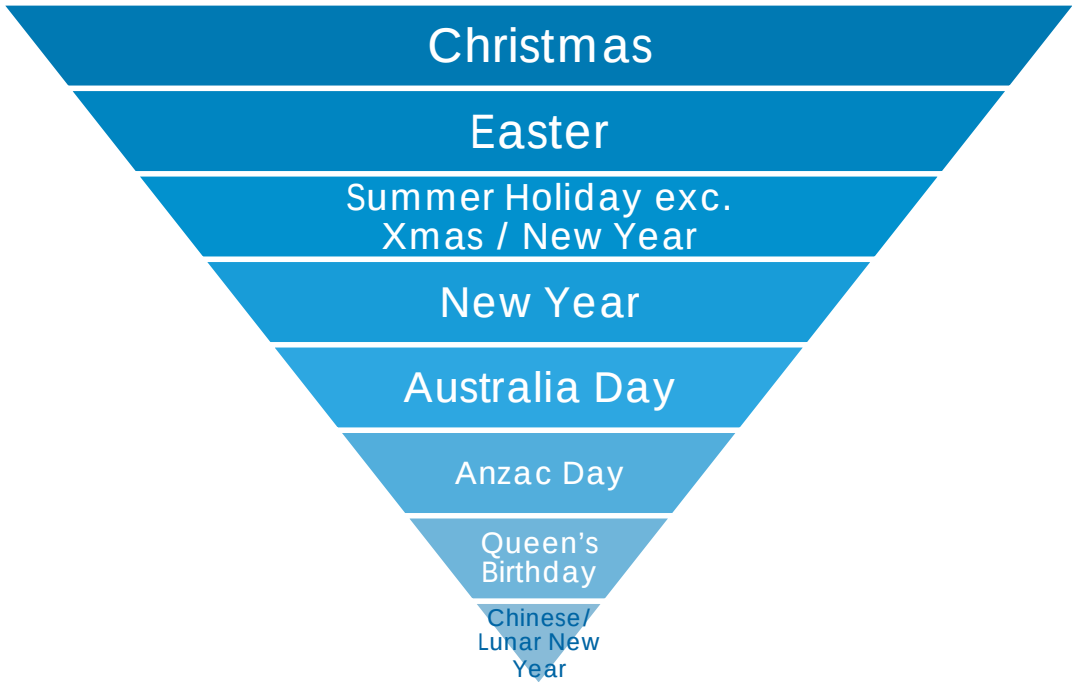
Which of the below describes the primary market segment you cater to in your business:



Base: All respondents

As with fish merchants, peak demand periods correspond broadly with traditional, Christian based holidays

When are your periods of peak demand for your business? Please rank them from 1-9



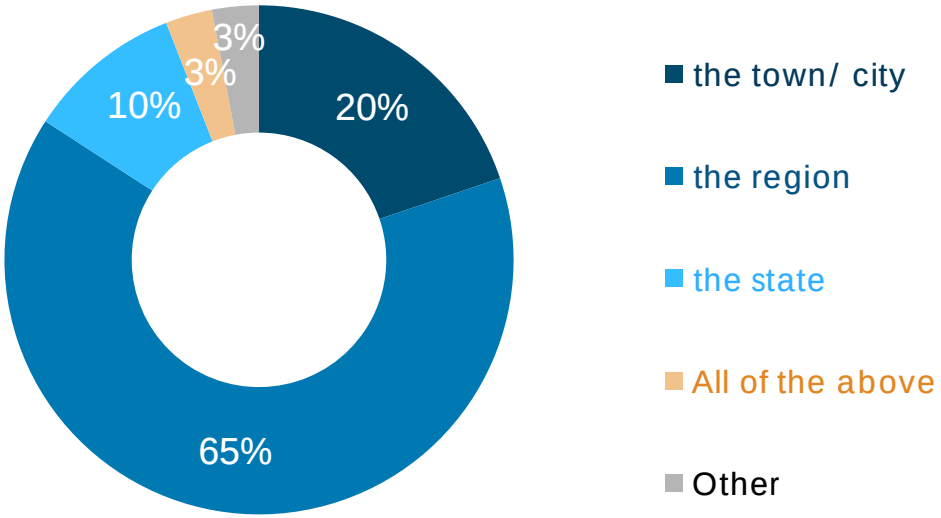
	Average Rank
Christmas	2.2
Easter	3.4
Summer Holiday exc. Xmas / New Year	3.4
New Year	3.7
Australia Day	5.5
Anzac Day	6.0
Queen's Birthday	6.4
Chinese/ Lunar New Year	8.1

Base: All respondents

Understanding of ‘locally’ sourced seafood

'Local' seafood is defined as the surrounding region - but to a much stronger degree than observed by either fish merchants or the community.

What do you understand by the term 'local' fish or seafood? Which of the following would apply?

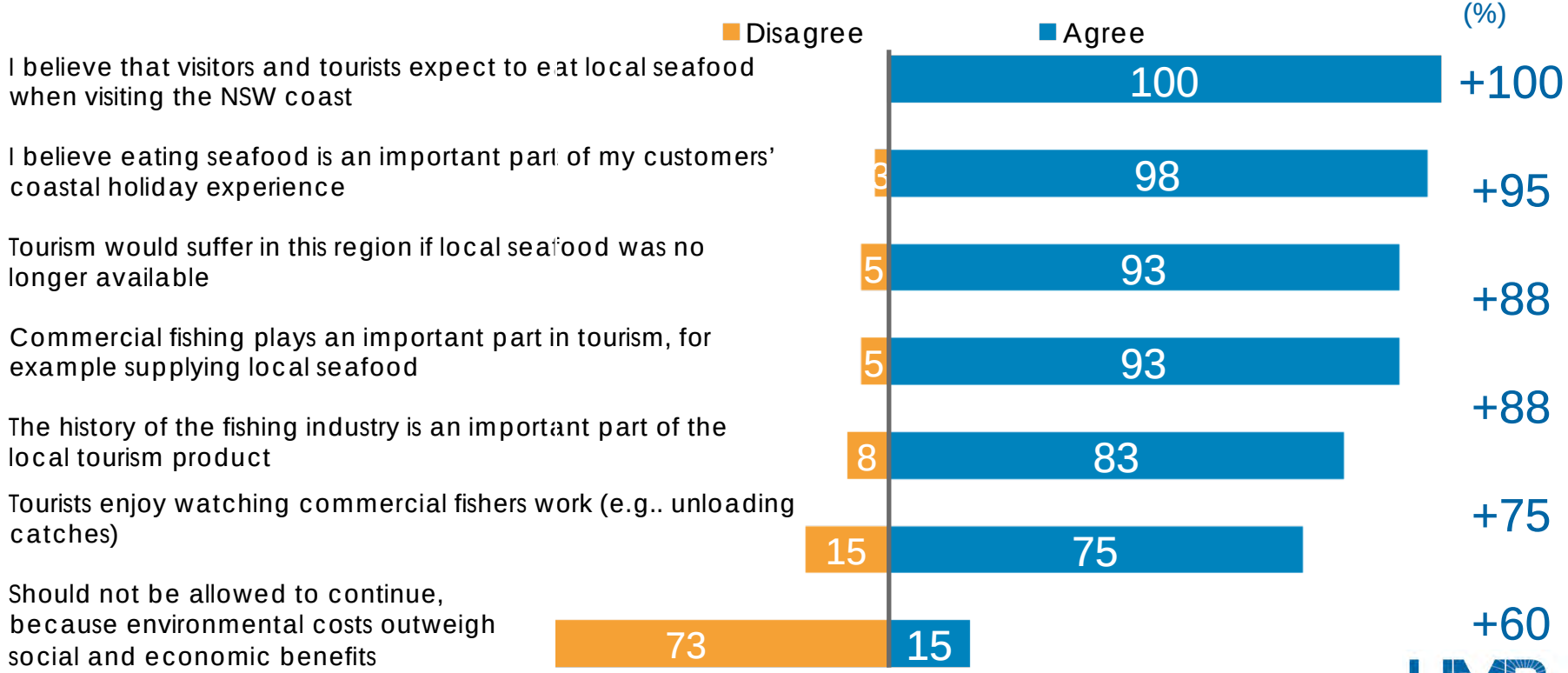


Base: All respondents

Attitudes and perceptions regarding the contribution of commercial fishing/ seafood to tourism

Strong belief that seafood integral to the tourism experience

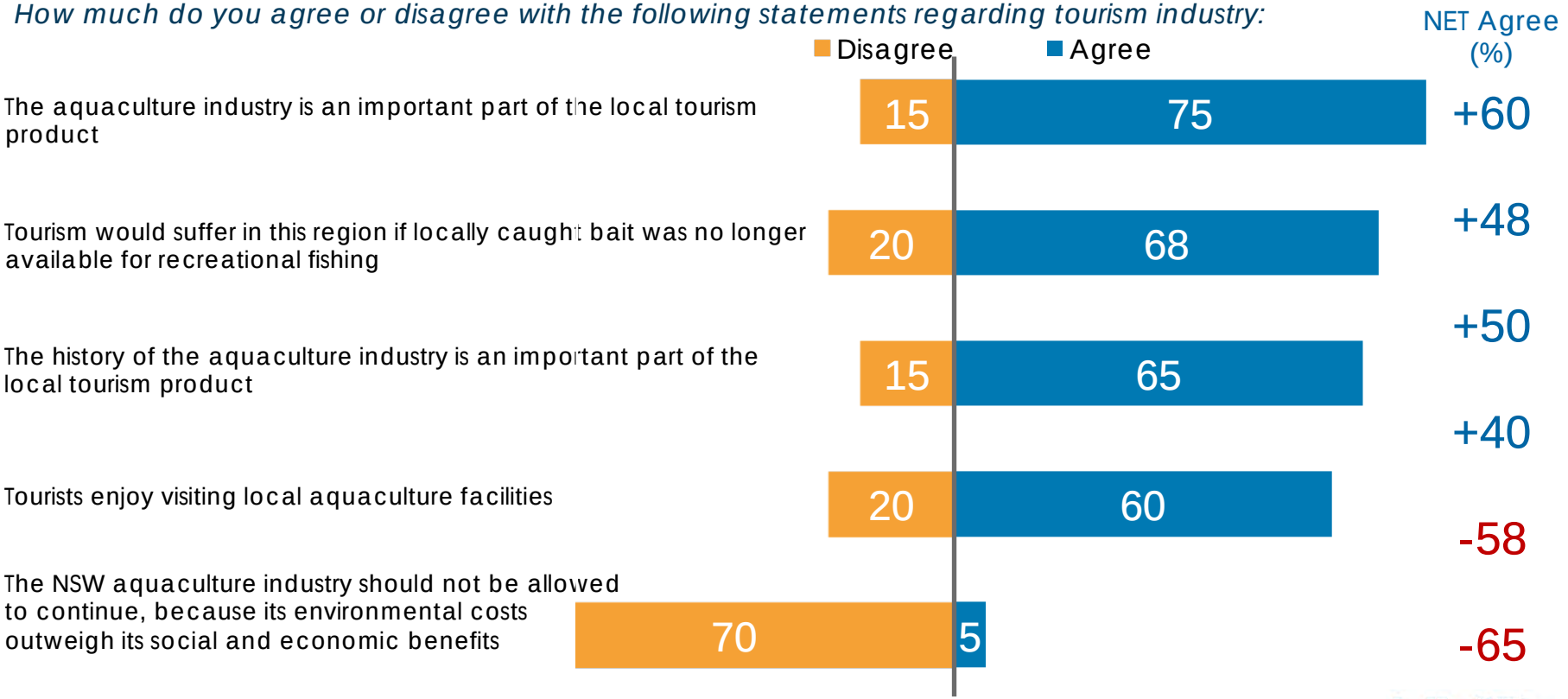
How much do you agree or disagree with the following statements regarding tourism industry:



Base: All respondents

Lower levels of agreement in relation to perceived benefits/ impact of aquaculture

How much do you agree or disagree with the following statements regarding tourism industry:



Base: All respondents

Service provided and promotions undertaken related to the seafood industry

Relatively high incorporation of seafood industry/ related imagery within promotional activities

When advertising your tourism product, do you use any of the following:

	Yes (%)
 Promotion of events or activities which feature the local seafood industry (e.g. festivals, farmers markets)	50
 Photos of seafood on marketing material (fish and chips, prawns etc.	43
 Photos related to aquaculture , e.g. local oysters, on marketing material	33
 Photos of commercial fishing vessels (e.g.. trawlers) on marketing material	30
 Any other advertising specifically related to the local seafood or fishing industry	20

Base: All respondents

Previous promotional events and activities which featured the local seafood industry included:

Please tell us a bit more about your promotional events and activities which feature the local seafood industry?

30%

Festivals and major events for region/ Local markets

"The Prawn Festival, targeting families, visiting friends and relatives. Major event for region."

"Local produce with the idea of supporting our local industries, are important when we hold a function night. This includes local beef, local rabbits, as well as local seafood."

20%

Images of local produce & fishing in both print and online marketing

"We have used images of local produce and fishing in both print and online marketing in the past."

"Mention Yamba Prawns, Wooli Oysters and local produce in marketing material. Gate to Plate, Feast in the Field and Dinner in the Paddock events all feature local seafood."

10%

Video promoting recreational fishing as well as the local Co-op

"We recently had a video promoting the town posted on our website and all social media. The heavily focused on recreational fishing as well as the local Co-op which sells fresh seafood."

10%

Social media advertising/ Blogs

"Via Facebook and blogs I post fresh fish and oyster stories."

"In our social media we promote the local upcoming events of the region."

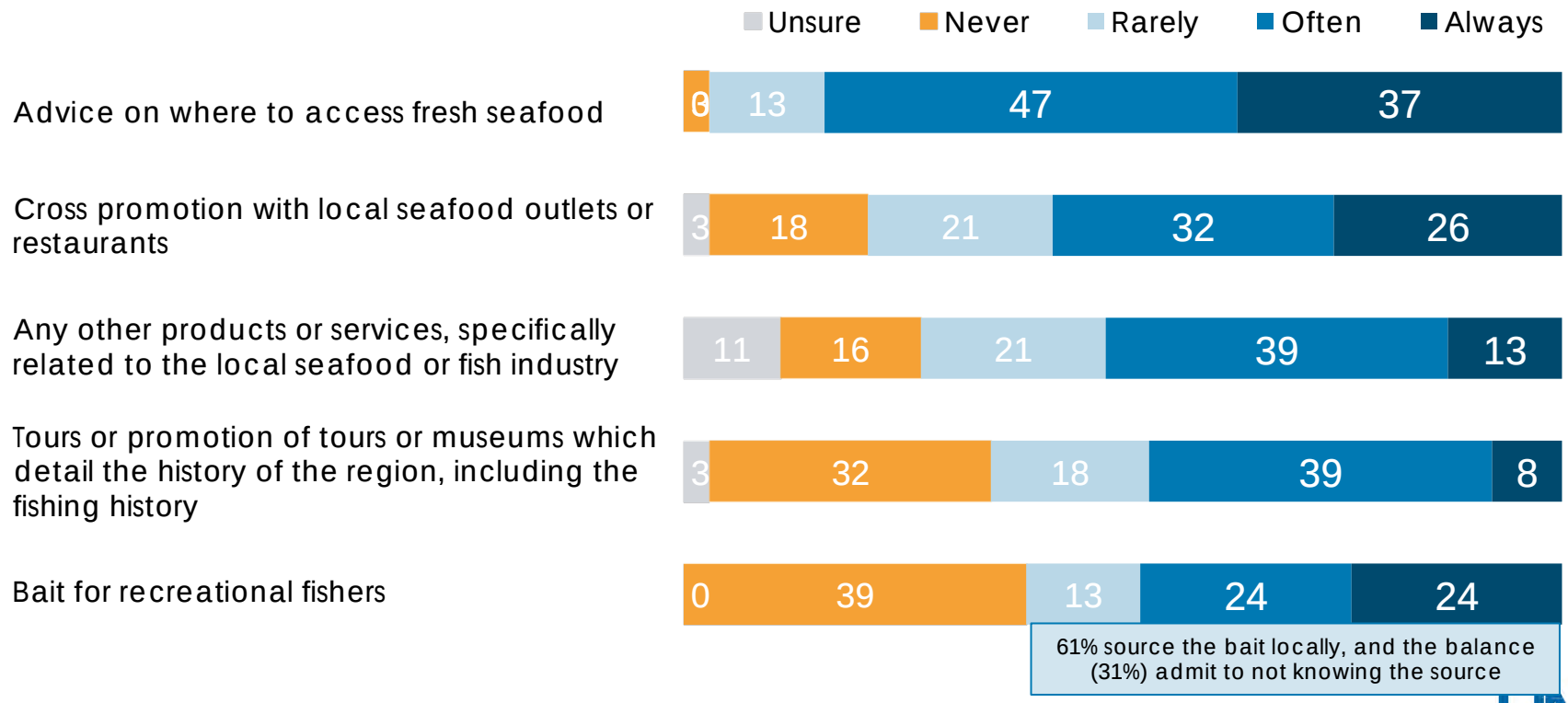
Others < 10%

- Promoted the bike hire business by highlighting fishing related destinations
- Photos of the local marine life
- Restaurant advertising/ Seafood Sunday
- Fishing competitions and diving introduction

Base: Those respondents whose use Promotion of events or activities which feature the local seafood industry

Services provided (amongst non-restaurants) very often included advice on where to access fresh seafood

Do you provide any of the following products or services to tourists and visitors?



Base: All respondents except those whose business type is Restaurant

Other services provided, relating to the local seafood industry included:

What is the other product or service you provide specifically related to the local seafood or fish industry

Others

- Others (5%)
- Kayak fishing tours (3%)
- Information on local tour operators (3%)
- No other (30%)
- Unsure/ None (10%)

Base: All respondents except those whose business type is Restaurant

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Restaurant specific – seafood source and sales

Regularity of seafood items on the menu – almost always!

How regularly do you have the following seafood on your menu?

	Always	Often	Rarely	Never
 Fish	100	0	0	0
 Prawns	100	0	0	0
 Oysters	100	0	0	0
 Shellfish (e.g. lobster/ crab/mussels/ clams/scallops)	50	50	0	0

Base: Those respondents whose business type is Restaurant

The main source of seafood varied by item, with only oysters remaining local

What is the main source of seafood sold in your restaurant? Please select one for each product

	Locally sourced	Interstate	Australian	Imported
 Fish	0	50	50	0
 Prawns	0	50	0	50
 Oysters	100	0	0	0
 Shellfish (e.g. lobster/crab/ mussels/clams/ scallops)	0	100	0	0

Base: Those respondents whose said either Always/Often/Rarely in the Regular seafood items question

Similarly, seafood sourced via Wild catch vs. Fish farmed varied by item

And can you tell us whether the seafood you source is mostly Wild catch or is it Fish farmed?

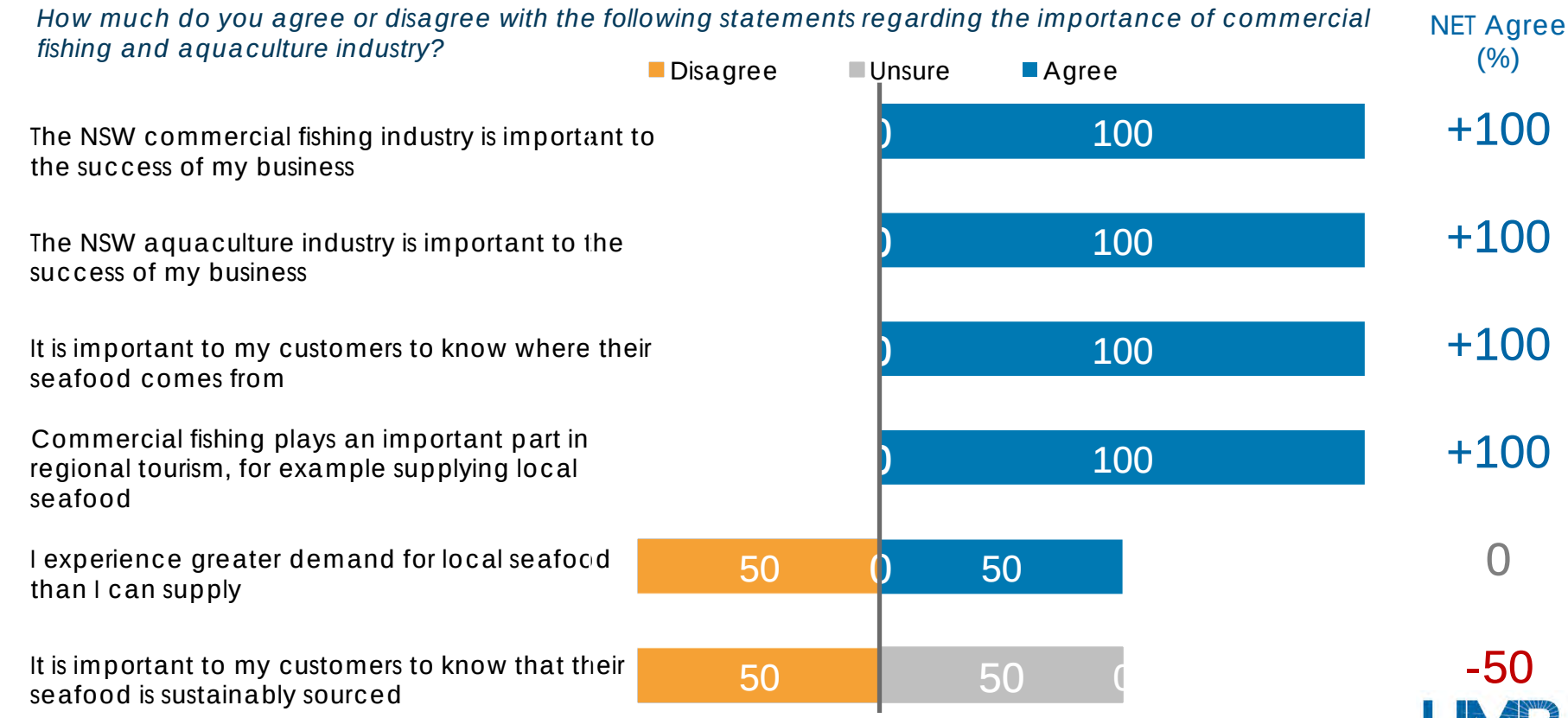
	Fish Farmed	Wild catch	Unsure
 Fish	0	100	0
 Prawns	50	50	0
 Oysters	100	0	0
 Shellfish (e.g. lobster/ crab/mussels/ clams/scallops)	0	50	50

Base: Those respondents whose said either Always/Often/Rarely in the Regular seafood items question

Restaurant specific – attitudes and perceptions regarding the impact of commercial fishing

Universal agreement regarding importance of commercial fishing industry, and impact on both their own business and regional tourism.

How much do you agree or disagree with the following statements regarding the importance of commercial fishing and aquaculture industry?



Base: Those respondents whose business type is Restaurant


Firmographics

Firmographics

		Total	Sample Size N=
Region (Multi)	Far North Coast	23%	9
	Clarence	28%	11
	Mid North Coast	25%	10
	Great Lakes - Port Stephens – Newcastle	5%	2
	Central Coast - Hawkesbury	10%	4
	Sydney Metro	8%	3
	Illawarra- Shoalhaven	8%	3
	South Coast	13%	5
	Other NSW (e.g. West, Central West, South West)	3%	1
	Victoria Coast	3%	1
	Others	5%	2
Turnover	Less than $1 million	60%	24
	$1 - $5 million	23%	24
	$6+ million	3%	9
	Unsure/refused	22%	1

Firmographics cont'd

		Total	Sample Size N=
Business Type (Multi)	Restaurant	15%	6
	Caravan Park	13%	5
	Motel	13%	5
	Tourist attraction	10%	4
	Tourism, Marketing and Advertising	10%	4
	Visitor Information Centre	8%	3
	Fishing charter operation	8%	3
	Bed and breakfast	5%	2
	Hotel	3%	1
	Guest house	3%	1
	Real Estate offering holiday accommodation	3%	1
	Serviced Units	3%	1
	Others	15%	6
Business operation	Less than 1 year	3%	1
	1 - 5 years	20%	8
	6 – 10 years	10%	4
	Over 10 years	65%	26

About UMR

UMR Strategic is a public opinion consultancy that helps Australasia's and Asia's Corporate and Political Leaders make strategic decisions about their organizations and the issues of the day, based on cutting edge research techniques.

UMR specialises in designing strategic research for clients that operate in highly competitive, often challenging environments. Our focus is on the social and political factors which impact corporate and organizational reputation.

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UTS: MCU / JOB 20059 / SEPTEMBER 2016