# Economic Analysis of NSW Commercial Fisheries Reform Package

*Final Report*

22 June 2015


AgEconPlus CONSULTING

ABN 41 107 715 364
**Michael Clarke P: (02) 9817 5888**
**E: clarke@AgEconPlus.com.au**
W: www.AgEconPlus.com.au

In association with

**Gillespie Economics**

P: (02) 9804 8562
E: gillecon@bigpond.net.au

econsearch

**EconSearch Pty Ltd**

P: (08) 8431 5533
E: jbmorison@econsearch.com.au
W: www.econsearch.com.au

## TABLE OF CONTENTS

## EXECUTIVE SUMMARY

NSW commercial fisheries are input-controlled with considerable excess capacity. This can result in low or negative return on investment (ROI) for individual fishers as well as fisheries as a whole. At the aggregate fishery level, the existence of excess capacity indicates a waste of resources, as, by definition, the same catch could have been taken by fewer vessels, using less inputs. It also makes the industry more vulnerable to adverse resource and economic shocks.

Previous studies of the NSW commercial fisheries confirm a low or negative ROI for individual fishers, with the ROI for an average vessel in each of the Estuary Prawn Trawl, Ocean Hauling, Ocean Trap and Line and Estuary General fisheries being less than the opportunity cost of capital. The only fishery in which the average vessel was profitable was the Ocean Trawl fishery. South Australian fisheries data also indicate low or negative ROI in input controlled fisheries.

Establishment of tradeable property rights such as through the Linkage of Shares to access, effort or catch can aid in the removal of excess capacity and improvement in financial and economic returns to individual fishing businesses (FBs) and fisheries as a whole. This is confirmed by studies of Commonwealth and South Australian fisheries. Commonwealth fisheries have generally improved in profitability as a result of, among other things, structural adjustment, removal of fishing effort and a shift to Individual Transferable Quotas. Studies of fisheries in South Australia indicate that economic performance has been improved by retiring effort from fisheries and in particular with a shift to output controls rather than input controls. A good, recent illustration is the Pipi fishery where the introduction of quota has led to increased investment in processing technology and marketing and, ultimately, to premium prices generating significant economic rents for quota holders. Linkage to catch is likely to provide a stronger property right and greater financial benefits (ROI) to FBs and the fishery than linkage to effort which in turn is likely to provide a stronger property right than linkage to minimum shareholdings.

The two key tasks of this study are to:

1. Examine the ROI in the following fisheries - Ocean Hauling, Ocean Trawl, Ocean Trap and Line, Estuary General and Estuary Prawn Trawl.
2. Analyse the impact of share linkage options on FBs in 15 different share classes.

### Task 1: ROI Analysis

Catch, revenue and effort data were available for the five fisheries but cost data needed to be imputed in order to examine the ROI of the fisheries. CSIRO cost models and survey-based cost data from South Australian fisheries were used to impute cost data for the five NSW fisheries.

According to the estimates reported in Table ES1, Ocean Hauling appears to be the most profitable of the five fisheries. This can be attributed to the high catch per day, the low investment in boat and gear, and that for a majority of the time the boats are used for fishing in other fisheries (hence the capital attributable to this fishery is relatively low, i.e. low level of latent effort compared to other fisheries). According to both estimation methods, all other fisheries have a negative ROI. Rankings according to the two methods were similar and in line with the ranking based on a simple calculation of gross value of production (GVP) divided by days fished.

The estimates reported in Table ES1 confirm the results of previous studies into the ROI in input controlled fisheries with excess capacity. When considering these estimates, an immediate question arises of ‘how can FBs survive and continue to operate with such low or negative returns?’ In the long term, of course, it is not possible to maintain a viable business if negative returns persist year on year. In

the short-to-medium term, however, survival is possible when business revenue is supplemented by other sources of income (e.g. part-time fishing with off-boat work, other family members working outside the FB) and where business capital (hull, engines, gear, etc.) is not replaced and no funds are set aside for such replacement (so-called 'living off depreciation'). These business survival strategies have been observed in input controlled fisheries in South Australia over almost two decades of economic monitoring and bear a strong resemblance to strategies commonly adopted in other natural resource based industries characterised by a large number of small businesses facing declining economic circumstances requiring industry-wide structural adjustment (e.g. dryland farming).

**Table ES1 - Estimated Return on Investment in NSW Commercial Fisheries**

| Fishery | Estimated Return on Investment (rank) | | Rank based on GVP/days fished |
|---|---|---|---|
| | CSIRO Model | SA Data Imputation | |
| Ocean Trawl | -9% (2) | -21% (3) | 2 |
| Ocean Trap and Line | -15% (3) | -12% (2) | 3 |
| Estuary General | -71% (5) | -46% (5) | 5 |
| Ocean Hauling | 8% (1) | 15% (1) | 1 |
| Estuary Prawn Trawl | -28% (4) | -30% (4) | 4 |

**Task 2: Impact of Share Linkage Options**

With one of the aims of sustainable management of the NSW commercial fisheries being a viable commercial industry, there is a prima facie case for structural reforms. However, proposals to link shares to catch, effort or minimum shareholdings is confounded by a major distortion between the share allocation to FBs and their historic catch/effort. This distortion means that regardless of the Linkage Option adopted in each share class, the reforms will involve an initial financial impact (positive or negative) on every FB. Because of the heterogeneity of FBs, there is no Linkage Option or combination of Linkage Options that minimises these impacts.

While case study fishers were consulted as part of the study and financial information at a FB level was requested, few financial data at a FB level were obtained. Other approaches were therefore required for assessing potential financial impacts of Linkage Options.

For estuary fishery case studies, of the 144 Linkage Option scenarios examined, in 25 of them the FB was least impacted under Option 1 (minimum shareholding linkage) and in 119 of them the FB was least impacted under Option 2 (a catch/effort linkage). Of the 24 FBs surveyed in the estuary fisheries, 9 opposed all Linkage Options or did not express a preference, while 4 preferred Linkage Option 1 and 11 preferred some form of catch/effort Linkage Option.

For the ocean fishery case studies, of the 126 Linkage Option scenarios examined, in 57 of them the FB was least impacted under Option 1 (minimum shareholding linkage) and in 69 of them the FB was least impacted under Option 2 i.e. a catch/effort linkage. Of the 21 FBs surveyed in the ocean fisheries, 9 opposed all Linkage Options or did not express a preference, while 3 preferred Linkage Option 1 and 9 preferred some form of catch/effort Linkage Option.

As would be expected, the analysis showed that as the price of shares increase, the outcome becomes worse for those who need to acquire additional shares. The results point to the important role that the exit grant program has to play in minimising the impacts to FBs who wish to remain in the industry who,

because of the distortion between the share allocation to FBs and their historic catch/effort, will need to acquire additional shares.

## 1.0 INTRODUCTION

The aim of commercial fisheries management is to ensure sustainability of the resource and, as far as possible, promote a viable commercial industry that provides social and economic benefits to the wider community. To achieve this requires the existence of well-managed and viable fishing businesses (FBs), operating profitably and responsibly, with the certainty necessary to enable sound business investment at all scales of operation (Stevens et al. 2012).

Sound fisheries management requires clearly defined and strong access rights and a system to autonomously adjust to changes brought on by a wide range of factors including changes in seasons, sustainability needs, costs and markets.

In 1994, the NSW Government enacted the *Fisheries Management Act 1994* to introduce a share management scheme that would provide a defined, secure and tradeable property right across all fisheries. Allocation was to be based primarily on catch history.

However, only two fisheries - Lobster and Abalone - came under the share management arrangements with the remainder declared as 'restricted fisheries' in 1997. Generous qualification criteria resulted in excessive levels of access to restricted fisheries (Stevens et al. 2012).

Most other fisheries were declared share management fisheries in 2004, and in 2007 fishing rights (shares) were issued to fishers. The basis for issuance of shares varied from Management Advisory Committee (MAC) to MAC, but shares were mainly allocated on a flat (equal allocation of shares) basis with no or only partial recognition of catch history. Shares were not linked to output (catch) or inputs (gear/time). This was a culmination of industry demand and what Stevens et al. (2012) refer to as Government failure during the share allocation process. The main management use of shares has been in relation to setting minimum shareholdings for FBs to fish in different share classes.

The key driver for continued reform process is long term economic viability of the fisheries (i.e. generation and maintenance of positive economic rents[1][2]) as most fish species appear to be sustainably fished according to scientific reports[3] (Stevens et al. 2012).

FB viability has been increasingly impacted by:

- loss of fishing grounds through establishment of marine parks and recreation fishing havens;
- increasing fishing costs e.g. crew costs, repairs and maintenance, insurance costs, etc.;
- increasing management fees towards cost recovery;
- competition from imports impacting local product prices; and
- input controls reducing efficiency.

[1] Economic rent is the difference between the price of a good produced using a natural resource and the unit costs of turning that natural resource in to the good, where the costs include direct operating costs such as non-labour operating costs and administration; labour costs; capital depreciation; and, opportunity cost of the capital applied to the fishery.
[2] Positive economic rents (and expectations about future rents) will generally lead to positive values for tradable access entitlements (licences, quota, shares, etc.). The objective of maximising economic rents is consistent with maximising entitlement values and is in line with the Objects of the Act.
[3] Nevertheless, there are potential sustainability issues/risks in the future from too many fishers (over capitalisation) and high levels of latency (excess capacity that can be activated at any time), and underreporting in some fisheries may be masking sustainability issues.

Stevens et al. (2012) identified that many fishers are now caught in a form of poverty trap, where those that hold shares struggle to derive a living from them or tailor their operations to become more viable, and are unwilling to sell out due to their low value.

Proposals to link shareholdings to catch/effort are confounded by the major distortion within most share classes where a flat share allocation does not reflect the fact that only a small proportion of FBs land the majority of the catch. Many individual shareholders would require substantially more than their present number of shares to allow them to maintain their current level of catch. Unless these individuals could afford to buy that many shares, linking shares would effectively force them out of the fishery.

The nub of the problem in most share classes is a situation where high catch shareholders who wish to continue fishing are required to obtain additional shares (via purchase or swap) just to keep operating at historic levels while low catch shareholders have excess shares but may be unwilling to sell at prevailing prices.

The Stevens et al. (2012) review considered that the most effective way of rectifying the misallocation of shares and address the current distortion between shareholdings and fishing activity is by creating an incentive framework involving a system of targeted exit grants.

The proposed restructuring package aims to facilitate structural adjustment by:

- the payment of exit grants involving a tender process targeted at share classes most in need of assistance (where the distortion is worst). The exit grant process is the subject of a separate independent review;
- the introduction of cost recovery, initially based on an interim flat charge per share class, irrespective of the level of shareholding or catch;
- establishing links between shares and output (directly as quota, or indirectly as effort units) and the setting of Total Allowable Catch (TAC) or Total Allowable Effort (TAE) limits; and
- once the linkages and TACs/TAEs are in place:
  - removing or streamlining input controls that are no longer needed;
  - implementing a proportional management charge based on the number of shares held;
  - moving away from using FBs as an effort management tool.

The Government announced an 18-month industry consultation phase to determine the detail of these new arrangements. Public consultation papers for each share fishery examined different ways that linkage (including the setting of interim total commercial access level) could occur.

Notwithstanding the extensive public consultation process and investments that have already been made by some fishers in additional shares in preparation for linkage, there is significant[4] opposition to the proposed reforms from industry. Key issues raised include:

- that the industry is viable now and hence the reforms are not necessary; and
- even with the proposed reforms the cost of buying shares will adversely impact the economic viability of existing businesses.

[4] Between 30% and 83% of all commercial fisher submissions received indicated that none of the [share linkage] options were suitable (differed by share class group) (*Draft Summary of Submissions Report* 2015)

The two key tasks of this study are to:

- Task 1: examine the return on investment (ROI) in the following fisheries - Ocean Hauling, Ocean Trawl, Ocean Trap and Line, Estuary General and Estuary Prawn Trawl - compared to other fisheries that have different management regimes. The results for this Task are reported in Section 3.
- Task 2: analyse the impact of share linkage options on FBs in the share classes outlined in Table 1.1. The results for this Task are reported in Section 4.

Prior to addressing these Tasks, Section 2 of the Report briefly identifies available fisheries data and data gaps that constrain the analysis.

**Table 1.1 - Case Study Share Classes**

| **Share Class** | |
|---|---|
| EGC1H6 | Estuary General Category One Hauling Region 6 |
| EGHG4 | Estuary General Hand Gathering Region 4 |
| EGM2 | Estuary General Meshing Region 2 |
| EGMC1 | Estuary General Mud Crab Trapping Region 1 |
| EGP4 | Estuary General Prawning Region 4 |
| EGT4 | Estuary General Trapping Region 4 |
| EGC2H4 | Estuary General Category 2 Hauling Region 4 |
| EPTCR | Estuary Prawn Trawl Clarence River |
| OHGPN4 | Ocean Hauling Haul Net General Purpose Region 4 |
| OHGN | Ocean Haul Garfish Net Hauling |
| OTISP & OTOSP | Ocean Trawl Inshore Prawn & Ocean Trawl Offshore Prawn |
| OTFN | Ocean Trawl Fish Northern Zone |
| OTLD | Ocean Trap and Line Demersal Fish Trap |
| OTLLW | Ocean Trap and Line – Line Fishing Western Zone |
| OTLSG | Ocean Trap and Line School & Gummy Shark |

## 2.0 AVAILABLE FISHERY INFORMATION AND DATA GAPS

Available data for each fishery share class includes:

- Historical catch (kg) by FB;
- Gross value ($) of production (GVP) by FB;
- Number of FBs;
- Number of active FBs expending effort fishing (days fished);
- Shares allocated to each FB;
- Current minimum shareholding to fish;
- Proposed minimum shareholding to fish;
- Linkage options per fishery;
- Effort (average annual days fished by each FB in a share class);
- Limited vessel data per fishery.

While this data is available and is relied on in this report for addressing both Tasks, it is recognised that there are limitations to the data. For instance, there may be inaccuracies in the reporting by FBs of days fished and GVP is imputed by NSW Fisheries based on Sydney Fish Market Prices. Nevertheless, it provides the only basis on which analysis can be undertaken. This Study utilises the 2009/10 - 2011/12 NSW Fisheries data base, noting that on-going data validation may alter this data.

Table 2.1 summarises the key characteristics of the Ocean Trawl, Ocean Trap and Line, Estuary General, Ocean Hauling and Estuary Prawn Trawl fisheries in NSW. The Estuary General fishery provides the largest average annual GVP but also has the largest number of FBs and largest number of days effort.

**Table 2.1 - Snapshot of the commercial fisheries in NSW**

| Fishery | Ocean Trawl | Ocean Trap and Line | Estuary General | Ocean Hauling | Estuary Prawn Trawl |
|---|---|---|---|---|---|
| **Methods** | Otter trawl net, Danish Seine net | Fish trap, Spanner crab net, Setline, Trotline, Drift line, Poling, Handline, Jigging, Dropline, Trolling | Handline, Trap, Hauling net, Mesh net, Hand collecting | General purpose haul net, Garfish haul net, Purse seine net | Otter trawl net |
| **Key species** | King prawns, School prawns, Royal red prawn, Balmain bugs, Octopus, Silver trevally, Tiger flathead, Redfish, Calamari, School whiting | Snapper, Leatherjackets, Bonito, Kingfish, Morwong, Blue-eye, Spanner crabs, Silver trevally | Yellowfin bream, Luderick, Dusky flathead, Sand whiting, Longfinned eels, Sea mullet, Pipis | Sea mullet, Australian salmon, Blue mackerel, Sea garfish, Luderick, Yellowtail, Pilchards | School prawn, King prawn |
| **Ave annual catch (kgs)** | 3,082,274 | 1,923,826 | 4,219,614 | 5,395,536 | 390,918 |
| **Ave annual GVP ($)^** | $20,846,131 | $12,477,368 | $21,818,175 | $13,739,311 | $2,647,336 |
| **No. of FBs** | 216 | 357 | 604 | 278 | 169 |
| **No. of active FBs** | 126 | 267 | 500 | 194 | 114 |
| **Days effort in this fishery*** ** | 7,689 | 15,753 | 42,706 | 3,270 | 4,501 |
| **Standard boat length in metres (approx.)** | 14 | 6-8 | 5 | 4 | 9 |
| **General no. of unlicensed crew** | 2-3 | 0-1 | 0* | 0** | 1 |

* Unlicensed crew permitted only when undertaking boat based prawn seining

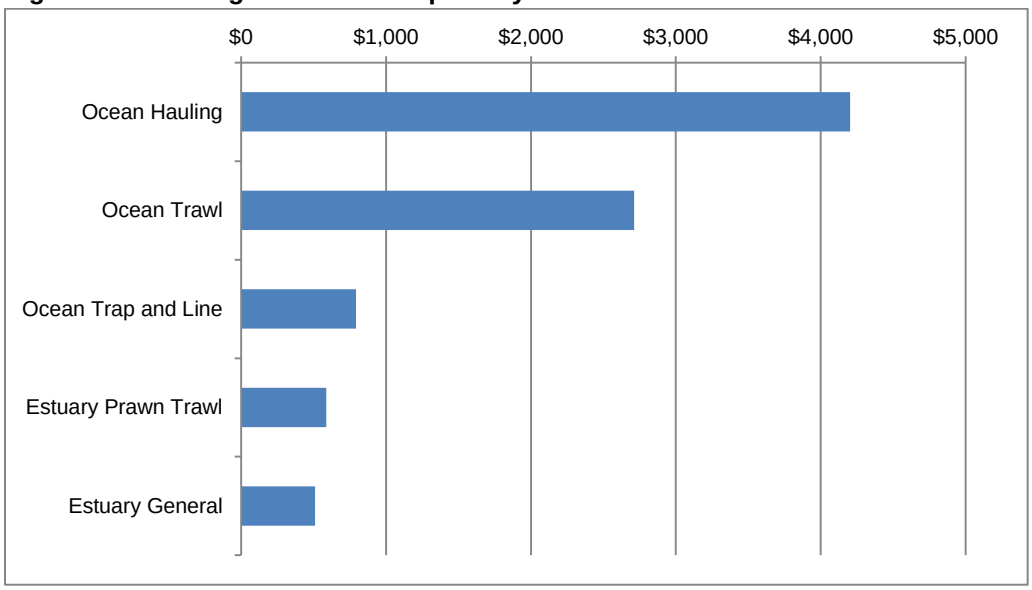
** Unlicensed crew permitted in some forms of boat based hauling

***Data does not include part days. Where a business spends half a day in two different fisheries it is recorded as two days.

^ Data subject to on-going data validation.

On an average annual GVP per days effort basis (Figure 2.1) Ocean Hauling and Ocean Trawl are the most efficient fisheries with estuary generally being the least efficient.

**Figure 2.1 - Average Annual GVP per Days Effort**




Attachment 1 provides a more detailed breakdown of NSW Fisheries data for commercial fisheries in NSW.

In addition, relevant studies to the terms of reference of this report include:

- Independent Review of NSW Commercial Fisheries Policy, Management and Administration;
- Previous Environmental Impact Assessments of Fisheries;
- Reform program consultation papers and documents for each fishery;
- Summary of submissions to consultation (options) papers;
- Shares and shareholding information documents;
- Share trading notice board;
- Preliminary exit grant information based on the proposed exit grant structure at the time of preparation of this report;
- ABARE fisheries studies;
- Economic study of commercial fishing industry in the Ballina, Clarence and Coffs Harbour regions;
- EconSearch studies for the Department of Primary Industries and Regions South Australia (PIRSA); and
- Fisheries Research and Development Corporation studies including by CSIRO on imputing cost data in fisheries.

However, data required to complete the Tasks of this study are incomplete. For instance, cost data are limited and fragmented and so require considerable imputation at a fishery level to enable ROI estimates to be generated. Cost data at the individual FB level is also relevant to consideration of the financial impacts of linkage options.

Imputed cost data at the fishery level in Section 3, to enable ROI estimates to be generated, represent industry averages within fisheries and, because of multiple class share holdings, are unlikely to reflect cost structures at a FB level. While case study fishers were consulted as part of the study and financial

information at a FB level was requested, few financial data at a FB level were obtained. Other approaches were therefore required for assessing potential financial impacts of Linkage Options at the FB level. These are outlined in Section 4.

# 3 RETURN ON INVESTMENT IN FISHERIES

## 3.1 Introduction

As identified in the introduction, the aim of commercial fisheries management is to ensure sustainability of the resource and, as far as possible, promote a viable commercial industry that provides social and economic benefits to the wider community. To achieve this requires the existence of well-managed and viable FBs, operating profitably and responsibly, with the certainty necessary to enable sound business investment at all scales of operation (Stevens et al. 2012). In relation to viable FBs, a constant issue in NSW fisheries has been the existence of excess capacity.

From a stock conservation perspective, excess capacity does not pose any significant threat provided total output of the fishery is constrained to a sustainable level (directly by TAC or indirectly by input controls). However, the existence of excess capacity creates an economic problem in that economic returns generated by operators are lower than they would be otherwise. At the aggregate fishery level, the existence of excess capacity indicates a waste of resources, as, by definition, the same catch could have been taken by fewer vessels, using less inputs (in aggregate) (Newby et al. 2004).

The existence of excess capacity and hence dissipation of profits also makes the industry more vulnerable to adverse resource and economic shocks (Newby et al. 2004), for instance rising fuel prices and increased competition from overseas. Excess capacity in fisheries combined with the management of fisheries by input controls can result in low or negative ROI for individual fishers as well as fisheries as a whole (Pascoe 2007).

Establishment of tradeable property rights can aid in the removal of excess capacity, with some vessels exiting the fishery and the remaining vessels consolidating the available property rights. This can create incentives to reduce the costs of capture, with fleet adjustments favouring the least cost producers and reinvestment occurring in vessels that will operate at minimum average cost (Pasco 2007). Tradeable property rights may also mean that other regulations designed to restrict the harvest of the fishing fleet may be redundant. With the removal of these restrictions and coupled with transferability, fishers are able to adjust their scale of operation to minimise costs and maximise profit for the individual and the fishery as a whole (Grafton et al. 2000).

Nevertheless, to date, the introduction of tradeable property rights such as shares with linkage to effort or quotas has been strongly opposed by fishers, especially operators with larger vessels, who believe they can generate higher returns under the present regulations (Kompas et al. 2004). In submissions to the current proposed reforms, between 30% and 83% (share class to share class) of all commercial fisher submissions received indicated that none of the share linkage options were suitable with the opposition varying between share class groups.

This Section addresses Task 1 of the Study by examining the ROI in commercial fisheries in NSW and other commercial fisheries in Australia that have different management regimes. Section 3.2 defines the concept of ROI. Section 3.3 then reports on the results of published studies that have previously examined the ROI in NSW Fisheries, South Australian Fisheries and Commonwealth Fisheries. Section 3.4 then imputes the ROI in the Ocean Hauling, Ocean Trawl, Ocean Trap and Line, Estuary General and Estuary Prawn Trawl fisheries. The results are compared to previous analyses of the ROI in these fisheries and in other fisheries that have different management regimes.

### 3.2 Return on Investment

ROI can be defined as profit for a period of time as a percentage of the value of the capital employed. Generally profit comprises revenues less costs (excluding rent and interest i.e. assuming full equity) and is taken before deductions of tax. Investment is considered to be the market value of the capital employed by licence holders in the fishery. Capital includes boats, fishing gear, sheds, vehicles and other capital items used as part of the fishing enterprise. ROI can be reported net of any asset value attached to a licence/quota or including this.

Some studies also report ROI after an allowance for the opportunity cost of capital (Dominion Consulting Pty Ltd 2002, 2003a, 2003b, 2004, 2006) while others are gross of the opportunity cost of capital (EconSearch 2013).

ROI can also be reported on:

- a fishery basis which requires prorating of capital costs to recognise that FBs may fish among a portfolio of fisheries; or
- on a business/vessel basis i.e. those holding an endorsement in a certain fishery, but incorporating all other aspects of the fishing operations.

An investment that does not obtain a normal return on investment, as reflected by the opportunity cost of capital, means that the capital value could be employed elsewhere in the economy and obtain a greater return.

Economic theory would suggest that fisheries with latent effort and managed by input controls would have low ROI and a lower ROI than fisheries managed by output controls. The evidence from the literature would tend to support these suggestions.

### 3.3 Evidence from Previous Studies

#### *3.3.1 NSW Fisheries*

Dominion Consulting Pty Ltd (2002, 2003a, 2003b, 2004, 2006) found that the ROI for the average vessel in each of the Estuary Prawn Trawl, Ocean Hauling, Ocean Trap and Line and Estuary General fisheries was less than the opportunity cost of capital. The only fishery in which the average vessel was profitable was the Ocean Trawl (refer to Table 3.1). These results don't mean that FBs can't continue to operate. FB may forego payment for the time fishing (for lifestyle and autonomy) or make less wages than imputed. They may also forego the opportunity cost of capital and depreciation hoping to keep current assets operational beyond their envisaged lifespan, or to locate a second hand vessel if a replacement is required. They may also substitute between fishing and other industries.

The result also does not mean that some businesses aren't profitable. Dominion Consulting Pty Ltd found that:

- 41% of Ocean Trawl business respondents were earning an economic surplus (meeting opportunity cost of capital and economic depreciation) required for long term viability, while 59% were not.
- 28% of the business that held Ocean Trap and Line fishery entitlements were earning an economic surplus under the levels of opportunity costs and economic depreciation assumed for long term viability. The remaining 72% were operating below long term viability benchmarks.

- 10% of businesses in the estuary Prawn Trawl fishery had a positive economic ROI. The average ROI was -18%, the median being -25%.
- 20% of fishers in the Estuary General fishery generated a surplus with 80% operating below long term economic viability levels. For larger FBs in this fishery the ROI was approximately 11%.
- 25% of businesses in the Ocean Haul fishery had a positive ROI. Average economic ROI was -2%, the median was -12%.

**Table 3.1 - ROI in NSW Fisheries for the Average Fishing Vessel in the Fishery (2002-2006 reports)**

| | Fishery | | | | |
|---|---|---|---|---|---|
| | **OT** | **OTL** | **EG** | **OH** | **EPT** |
| **Gross Revenue** | **$217,698** | **$109,363** | **$65,350** | **$123,642** | **$79,602** |
| *Less costs* | | | | | |
| Cooperative expenses | $7,248 | $3,877 | $2,715 | $1,573 | $1,565 |
| Bait | $1,523 | $2,536 | $990 | $1,561 | $356 |
| Boat fuel | $43,648 | $13,782 | $5,145 | $16,123 | $10,929 |
| Repairs | $25,204 | $8,555 | | | |
| Fishing gear | $12,542 | $5,808 | $3,486 | $6,062 | $5,440 |
| Vehicle fuel | $3,984 | $3,169 | $2,629 | $4,201 | $3,640 |
| Freight | $3,056 | $2,812 | $805 | $2,129 | $595 |
| Other costs | $1,457 | $1,013 | $970 | $1,056 | $722 |
| Imputed labour | $36,165 | $36,297 | $39,937 | $42,485 | $35,773 |
| ***Total Direct Costs*** | ***$134,827*** | ***$77,849*** | ***$56,677*** | ***$75,190*** | ***$59,020*** |
| Boat registrations | $3,931 | $1,746 | $861 | $1,893 | $2,120 |
| Vehicle registrations | $1,021 | $919 | $995 | $1,306 | $768 |
| Insurance | $8,624 | $3,329 | $1,082 | $2,106 | $2,010 |
| Fishery management charges | $2,659 | $1,490 | $617 | $1,762 | $205 |
| Commercial fish licence | $1,757 | $1,347 | $1,016 | $1,483 | $963 |
| Accounting | $2,055 | $1,224 | $839 | $1,191 | $956 |
| Phone | $1,980 | $1,340 | $966 | $1,812 | $1,112 |
| Power | $633 | $723 | $596 | $883 | $637 |
| Rates | $1,575 | $1,198 | $1,283 | $1,312 | $1,702 |
| Bank | $1,053 | $546 | $374 | $670 | $722 |
| Economic depreciation | $14,088 | $6,702 | $1,679 | $2,633 | $4,726 |
| Opportunity cost of capital | $22,070 | $10,507 | $5,349 | $14,765 | $12,845 |
| Repairs | $2,928 | $1,388 | $3,024 | $13,523 | $2,527 |
| Repairs vehicle | $2,215 | $1,938 | $1,426 | $2,408 | $241 |
| Travel | $2,887 | $798 | $334 | $2,546 | $3,116 |
| Other costs | $7,061 | $1,642 | $1,169 | $2,372 | $18,550 |
| ***Total Indirect Costs*** | ***$76,537*** | ***$36,837*** | ***$21,610*** | ***$52,665*** | ***$53,200*** |
| **Total Economic Costs** | **$211,364** | **$114,686** | **$78,287** | **$127,855** | **$112,220** |
| **Economic Gross Profit** | **$6,333** | **-$5,323** | **-$12,937** | **-$4,213** | **$32,619** |
| **Capital Asset Value** | **$315,288** | **$150,099** | **$76,413** | **$210,932** | **$185,503** |
| **Economic Rate of Return to Capital** | **2%** | **-4%** | **-17%** | **-2%** | **-18%** |
| **Economic Rate of Return to Capital pre OC of Capital** | **9%** | **3%** | **-10%** | **5%** | **-11%** |

Source: Dominion Consulting Pty Ltd (2002, 2003a, 2003b, 2004, 2006)
Note: Average vessels in the fishery also fish in other fisheries.

### *3.3.2 South Australian Fisheries*

Analysis of the ROI in South Australian fisheries (refer to Table 3.2) also suggests low or negative ROI in input controlled fisheries. There are four fisheries without catch quotas in South Australia: Charter Boats, Gulf St Vincent Prawns, Spencer Gulf Prawns and Marine Scalefish. The first three had negative ROI and Marine Scalefish had the lowest (2.7%) of the seven fisheries that generated a positive return. Although

the Lakes & Coorong fishery has just one species (Pipi) under quota, it does comprise about half the fishery's GVP.

**Table 3.2 - ROI in South Australian Fisheries**

| | Abalone | Charter Boats | GSV Prawns | SG & WC Prawns | Sth'n Zone Rock Lob | Nth'n Zone Rock Lob | Blue Crabs [a] | Marine Scalefish | Sardines | Lakes and Coorong |
|---|---|---|---|---|---|---|---|---|---|---|
| **Total Boat Gross Income** | **819.2** | **149.1** | **205.9** | **606.0** | **493.4** | **371.2** | **6,449.7** | **103.9** | **1,557.4** | **246.5** |
| Variable Costs | | | | | | | | | | |
| Fuel | 19.6 | 27.9 | 39.8 | 107.6 | 37.2 | 25.2 | 478.4 | 10.0 | 188.1 | 10.1 |
| Repairs & Maintenance | 25.2 | 16.9 | 14.1 | 41.8 | 28.9 | 22.5 | 158.4 | 7.8 | 125.0 | 5.5 |
| Bait/Ice | 0.4 | 4.7 | 0.0 | 0.0 | 16.9 | 8.8 | 78.2 | 1.9 | 0.5 | 3.1 |
| Provisions | 0.7 | 6.4 | 0.7 | 9.2 | 0.7 | 2.8 | 14.6 | 0.8 | 26.8 | 0.5 |
| Labour - paid | 190.9 | 29.8 | 77.0 | 247.2 | 117.1 | 91.0 | 1,510.6 | 13.1 | 465.5 | 51.2 |
| - unpaid | 4.4 | 15.4 | 5.7 | 1.7 | 22.7 | 18.6 | 219.1 | 25.6 | 0.0 | 20.9 |
| Other | 8.9 | 4.3 | 0.5 | 17.9 | 7.9 | 3.4 | 14.9 | 0.0 | 23.8 | 8.0 |
| **Total Variable** | **250.3** | **105.5** | **137.8** | **425.4** | **231.3** | **172.3** | **2,474.1** | **59.3** | **829.7** | **99.2** |
| Fixed Costs | | | | | | | | | | |
| Licence Fee | 63.0 | 2.9 | 33.2 | 22.7 | 20.5 | 18.6 | 256.5 | 6.7 | 59.3 | 18.5 |
| Insurance | 5.2 | 3.6 | 21.3 | 20.4 | 7.0 | 8.0 | 145.3 | 2.0 | 32.2 | 3.3 |
| Interest | 81.2 | 4.8 | 20.4 | 43.3 | 34.1 | 31.2 | 780.2 | 3.5 | 90.6 | 11.8 |
| Labour - unpaid | 7.3 | 8.0 | 13.7 | 9.4 | 3.8 | 6.4 | 43.8 | 3.2 | 0.0 | 4.8 |
| Leasing | 2.0 | 0.0 | 0.0 | 0.0 | 3.3 | 42.3 | 8.1 | 0.0 | 23.8 | 0.0 |
| Legal & Accounting | 8.5 | 1.5 | 7.1 | 10.8 | 3.2 | 2.9 | 55.1 | 1.1 | 21.2 | 4.2 |
| Telephone etc. | 2.4 | 2.5 | 2.8 | 3.8 | 2.2 | 3.1 | 14.0 | 1.0 | 1.9 | 2.4 |
| Slipping & Mooring | 2.8 | 1.7 | 4.3 | 3.0 | 7.5 | 3.2 | 16.3 | 0.5 | 7.7 | 0.0 |
| Travel | 3.2 | 1.2 | 0.5 | 1.6 | 1.2 | 1.0 | 2.6 | 0.5 | 3.1 | 0.6 |
| Office & Admin | 7.4 | 6.1 | 4.3 | 6.7 | 5.1 | 8.6 | 52.2 | 8.0 | 35.9 | 11.1 |
| **Total Fixed Costs** | **183.1** | **32.4** | **107.6** | **121.7** | **87.9** | **125.2** | **1,374.2** | **26.6** | **275.8** | **56.8** |
| **Total Boat Cash Costs (3 + 7)** | **433.4** | **137.8** | **245.4** | **547.1** | **319.2** | **297.5** | **3,848.3** | **85.9** | **1,105.5** | **156.1** |
| **Boat Gross Margin (1 - 3)** | **568.9** | **43.7** | **68.1** | **180.5** | **262.2** | **198.9** | **3,975.6** | **44.6** | **727.8** | **147.3** |
| **Total Unpaid Labour (2 + 5)** | **11.7** | **23.4** | **19.4** | **11.1** | **26.4** | **25.0** | **262.9** | **28.8** | **0.0** | **25.7** |
| **Gross Operating Surplus (1- 8+9)** | **397.5** | **34.7** | **-20.1** | **70.0** | **200.6** | **98.6** | **2,864.3** | **46.8** | **451.9** | **116.2** |
| **Boat Cash Income (1 - 8)** | **385.8** | **11.3** | **-39.5** | **58.9** | **174.2** | **73.7** | **2,601.4** | **18.0** | **451.9** | **90.4** |
| **Depreciation** | **41.7** | **33.4** | **83.8** | **139.0** | **53.7** | **47.8** | **924.8** | **13.9** | **195.9** | **19.1** |
| **Boat Business Profit (10 - 11)** | **344.1** | **-22.1** | **-123.3** | **-80.2** | **120.5** | **25.9** | **1,676.6** | **4.1** | **256.1** | **71.3** |
| **Profit at Full Equity (12 + 4 + 6)** | **425.3** | **-17.3** | **-103.0** | **-36.9** | **157.9** | **99.4** | **2,465.0** | **7.6** | **370.5** | **83.1** |
| **Boat Capital** | | | | | | | | | | |
| Fishing Gear & Equip | 276.5 | 351.5 | 1,171.5 | 1,734.7 | 428.9 | 348.1 | 4,642.4 | 122.9 | 2,031.5 | 120.4 |
| Licence Value | 6,902.0 | 39.9 | 1,458.8 | 3,005.0 | 3,337.0 | 1,628.2 | 33,152.4 | 163.2 | 5,150.0 | 646.9 |
| **Total Boat Capital** | **7,178.5** | **391.4** | **2,630.3** | **4,739.7** | **3,765.9** | **1,976.3** | **37,794.8** | **286.1** | **7,181.5** | **767.3** |
| **Rate of Return on Fishing Gear & Equip (13 / 14 *** | **153.8%** | **-4.9%** | **-8.8%** | **-2.1%** | **36.8%** | **28.6%** | **53.1%** | **6.2%** | **18.2%** | **69.1%** |
| **Rate of Return on Total Boat Capital (13 / 15 * 100)** | **5.9%** | **-4.4%** | **-3.9%** | **-0.8%** | **4.2%** | **5.0%** | **6.5%** | **2.7%** | **5.2%** | **10.8%** |

[a] Total for whole fishery.

Source: EconSearch (2013)

### *3.3.4 Commonwealth Fisheries*

Northern Prawn Fishery and Torres Strait Prawn Fishery

Skirtun (2013) examined the impact of policies that reduced vessel numbers in the Northern Prawn Fishery (NPF) and Torres Strait Prawn Fishery (TSPF) on the fishery profitability and the key drivers behind fishery's profitability over time.

The study found that the NPF has achieved considerable improvements in profitability in recent years across both the tiger prawn and banana prawn seasons. For the tiger prawn season, this was a result of improvements in stock-adjusted productivity, which offset high fuel prices and low output prices. For the banana prawn season, the combined effects of productivity and increased catch rates were the major contributing factors.

The study found that productivity improvements were likely to have been supported by structural changes in the fishery over the last decade; in particular, the Securing Our Fishing Future (SOFF) structural adjustment package, the lifting of the limit on towing more than two nets in 2006 and a 33 per cent increase in headrope length allowance in 2008. Increases in productivity and efficiency directly through these management changes were considered likely to have occurred together with market-driven autonomous adjustment. These impacts (especially from the SOFF package) are supported by Vieira et al. (2010) who showed a 56 tonne (89 per cent) increase in the average catch per vessel in the post-buyback period, between 2005–06 and 2008–09. The fishery's real net economic returns also increased following the buyback, rising from –$10 million in 2005–06 to $8.5 million in 2007–08 (George et al. 2012).

In contrast, profitability in the TSPF has continued to remain negative and declining over time. This is likely to partly reflect the greater impact of fuel price increases on the TSPF given it is more remote location and removal of key infrastructure that supplied the fleet with fuel (Flood et al. 2011). However, the most significant difference between the two fisheries is the contribution to profit from productivity. Since 2002–03 the productivity index remained relatively stable in the TSPF (in contrast to the NPF) and with falling output prices profitability has also fallen. Although the TSPF has undergone its own set of structural adjustments—including a reduction in the total fishery effort cap in November 2005 that resulted in vessel numbers declining from 63 in 2004–05 to 50 in 2006–07—the effect on productivity is less evident and would seem to reflect inflexible input controls.

Eastern Tuna and Billfish Fishery

The Commonwealth Eastern Tuna and Billfish Fishery (ETBF) moved to a system of Total Allowable Commercial Catch (TACC) for key target species, with Individual Transferable Quotas (ITQs) in 2011. This superseded an 18-month transitional arrangement whereby the fishery was managed with a total allowable effort limit with transferable effort rights.

George and New (2013) in a study of the Commonwealth ETBF found that it has gone from earning only very small or negative economic returns before 2008-09 to consistent increases in net economic returns. The study found an improvement in the financial performance of boats from -0.25% rate of return to boat capital to 7.23% from 2009/10 to 2010/11 and an improvement in economic performance from -4.46% to 0.56% over the same period. In 2011/12 preliminary net economic returns were estimated using non-survey based methods at almost $3.0 million.

A key driver in the improved performance was reduced operating costs. A reduction in boat numbers operating in the fishery was thought to have driven this reduction in costs with the most efficient boats likely to have remained in the fishery.

Commonwealth Trawl Sector

The Commonwealth Trawl Sector (CTS) has operated under a management system of total allowable catch (TAC) limits with ITQs first introduced in 1998, and global TACs extended to cover all 16 quota species and groups in 2001. In 2006, the SOFF structural adjustment package resulted in the removal of half of the 118 concessions originally available in the sector

For the CTS of the Southern and Eastern Scalefish and Shark Fishery (SESSF), fishery level net economic returns improved from $2.5 million in 2009/10 to $6.8 million in 2010/11. In 2011-12 preliminary net economic returns were estimated using non-survey based methods at $5.5 million. Rate of return to boat capital was 49% in 2010/11 and rate of return to full equity (i.e. including value of quota and licences) was 7%.

Gillnet Hook and Trap Sector

The Gillnet Hook and Trap Sector (GHTS) is managed using a system of output controls with individual transferable quota (ITQ). Quota was first introduced for blue-eye trevalla in 1998, and was then extended to all quota-managed species except some species of shark in 2001. ITQs for school and gummy shark were also introduced in 2001, and ITQs for elephant fish and sawshark were introduced in 2002. In 2006, as part of the SOFF structural adjustment package, 26 gillnet boat statutory fishing rights, 63 scalefish hook boat statutory fishing rights and 17 shark boat statutory fishing rights were removed.

In 2010/11 the average rate of return to boat capital was 25% with the rate of return to full equity being 5%. For the GHTS of the Southern and Eastern Scalefish and Shark Fishery, fishery level net economic returns improved from -$0.4 million in 2009-10 to -$0.1 million in 2010-11. In 2011-12 preliminary net economic returns were estimated using non-survey based methods at around -$0.2 million

Multiple Fisheries

Stephan (2013) reports the total factor productivity indexes of five key Commonwealth fisheries - ETBF, the CTS and GHTS of the SESSF, the NPF and the TSPF.

The study identifies that productivity trends have largely reflected government induced structural adjustments and management changes, autonomous adjustment responses to market conditions and stock levels.

The TFP trends presented capture two key effects associated with changing policy and market conditions. The first is structural adjustment at the fishery level with the least profitable and efficient vessels first to exit the fishery. The second effect is improvement in the efficiency of remaining vessels as the vessels innovate to adapt to changes in the operating environment largely driven by external economic factors, environmental factors and fishery management. Government induced structural adjustment predominantly affected productivity changes through the SOFF structural adjustment package. The voluntary tender process used for the buyback resulted in the least profitable (and therefore, least efficient) vessels exiting the fishery. Therefore, the remaining fleet is expected to be more productive on average. The SOFF buyback also resulted in fewer vessels sharing a similar sized resource, with less crowding and competition between vessels. This in general leads to an increase in fishery productivity as it allows vessels to operate more efficiently.

## 3.4 Estimation of the ROI in NSW Commercial Fisheries

### *3.4.1 Introduction*

Studies by Dominion Consulting Pty Ltd of the ROI in NSW commercial fisheries found that in only one fishery (Ocean Trawl) did the average fishing vessel in that fishery have a positive, albeit small, ROI. In the other four fisheries the average fishing vessel had negative ROI. Studies of South Australian commercial fisheries by EconSearch found low or negative ROI in input controlled fisheries and positive ROI in output controlled fisheries. Studies of Commonwealth commercial fisheries found improvements in productivity and returns following structural adjustment and shifts to ITQs.

This sub-section estimates ROI for average active FBs within each of the Estuary Prawn Trawl, Ocean Hauling, Ocean Trap and Line and Estuary General fisheries of NSW, based on data from the NSW Fisheries data base for 2009/10 to 2012/13.

While catch, effort and imputed revenue information per FB is available from this data base, information on the costs of fishing is extremely limited. Fishers are often reluctant to participate in voluntary surveys to provide detailed information on their individual financial situation (Pascoe 2007) and in any case a representative fisher survey was beyond the scope of this study. Hence, cost data was imputed in two ways:

- Adopting the method developed by Zhou et al. (2013) in their Fisheries Research and Development Corporation report: *Quantitatively defining biological and economic reference points in data poor fisheries*. This method utilises econometrically estimated equations that will have application in some share class fisheries; and
- Aligning cost data extracted from the economic indicator studies undertaken by EconSearch for Primary Industries and Regions South Australia (PIRSA) to relevant share class fisheries with appropriate adjustments for days fished and other comparable information.

### *3.4.2 Imputation from Econometric Model*

Zhou et al. (2013) used economic data from a wide range of fisheries (both Commonwealth and South Australian) to derive simple relationship between the costs of fishing and the type of fishing activity. The key cost components that were modelled were variable costs (separated into fuel and oil, crew, freight and marketing and other variable costs), quasi-fixed costs (including repairs and maintenance), fixed costs and capital and depreciation costs. Estimates of most cost components were able to be imputed based on average size of vessels, their main fishing gears[5], the number days fished and the type of management under which vessels operate.

Catch and revenue estimates were available on a fishery basis however cost data imputed from Zhou et al. (2013) is on a vessel or business basis which may be utilised in other fisheries. Consequently, to estimate ROI on an average FB in a particular fishery, fixed costs, depreciation and value of capital was apportioned based on the days FBs spent in the subject fishery compared the total number of days fishing[6]. On this basis the ROI in each fishery for the average business is summarised in Table 3.3.

[5] Most fishers use multiple types of fishing gear and there is heterogeneity across fishers. However, application of the CSIRO modelled required selection of the main fishing gear or approach.
[6] It is recognised that there are concerns over the accuracy of FB reporting.

**Table 3.3 - ROI in Fisheries Based on Zhou et al. (2013)**

| | Ocean Trawl | Ocean Trap and Line | Estuary General | Ocean Hauling | Estuary Prawn Trawl |
|---|---|---|---|---|---|
| **Assumptions for CSIRO Model[1]** | | | | | |
| Average boat days fished (Days) by active fisher in this fisheries | 61 | 59 | 85 | 17 | 39 |
| Average boat days fished by active fisher in this fishery in all fisheries | 63 | 72 | 85[7] | 41 | 52 |
| Average size of vessels | 14.0 | 7.0 | 5.0 | 4.0 | 9 |
| Main fishing gear dummy variables selected | Trawl Prawn Temperate | Longline Demersal | Multiple Gear | Purse seine nets | Trawl Prawn Temperate |
| No. of crew | 2 | 1 | 0 | 0 | 1 |
| Owner operated | Yes | Yes | Yes | Yes | Yes |
| Freezer | No | No | No | No | No |
| **Imputed Financial Data[2]** | | | | | |
| **Revenue** | **$165,445** | **$46,732** | **$43,636** | **$70,821** | $23,222 |
| **Cash Costs** | | | | | |
| Fuel cost | $54,840 | $11,139 | $6,246 | $14,438 | $30,527 |
| Crew costs[1] | $47,066 | $13,582 | $12,666 | $20,320 | $6,781 |
| Freight costs | $5,349 | $1,526 | $1,505 | $2,900 | $751 |
| Other variable costs | $641 | $566 | $779 | $151 | $387 |
| Repairs and maintenance | $35,718 | $17,259 | $29,636 | $4,751 | $16,826 |
| Apportioned Fixed costs | $65,255 | $14,397 | $15,185 | $18,739 | $40,869 |
| **Total Cash Costs** | **$208,869** | **$58,469** | **$66,017** | **$61,300** | **$96,140** |
| **Net Operating Profit** | **-$43,424** | **-$11,737** | **-$22,380** | **$9,521** | **-$72,917** |
| Apportioned Depreciation | $14,981 | $2,082 | $750 | $2,077 | $6,462 |
| Profit after Depreciation | -$58,405 | -$13,820 | -$23,131 | $7,445 | -$79,379 |
| **Apportioned Total Vessel Capital** | **$651,366** | **$90,539** | **$32,625** | **$90,293** | **$280,963** |
| **ROI pre opportunity cost of capital** | **-9%** | **-15%** | **-71%** | **8%** | **-28%** |

[1] Information on boat days fished is from the NSW Fisheries database for 2009-10 to 2011-12.Information on average vessel size, no. of crew and fishing methods is from NSW Department of Primary Industries (2007). For the purpose of applying the model a main fishing gear dummy variable was selected.
[2] This financial data was generated from the Pasco et al. (2013) model.
[3] Crew costs refers to payments to labour including the self-employed.

The results are sensitive to the assumed fishing gear and boat size but suggest that, apart from in the Ocean Hauling fishery, the average FB does not make a positive ROI. This is not surprising based on the proportion of the year that capital is employed.

A caveat on this relates to the definition of a FB. Data on which a FB was defined relates to separate FB identification numbers. Some people (as indicated by Owner Number) have more than one FB identification number and some people have more than one Owner Number. Furthermore, it is possible that different individuals, e.g. family members, with separate Owner Numbers or FB identification numbers, operate their businesses as one, which would improve the profitability of businesses.

Nevertheless, on the basis on which it was calculated, Ocean Hauling would appear to be the most profitable fishery as catch value is high relative to days fished and smaller less valuable boats and fishing gear are used. Less than 50% of fixed costs and capital is attributable to this fishery as it is mostly used in other fisheries.

[7] Due to data issues, conservatively EG fishers were assumed to fish solely in the EG fishery.

### *3.4.3 Imputation from South Australian Fisheries*

An alternative approach to imputing the ROI for the average FB within each fishery was to use baseline data collected in a range of South Australian fisheries to impute cost items for each of the five NSW fisheries. Each of the NSW fisheries was "matched" with a South Australian fishery with similar characteristics and for which detailed fishing costs were known. The fisheries in the two states were paired as shown in Table 3.4.

**Table 3.4 - Matching of NSW and SA Fisheries**

| **NSW Fishery** | **"Matching" SA Fishery** |
|---|---|
| Ocean Trawl Fishery | Spencer Gulf Prawn Fishery |
| Ocean Trap and Line Fishery | Marine Scalefish Fishery (line sector) |
| Estuary General | Marine Scalefish Fishery (net sector) |
| Ocean Hauling | Sardine Fishery |
| Estuary Prawn Trawl | Spencer Gulf Prawn Fishery |

The known costs in the South Australian fisheries were adjusted according to a range of factors that were known in both the South Australian and NSW fisheries. These included

- Days fished;
- Days fished in fishery as a proportion total days fished;
- Average boat length;
- Revenue in fishery; and
- Depreciation percent.

These data together with detailed per boat data for the "matching" SA fishery were used to derive the cost structures reported in lower portion of Table 4.4. Individual costs were estimated using relevant data as follows:

- Fuel costs – percentage of days fished & boat length adjustment;
- Crew costs – percentage of revenue;
- Freight costs – percentage of revenue;
- Other variable costs – percentage of days fished & boat length adjustment;
- Repairs and maintenance – percentage of days fished & boat length adjustment;
- Other fixed costs – percentage of days in fishery & boat length adjustment;
- Vessel capital - percentage of days in fishery & boat length adjustment; and
- Depreciation - percentage depreciation

GVP/effort rankings of fisheries reported earlier in Figure 2.1 roughly align with profitability as shown in Table 3.5, with Ocean Hauling having the greatest GVP per days fishing followed by Ocean Trawl. The estimated ROI values and ranking are also similar to those estimated using the Zhou et al (2013) method (Table 3.3).

According to the estimates reported in Table 3.5, Ocean Hauling again appears to be the most profitable fishery. This can be attributed to the high catch per day[8], the relatively low investment in boat and gear, and that for a majority of the time the boats are used for fishing in other fisheries (hence the capital attributable to this fishery is relatively low).

Overall, application of the two methods outlined above generated very similar results with regard to the NSW fisheries subject to reform. Based on the approach used, the average FB in the Ocean Trawl, Ocean Trap and Line, Estuary General and Estuary Prawn Trawl fisheries have a negative estimated ROI.

**Table 3.5 - ROI in Fisheries Based on South Australian data (2013)**

| | Ocean Trawl | Ocean Trap and Line | Estuary General | Ocean Hauling | Estuary Prawn Trawl |
|---|---|---|---|---|---|
| **Assumptions** | | | | | |
| Average Boat days fished (Days) by active fisher in this fisheries | 61 | 59 | 85 | 17 | 39 |
| Average boat days fished by active fisher in this fishery in all fisheries | 63 | 72 | 85 | 41 | 52 |
| Average size of vessels | 14 | 7 | 5 | 4 | 9 |
| Main fishing gear dummy variables selected | Trawl Prawn Temperate | Longline Demersal | Multiple Gear | Purse seine nets | Trawl Prawn Temperate |
| No. of crew | 2 | 1 | 0 | 0 | 1 |
| Owner operated | Yes | Yes | Yes | Yes | Yes |
| Freezer | No | No | No | No | No |
| **Imputed Financial Data** | | | | | |
| **Revenue** | **$165,445** | **$46,732** | **$43,636** | **$70,821** | **$23,222** |
| **Cash Costs** | | | | | |
| Fuel cost | $58,414 | $5,814 | $5,632 | $5,946 | $24,008 |
| Crew costs[1] | $57,378 | $16,703 | $13,286 | $18,843 | $8,054 |
| Other variable costs | $12,595 | $6,343 | $5,528 | $2,444 | $5,177 |
| Repairs and maintenance | $31,423 | $2,498 | $15,651 | $4,045 | $12,915 |
| Apportioned Fixed costs | $69,659 | $15,190 | $29,070 | $13,415 | $34,687 |
| **Total Cash Costs** | **$229,469** | **$46,548** | **$69,168** | **$44,693** | **$84,841** |
| **Net Operating Profit** | **-$64,024** | **$184** | **-$25,532** | **$26,128** | **-$61,619** |
| Apportioned Depreciation | $72,431 | $11,896 | $12,986 | $10,087 | $36,067 |
| Profit after Depreciation | -$136,455 | -$11,712 | -$38,518 | $16,041 | -$97,686 |
| **Apportioned Total Vessel Capital** | **$644,210** | **$100,052** | **$84,063** | **$104,624** | **$320,785** |
| **ROI pre opportunity cost of capital** | -21% | -12% | -46% | 15% | -30% |

[1] Crew costs refers to payments to labour including the self employed.

[8] Although it is recognised that fishing days may be under-reported in this fishery.

# 4 IMPACT OF SHARE LINKAGE OPTIONS ON FISHING BUSINESSES

## 4.1 Introduction

In 2007 fishing rights (shares) were issued to fishers in different fishery endorsement codes. The total number of shares per fishery endorsement code and the means of allocation to fishers varied from fishery to fishery. However, in general share allocation was evenly distributed and did not reflect historic levels of effort or catch.

It is now proposed to establish a link between shares and output (directly as quota, or indirectly as effort units) and the setting of Total Allowable Catch (TAC) or Total Allowable Effort (TAE) limits. Public consultation papers for each share fishery examined different ways that linkage (interim total commercial access level) could occur. Three typical examples of share linkage options are:

- each share gives the shareholder a portion of a total catch level that is set - e.g. 1 share = x kg of catch);
- each share gives the shareholder a portion of a total effort level that is set - e.g. 1 share = x amount of gear, or 1 share = x fishing days;
- minimum shareholdings can be used to limit the number of endorsements that are available - (if neither approach above leads to a workable outcome).

Proposals to link shareholdings to catch/effort are confounded by the major distortion within most share classes where a flat share allocation does not reflect the fact that only a small proportion of fishers land the majority of the catch.

This Section addresses Task 2 of the terms of reference by examining case study businesses in a number of individual fisheries, with the aim of exploring the potential impacts of the proposed options on business viability. This is undertaken using data from the NSW Fisheries database for 2009/10 to 2011/12 as well as implementation of a questionnaire to fishers in the share classes identified in Table 1.1. The questionnaire is provided in Attachment 2.

As identified above, a confounding factor with examining impacts on FBs is the difficulty in identifying the scope of FBs from the available NSW Fisheries data. However, for the purpose of demonstrating potential impacts using NSW Fisheries data the unit of assessment was FB identification numbers. In other words, consideration has not been given to any additional FBs (with shares) that the FB owner may own or have an interest in.

## 4.2 Approach

### *4.2.1 Introduction*

A number of interrelated factors are relevant to assessing the impact of share linkage on individual businesses. These include:

- the current financial viability of individual businesses;
- the method of share linkage;
- the price of shares; and
- strategies adopted by businesses regarding purchase and sale of shares, businesses capital rationalisation, fishing share consolidation etc.

### *4.2.2 Businesses Viability*

Current business viability is difficult to determine as its estimation requires FBs to provide commercial-in-confidence financial information. While the NSW Fisheries data contains estimations of imputed revenues it provides no estimation of costs for FBs. Data provided by FBs on days fished is also very imprecise. Imputing accurate cost data at an individual FB level is not possible. The most reliable data in the NSW Fisheries data base is the imputed revenue data. A starting point for the analysis was therefore to look at the estimated revenues for case study FBs and how these revenues may be affected by Share Linkage Options.

### *4.2.3 Share Linkages*

Case study FBs invariably hold shares across multiple fisheries. Each of these fisheries has multiple potential Share Linkage Options. When looking at the impacts of share linkage on business viability or revenues there are therefore numerous combinations of potential linkage scenarios which would each have differing consequences for the case study FBs. For example, if a FB held shares in five different share classes and each of these had three potential linkage options there would be $5^3$ i.e. 125 different potential linkage combinations, each with different consequences for the viability/revenues of the business.

Two linkage options are analysed for each FB:

- where the linkage for each active share class is based on minimum shareholdings - referred to as Linkage Option 1;
- where the linkage for each active share class is based on an effort or catch quota (generally reflecting Option 2 of the linkage discussion papers) - referred to as Linkage Option 2. It should be noted that Linkage Option 2 may differ across different share classes and hence for the case studies an effort (days) linkage may apply to some share classes that FBs hold while a catch (kg) linkage may apply to others.

### *4.2.4 Share Price*

An important variable in considering the potential impact of share linkage on FBs is the price of shares. The market price for fisheries shares will reflect the interaction of supply and demand for those shares.

The demand (or willingness to pay) of fishers for shares in any particular fishery reflects potential capitalised future after tax[9] net revenues (revenues minus costs where costs include expected levels of fisheries management costs), factoring in **expectations** regarding future fish prices, **expectations** about total allowable catches/effort, the expected certainty of future fishing entitlements, as well as any lifestyle benefits to the shareholder of current fishing entitlements.

All other things being equal (e.g. expectations and life style benefits), the demand of FBs for shares in any particular fishery will therefore be heterogeneous depending on among other things skill of the fisher as reflected in catch per unit effort and cost structure of the businesses i.e. long run marginal cost (LRMC).

[9] That is, purchasers of the shares would only be willing to pay up to the amount that the share will yield them in equivalent disposable income.

Those fishers with lower LRMC and higher catch per unit effort would be willing to pay more for fishing entitlements than other fishers and those with higher LRMCs and lower catch per unit effort would be willing to pay less - hence a downward sloping demand curve.

The supply of shares (or willingness of fishers to accept compensation for shares they hold) in any particular fishery reflects capitalised foregone future after tax net revenues[10] (revenues minus costs where costs include expected levels of fisheries management costs), factoring in **expectations** regarding future fish prices, **expectations** about total allowable catches/effort, the expected certainty of future fishing entitlements, as well as any lifestyle benefits to the shareholder of current fishing entitlements.

Willingness to accept payment for shares will vary from fishery to fishery as the potential contribution of shares to profitability varies from FB to FB and fishery to fishery. With considerable unused shares held by many FBs, these rights are currently contributing little to the profitability of the business and hence the willingness to accept compensation (price) may be low, reflecting an option value and perhaps some lifestyle benefits. Willingness to accept compensation would be higher where shares are actually generating or capable of generating a profit.

Willingness to pay and willingness to accept are mirror images of the same concept and hence the willingness to pay of a FB for shares can turn into a willingness to accept compensation for shares if another FB has a higher willingness to pay than the FB does. Any FB can become a seller or a buyer depending on the going offer price.

The components of the structural reforms in the NSW commercial fisheries reforms will have different potential impacts on demand and supply for shares and hence share prices. Predicting the price of shares is not possible and so for the purpose of this analysis we have reported the impacts of Share Linkage Options on FBs under a number of share price scenarios:

- NSW Fisheries data on reported share prices (median prices reported in 2010/11 and 2011/12)[11];
- assuming that management of the fisheries results in economic rent of 5% or 10% being generated, which represents a conservative estimate of the level of rent that could be generated as a proportion of GVP in output managed fisheries[12]. The value of a share is then calculated as follows:
  - calculation of GVP/share in the fishery;
  - estimating the percentage of this that is economic rent - 5% or 10% scenario;
  - estimating after tax value of the economic rent - assumed to be 15%[13];
  - discounting this to present value based on a 30-year time period and a private discount rate of 15%[14].

The share price scenarios for different share classes of relevance to the FB case studies are provided in Attachment 3.

[10] That is, sellers of the shares would only be willing to pay up to the amount that the share will yield them in equivalent disposable income.

[11] The Department has provided data reported by fishers to the Department on transfer forms for the sale and transfer of shares and businesses. These reported values for a particular share class can vary significantly as they may include business packaging deals, bartering transactions and other arrangements etc.

[12] Over the 15 years to 2012/13 the average rent across all commercial fisheries in SA was 8.1% (EconSearch 2014). In 2012/13 it was above 10% in all output control fisheries and below 5% in all input control fisheries.

[13] This is to reflect an average tax rate for FBs. FBs may be operated under a company structure and pay 30% of profit in tax or under an a unincorporated structure where the personal income tax rates apply to profits i.e. zero tax for first $18,200, 19c for each dollar earned between $18,200 and $37,000, 32.5c for each dollar earned between $37,000 and $80,000 etc.

[14] People value a dollar earned today higher than a dollar earned in the future. This rate at which people discount future earnings is the discount rate. An indication of the private discount rate is given interest rates on credit cards which is around 15%.

### *4.2.5 Fishing Business Strategies*

FBs potentially have numerous ways of responding to the market signals provided by the proposed reforms. These include businesses capital rationalisation, sale and purchase of shares to optimise the FB etc. It is not possible to predict how market participants will respond. However, at a very simplistic level the impact on FBs revenue can be estimated if they simply sell shares that are latent or they have excess of under the linkage options and buy shares they require to continue fishing at current levels. Some basic consideration is also given to consolidation of shares within individual case study FBs by selling shares in fisheries that they are least productive in i.e. make least GVP in[15]. This gives an indication of how sensitive the financial impact on FBs is to the sale and purchase of shares.

### *4.2.6 Methodology used in the Assessment*

The approach used to illustrate the impacts of the reforms on case study fishers is therefore to:

- use FBs as the unit of evaluation;
- identify three FB in each of the case study fisheries to analyse[16];
- examine changes in annual revenue;
- assess the impacts of two Share Linkage Options for each FB based on the shares in each of the share classes that they currently hold- minimum shareholdings and effort/catch linkage options;
- assume a base scenario - that fishers wish to continue to fish in each of the fisheries they have been active in and purchase sufficient shares to do so. Latent shares are assumed to be sold;
- examine a "consolidation" scenario - where case study fishers selling shares in fisheries that they earn least revenue in;
- examine impacts under three share price scenarios - NSW Fisheries data on reported sales, share prices assuming 5% and 10% economic rent in the fisheries. Share prices are converted to annuities to be on annual basis for comparison to annual revenue; and
- consult with case study fishers, implementing the Questionnaire provided in Attachment 2.

The results of the analysis and consultations are summarised in the following section and provided in full in Attachment 4. This Attachment contains commercial-in-confidence data and hence is provided as a separate document. It should be noted that the assessment does not take account of the exit grant program which is currently being developed and aims to act as a subsidy for existing shareholders who wish to acquire additional shares (NSW Department of Primary Industries 2014).

[15] It was not possible to give consideration to consolidation of shares across multiple FBs that are in common ownership.
[16] These were identified by NSW Fisheries.

### 4.3 Impacts on Case Study Fishers

#### *4.3.1 EGC1H6 - Estuary General Category One Hauling Region 6*

FB1 holds shares in seven share classes and is active in EGC1H6. On average it fishes 61% of its fishing days in EGC1H6 and catches 49% of its total catch in that share class, which accounts for 50% of the estimated GVP of the business.

FB2 holds shares in seven share classes and is active in EGC1H6. On average it fishes 35% of its fishing days in EGC1H6 and catches 39% of its total catch in that share class, which accounts for 39% of the estimated GVP of the business.

FB3 holds shares in six share classes and is active in EGC1H6 but recorded no activity in that share class in the data period.

The estimated annual financial impacts on the case study FBs of linkage options are summarised in Table 4.1. Note that to protect personal business information a range has been provided as an indication of fishers' gross value of production.

**Table 4.1 - Impact of Linkage Options on EGC1H6**

| | | | Linkage Option 1 (two-stage minimum shareholding) | | | Linkage Option 2 (effort days in EGC1H6) | | |
|---|---|---|---|---|---|---|---|---|
| **FB** | **Scenario** | **GVP** | **NSW Fisheries Share Price Data** | **5% Economic Rent** | **10% Economic Rent** | **NSW Fisheries Share Price Data** | **5% Economic Rent** | **10% Economic Rent** |
| FB1 | Base | $75,000-$100,000 | -3.3%[17] | -0.7% | -1.5% | -2.9% | -1.1% | -2.3% |
| | Consolidation | | -2.1% | -2.8% | -2.4% | -3.8% | -3.8% | -4.3% |
| FB2 | Base | >$100,000 | -4.1% | -1.5% | -3.0% | -2.6% | -0.7% | -1.5% |
| | Consolidation | | -3.6% | -1.5% | -3.1% | -2.2% | -0.8% | -1.5% |
| FB3 | Base | $0 - $5,000 | 220.1% | 231.7% | 463.1% | 856.1% | 427.7% | 855.7% |
| | Consolidation | | 1627.7% | 668.7% | 1346.4% | 1272.6% | 527.0% | 1062.6% |

**Fishing Business 1**

- For FB1 there is a financial cost of both Linkage Options of between 0.7% and 4.3% of annual GVP;
- For FB1 the financial cost is greater under Linkage Option 2 (apart from under the NSW Fisheries Share Price Data Scenario); and
- Consolidation did not reduce the costs to FB1 (apart from under Linkage Option 1 and the NSW Fisheries Share Price Data Scenario).

**Fishing Business 2**

- For FB2 there is a financial cost of both Linkage Options of between 0.7% and 4.1% of annual GVP;
- The financial cost for FB2 is greater under Linkage Option 1; and

[17] Percentage changes in revenue in this and other tables relate to the imputed average annual GVP of the FB.

- Consolidation does not lead to a reduction in financial costs except for both linkage options under NSW Fisheries Share Price Data Scenario.

**Fishing Business 3**

- For FB3 both Linkage Options result in a positive financial result; and
- Consolidation improves this result.

### *4.3.2 EGHG4 - Estuary General Hand Gathering Region 4*

FB1 holds shares in four share classes and is active in EGHG4. On average it fishes 41% of its fishing days in EGHG4 and catches 48% of its total catch in that share class, which accounts for 57% of the estimated GVP of the business.

FB2 holds shares in six share classes and is active in EGHG4. On average it fishes 27% of its fishing days in EGHG4 and catches 100% of its total catch in that share class, which accounts for 100% of the estimated GVP of the business.

FB3 holds shares in four share classes and is active in EGHG4. On average it fishes 44% of its fishing days in EGHG4 and catches 15% of its total catch in that share class, which accounts for 53% of the estimated GVP of the business.

The estimated annual financial impacts on the case study FBs of linkage options are summarised in Table 4.2.

**Table 4.2 - Impact of Linkage Options on EGHG4**

| | | | Linkage Option 1 (two stage minimum shareholding) | | | Linkage Option 2 (catch quota for EGHG4) | | |
|---|---|---|---|---|---|---|---|---|
| **FB** | **Scenario** | **GVP** | **NSW Fisheries Share Price Data** | **5% Economic Rent** | **10% Economic Rent** | **NSW Fisheries Share Price Data** | **5% Economic Rent** | **10% Economic Rent** |
| FB1 | Base | $50,000 - $75,000 | -5.0% | -2.1% | -4.1% | -1.8% | -0.6% | -1.2% |
| | Consolidation | | -10.6% | -9.5% | -10.7% | -8.7% | -8.5% | -8.7% |
| FB2 | Base | $5,000 - $25,000 | 16.3% | 9.6% | 19.2% | 40.8% | 18.7% | 37.4% |
| | Consolidation | | 16.3% | 9.6% | 19.2% | 40.8% | 18.7% | 37.4% |
| FB3 | Base | $5,000 - $25,000 | -21.8% | -9.1% | -18.3% | -4.5% | -2.0% | -4.0% |
| | Consolidation | | -8.8% | -8.2% | -11.3% | 7.7% | 0.2% | 3.2% |

**Fishing Business 1**

- For FB1 there is a financial cost of both Linkage Options of between 0.6% and 5.0% of annual GVP;
- For FB1 the financial cost is greater under Linkage Option 2; and
- Consolidation did not reduce the costs to FB1.

**Fishing Business 2**

- For FB2 there is a financial gain from both Linkage Options of between 9.6% and 40.8% of annual GVP;
- The financial gain for FB2 is greater under Linkage Option 2; and
- Consolidation does not lead to an additional financial gain.

**Fishing Business 3**

- For FB3 both Linkage Options resulted in a financial cost of between 2.0% and 21.8% of annual GVP; and
- Consolidation reduces this cost and under Linkage Option 2 results in a financial gain.

### *4.3.3 EGM2 - Estuary General Meshing Region 2*

FB1 holds shares in six share classes and is active in EGM2. On average it fishes 52% of its fishing days in EGM2 and catches 76% of its total catch in that share class, which accounts for 56% of the estimated GVP of the business.

FB2 holds shares in five share classes and is active in EGM2. On average it fishes 86% of its fishing days in EGM2 and catches 87% of its total catch in that share class, which accounts for 80% of the estimated GVP of the business.

FB3 holds shares in seven share classes and is active in EGM2. On average it fishes 12% of its fishing days in EGM2 and catches 18% of its total catch in that share class, which accounts for 14% of the estimated GVP of the business.

The estimated annual financial impacts on the case study FBs of linkage options are summarised in Table 4.3.

**Table 4.3 - Impact of Linkage Options on EGM2**

| | | | Linkage Option 1 (two-stage minimum shareholding) | | | Linkage Option 2 (effort days in EGM2) | | |
|---|---|---|---|---|---|---|---|---|
| **FB** | **Scenario** | **GVP** | **NSW Fisheries Share Price Data** | **5% Economic Rent** | **10% Economic Rent** | **NSW Fisheries Share Price Data** | **5% Economic Rent** | **10% Economic Rent** |
| FB1 | Base | $75,000 - $100,000 | -1.4% | -1.8% | -3.6% | 0.1% | -0.3% | -0.5% |
| | Consolidation | | -1.8% | -2.7% | -4.1% | -0.7% | -1.3% | -1.4% |
| FB2 | Base | $50,000 - $75,000 | -0.5% | -0.9% | -1.8% | 0.2% | -1.1% | -2.2% |
| | Consolidation | | 0.0% | -0.8% | -1.3% | 0.3% | -1.2% | -2.0% |
| FB3 | Base | $50,000 - $75,000 | 0.3% | -1.3% | -2.7% | 0.4% | 0.2% | 0.4% |
| | Consolidation | | 1.1% | -1.1% | -1.7% | 1.2% | 0.4% | 1.2% |

**Fishing Business 1**

- For FB1 there is a financial cost of both Linkage Options (apart from Linkage Option 2 under the NSW Fisheries Share Price Data Scenario) of between 0.3% and 3.6% of annual GVP;
- For FB1 the financial cost is less under Linkage Option 2; and
- Consolidation did not reduce the costs to FB1.

**Fishing Business 2**

- For FB2 there is a financial cost of both Linkage Options (apart from Linkage Option 2 under the NSW Fisheries Share Price Data Scenario) of between 0.2% and 2.2% of annual GVP;
- For FB2 the financial cost is less under Linkage Option 1; and
- Consolidation reduced the financial costs under Linkage Option 1 but increased the financial cost under Linkage Option 2.

**Fishing Business 3**

- For FB3 Linkage Option 1 results in a financial cost of between 1.3% and 2.7% under two share price scenarios but a financial gain under the NSW Fisheries Share Price Data Scenario;
- Under Linkage Option 1 consolidation increases the financial cost under the two share price scenarios that result in a financial cost but increases the financial gain under the share price scenario that results in a financial gain;
- Under Linkage Option 2 FB3 obtains a financial gain of between 0.2% and 0.4%; and
- Consolidation increases this financial gain under Linkage Option 2.

### *4.3.4 EGMC1 - Estuary General Mud Crab Trapping Region 1*

FB1 holds shares in six share classes and is active in EGMC1. On average it fishes 45% of its fishing days in EGMC1 and catches 10% of its total catch in that share class, which accounts for 40% of the estimated GVP of the business.

FB2 holds shares in three share classes and is active in EGMC1. On average it fishes 99% of its fishing days in EGMC1 and catches 96% of its total catch in that share class, which accounts for 99% of the estimated GVP of the business.

FB3 holds shares in four share classes and is active in EGMC1. On average it fishes 100% of its fishing days in EGMC1 and catches 100% of its total catch in that share class, which accounts for 100% of the estimated GVP of the business.

The estimated annual financial impacts on the case study FBs of linkage options are summarised in Table 4.4.

**Table 4.4 - Impact of Linkage Options on EGMC1**

| | | | Linkage Option 1 (two stage minimum shareholding) | | | Linkage Option 2 (catch quota for EGMC1) | | |
|---|---|---|---|---|---|---|---|---|
| FB | Scenario | GVP | NSW Fisheries Share Price Data | 5% Economic Rent | 10% Economic Rent | NSW Fisheries Share Price Data | 5% Economic Rent | 10% Economic Rent |
| FB1 | Base | $25,000 - $50,000 | 1.3% | -1.3% | -2.7% | 2.5% | 0.2% | 0.5% |
| | Consolidation | | 5.0% | -1.7% | -2.8% | 6.2% | -0.1% | 0.4% |
| FB2 | Base | $25,000 - $50,000 | 1.3% | -0.3% | -0.6% | 0.7% | -1.2% | -2.4% |
| | Consolidation | | 1.3% | -0.6% | -0.6% | 0.5% | -1.6% | -2.6% |
| FB3 | Base | $25,000 - $50,000 | 6.3% | 0.9% | 1.8% | 5.3% | -0.2% | -0.4% |
| | Consolidation | | 6.3% | 0.9% | 1.8% | 5.3% | -0.2% | -0.4% |

**Fishing Business 1**

- For FB1 there is a financial cost of Linkage Option 1 under the 5% and 10% Economic Rent Share Price scenario of between 1.3% and 2.7% of annual GVP but under the NSW Fisheries Share Price Data Scenario there is a financial gain of 1.3%;
- There is a financial gain to FB1 under Linkage Option 2 of between 0.2% and 2.5% of annual GVP;
- Under Linkage Option 1 consolidation increases financial costs under share price scenarios where there is a financial cost but increases financial gains under the scenario where there is a financial gain; and
- Under Linkage Option 2 consolidation increases the financial gain under the NSW Fisheries Share Data Scenario, reduces the financial gain under the 10% Economic Rent Share Price Scenario and turns a financial gain into a financial loss under the 5% Economic Rent Share Price Scenario.

**Fishing Business 2**

- For FB2 there is a financial cost of both Linkage Options under the 5% and 10% Economic Rent Share Price Scenario of between 0.3% and 2.4% of annual GVP;
- Under the NSW Fisheries Share Price Data there is a financial gain under both linkage options of between 0.7% and 1.3%;
- Consolidation increases the financial cost or lessens the financial benefit for FB2; and
- For FB2 the financial cost is less under Linkage Option 1.

**Fishing Business 3**

- For FB3 there is a financial benefit under Linkage Option 1 of between 0.9% and 6.3% of annual GVP and a financial cost under Linkage Option 2 of between 0.2% and 0.4% of annual GVP under two of the share price scenarios but a financial gain of 5.3% of annual GVP under the NSW Fisheries Share Price Data Scenario;
- There is no scope for consolidation of shares for FB3; and
- For FB3 Linkage Option 1 is provides the greatest financial gain.

### *4.3.5 EGP4 - Estuary General Prawning Region 4*

FB1 holds shares in nine share classes and is active in EGP4. On average it fishes 33% of its fishing days in EGP4 and catches 6% of its total catch in that share class, which accounts for 17% of the estimated GVP of the business.

FB2 holds shares in nine share classes and is active in EGP4. On average it fishes 35% of its fishing days in EGP4 and catches 17% of its total catch in that share class, which accounts for 27% of the estimated GVP of the business.

FB3 holds shares in three share classes and is active in EGP4. On average it fishes 100% of its fishing days in EGP4 and catches 100% of its total catch in that share class, which accounts for 100% of the estimated GVP of the business.

The estimated annual financial impacts on the case study FBs of linkage options are summarised in Table 4.5.

**Table 4.5 - Impact of Linkage Options on EGP4**

| | | | Linkage Option 1 (two-stage minimum shareholding) | | | Linkage Option 2 (effort days in EGP4) | | |
|---|---|---|---|---|---|---|---|---|
| **FB** | **Scenario** | **GVP** | **NSW Fisheries Share Price Data** | **5% Economic Rent** | **10% Economic Rent** | **NSW Fisheries Share Price Data** | **5% Economic Rent** | **10% Economic Rent** |
| FB1 | Base | $100,000 - $200,000 | -2.3% | -1.1% | -2.2% | 0.5% | 0.5% | 1.0% |
| | Consolidation | | -2.7% | -1.5% | -2.1% | -0.3% | -0.4% | 0.2% |
| FB2 | Base | $100,000 - $200,000 | -5.5% | -1.5% | -3.0% | -1.3% | -0.4% | -0.7% |
| | Consolidation | | -4.2% | -2.1% | -3.4% | -1.5% | -1.1% | -1.4% |
| FB3 | Base | $0 - $5,000 | 28.8% | 14.2% | 28.4% | 87.6% | 30.4% | 60.9% |
| | Consolidation | | 28.8% | 14.2% | 28.4% | 87.6% | 30.4% | 60.9% |

**Fishing Business 1**

- For FB1 there is a financial cost of Linkage Option 1 between 1.1% and 2.3% of annual GVP and a financial gain under Linkage Option 2 of between 0.5% and 1.0% of annual GVP;
- Consolidation of shares tended to increase the financial cost and reduce any financial benefit; and
- For FB1 Linkage Option 2 would be preferable based on this analysis.

**Fishing Business 2**

- For FB2 there is a financial cost of both Linkage Options of between 0.4% and 5.5% of annual GVP;
- Consolidation increased the financial cost for FB2 apart from under Linkage Option 1 and the NSW Fisheries Share Price Data Scenario; and
- For FB2 the financial cost is less under Linkage Option 2.

**Fishing Business 3**

- For FB3 there is a financial benefit under both linkage options of between 14.2% and 87.6%;
- There is no scope for consolidation of shares for FB3; and

- For FB3 Linkage Option 2 is provides the greatest financial gain.

### *4.3.6 EGT4 - Estuary General Trapping Region 4*

FB1 holds shares in four share classes and is active in EGT4. On average it fishes 31% of its fishing days in EGT4 and catches 46% of its total catch in that share class, which accounts for 42% of the estimated GVP of the business.

FB2 holds shares in eight share classes and is active in EGT4. On average it fishes 33% of its fishing days in EGT4 and catches 4% of its total catch in that share class, which accounts for 14% of the estimated GVP of the business.

FB3 holds shares in seven share classes and is active in EGT4. On average it fishes 25% of its fishing days in EGT4 and catches 21% of its total catch in that share class, which accounts for 18% of the estimated GVP of the business.

The estimated annual financial impacts on the case study FBs of linkage options are summarised in Table 4.6.

**Table 4.6 - Impact of Linkage Options on EGT4**

| | | | Linkage Option 1 (two-stage minimum shareholding) | | | Linkage Option 2 (catch quota for EGT4) | | |
|---|---|---|---|---|---|---|---|---|
| **FB** | **Scenario** | **GVP** | **NSW Fisheries Share Price Data** | **5% Economic Rent** | **10% Economic Rent** | **NSW Fisheries Share Price Data** | **5% Economic Rent** | **10% Economic Rent** |
| FB1 | Base | $75,000 - $100,000 | -0.4% | -0.5% | -1.0% | 1.5% | 0.5% | 0.9% |
| | Consolidation | | 1.0% | -0.1% | -0.1% | 2.0% | 0.6% | 1.3% |
| FB2 | Base | $100,000 - $200,000 | -2.0% | -0.7% | -1.5% | -0.9% | 0.0% | 0.0% |
| | Consolidation | | -2.4% | -1.3% | -1.1% | -1.9% | -1.1% | -0.6% |
| FB3 | Base | $50,000 - $75,000 | 2.3% | 1.1% | 2.2% | 5.3% | 2.5% | 5.0% |
| | Consolidation | | -13.1% | -16.4% | -14.3% | -11.6% | -15.4% | -12.4% |

**Fishing Business 1**

- For FB1 there is a financial cost of Linkage Option 1 between 0.4% and 1.0% of annual GVP and a financial gain under Linkage Option 2 of between 0.5% and 1.5% of annual GVP;
- Consolidation of shares reduced the financial cost under Linkage Option 1 and increased the financial gain under Linkage Option 2; and
- For FB1 Linkage Option 2 would be preferable based on this analysis.

**Fishing Business 2**

- For FB2 there is a financial cost under Linkage Option 1 of between 0.7% and 2.0% of annual GVP;
- There is also a financial cost of Linkage Option 2 under the NSW Fisheries Share Price Data Scenario;
- Consolidation of shares increased the financial cost under all but one share price scenario (under Linkage Option 1 and 10% Economic Rent Share Price Scenario); and
- For FB2 the financial cost is less under Linkage Option 2.

**Fishing Business 3**

- For FB3 there is a financial benefit under both linkage options of between 1.1% and 5.3%;
- Consolidation of shares for FB3 results in a financial cost; and
- For FB3 Linkage Option 2 is provides the greatest financial gain.
-

### *4.3.7 EGC2H4 - Estuary General Category 2 Hauling Region 4*

FB1 holds shares in five share classes and is active in EGC2H4 but recorded no activity in that share class in the data period. On average it fished just thirty-six days per annum.

FB2 holds shares in six share classes and is active in EGC2H4. On average it fishes 10% of its fishing days in EGC2H4 and catches 18% of its total catch in that share class, which accounts for 14% of the estimated GVP of the business.

FB3 holds shares in five share classes and holds an endorsement in EGC2H4 but recorded no activity in that share class in the data period. On average it fished just thirteen days per annum.

The estimated annual financial impacts on the case study FBs of linkage options are summarised in Table 4.7.

**Table 4.7 - Impact of Linkage Options on EGC2H4**

| FB | Scenario | GVP | Linkage Option 1 (two-stage minimum shareholding) | | | Linkage Option 2 (effort days in EGC2H4) | | |
|---|---|---|---|---|---|---|---|---|
| | | | NSW Fisheries Share Price Data | 5% Economic Rent | 10% Economic Rent | NSW Fisheries Share Price Data | 5% Economic Rent | 10% Economic Rent |
| FB1 | Base | $5,000 - $25,000 | 5.6% | 0.2% | 0.5% | 17.0% | 5.7% | 11.3% |
| | Consolidation | | 9.6% | -0.9% | 2.1% | 16.1% | 2.8% | 9.5% |
| FB2 | Base | $100,000 - $200,000 | -3.4% | -1.6% | -3.2% | -0.5% | -0.4% | -0.7% |
| | Consolidation | | -3.2% | -2.2% | -3.5% | -0.9% | -1.1% | -1.3% |
| FB3 | Base | $5,000 - $25,000 | -4.1% | -2.2% | -4.4% | 13.4% | 4.8% | 0.0% |
| | Consolidation | | 4.9% | -8.8% | -5.0% | 12.3% | -4.6% | -12.7% |

**Fishing Business 1**

- For FB1 there is a financial benefit of Linkage Option 1 between 0.2% and 5.6% of annual GVP and a financial gain under Linkage Option 2 of between 5.7% and 17.0% of annual GVP;
- Consolidation of shares increases the financial gain under Linkage Option 1 for two share price scenarios and reduces the financial gain (to a financial cost) under the 5% Economic Rent Share Price Scenario;
- Consolidation of shares decreases the financial gain under Linkage Option 2; and
- For FB1 Linkage Option 2 provides the greatest financial gain.

**Fishing Business 2**

- For FB2 there is a financial cost under both linkage options of between 0.4% and 3.4% of annual GVP;
- Consolidation of shares tends to increase the financial cost to FB2 except for the NSW Fisheries Share Price Data Scenario for Linkage Option 1; and
- For FB2 the financial cost is less under Linkage Option 2.
-

**Fishing Business 3**

- For FB3 there is a financial cost under Linkage Option 1 of between 2.2% and 4.4% of annual GVP and a financial gain of between 0.0% and 13.4% under Linkage Option 2;
- Under Linkage Option 1 consolidation of shares increases the financial cost for two share prices scenarios but results in a financial gain under the NSW Fisheries Share Price Data Scenario;
- Under Linkage Option 2 consolidation of shares reduces the financial gain to FB3 and under two share price scenarios results in a financial cost; and
- For FB3 Linkage Option 2 provides the greatest financial gain.

### *4.3.8 EPTCR - Estuary Prawn Trawl Clarence River*

FB1 holds shares in seven share classes and is active in EPTCR. On average it fishes 59% of its fishing days in EPTCR and catches 58% of its total catch in that share class, which accounts for 68% of the estimated GVP of the business.

FB2 holds shares in four share classes and is active in EPTCR. On average it fishes 31% of its fishing days in EPTCR and catches 26% of its total catch in that share class, which accounts for 35% of the estimated GVP of the business.

FB3 holds shares in five share classes and is active in EPTCR. On average it fishes 71% of its fishing days in EPTCR and catches 60% of its total catch in that share class, which accounts for 77% of the estimated GVP of the business.

The estimated annual financial impacts on the case study FBs of linkage options are summarised in Table 4.8.

**Table 4.8 - Impact of Linkage Options on EPTCR**

| FB | Scenario | GVP | Linkage Option 1 (two-stage minimum shareholding) | | | Linkage Option 2 (net length days in EPTCR) | | |
|---|---|---|---|---|---|---|---|---|
| | | | NSW Fisheries Share Price Data | 5% Economic Rent | 10% Economic Rent | NSW Fisheries Share Price Data | 5% Economic Rent | 10% Economic Rent |
| FB1 | Base | $25,000 - $50,000 | -2.9% | -3.6% | -7.1% | 0.8% | 0.8% | 1.6% |
| | Consolidation | | -8.0% | -9.4% | -12.3% | -5.1% | -5.4% | -4.4% |
| FB2 | Base | $100,000 - $200,000 | -1.6% | -1.4% | -2.9% | -0.7% | -0.7% | -1.3% |
| | Consolidation | | -5.9% | -6.3% | -7.6% | -5.3% | -5.7% | -6.2% |
| FB3 | Base | $5,000 - $25,000 | -4.4% | -6.8% | -13.7% | 4.3% | 3.1% | 6.3% |
| | Consolidation | | -1.6% | -5.7% | -10.4% | 4.8% | 2.9% | 6.9% |

**Fishing Business 1**

- For FB1 there is a financial cost of Linkage Option 1 between 2.9% and 7.1% of annual GVP and a financial gain under Linkage Option 2 of between 0.8% and 1.6% of annual GVP;
- Consolidation of shares increases the financial gain under Linkage Option 1 and reduces the financial gain (to a financial cost) under Linkage Option 2; and
- For FB1 Linkage Option 2 is preferred based on this analysis.

**Fishing Business 2**

- For FB2 there is a financial cost under both linkage options of between 0.7% and 2.9% of annual GVP;
- Consolidation of shares increased the financial cost to FB2; and
- For FB2 the financial cost is less under Linkage Option 2.

**Fishing Business 3**

- For FB3 there is a financial cost under Linkage Option 1 of between 4.4% and 13.7% of annual GVP and a financial gain of between 3.1% and 6.3% under Linkage Option 2;
- Under Linkage Option 1 consolidation of shares decreases the financial cost ;
- Under Linkage Option 2 consolidation of shares increases the financial gain to FB3 (except under the 5% Economic Rent Share Price Scenario); and
- For FB3 Linkage Option 2 provides the greatest financial gain.

### *4.3.9 OHGPN4 - Ocean Hauling Haul Net General Purpose Region 4*

FB1 holds shares in ten share classes and is active in OHGPN4. On average it fishes 4% of its fishing days in OHGPN4 and catches 44% of its total catch in that share class, which accounts for 38% of the estimated GVP of the business.

FB2 holds shares in eight share classes and is active in OHGPN4. On average it fishes 1% of its fishing days in OHGPN4 and catches 32% of its total catch in that share class, which accounts for 22% of the estimated GVP of the business.

FB3 holds shares in ten share classes and is active in OHGPN4. On average it fishes 7% of its fishing days in OHGPN4 and catches 33% of its total catch in that share class, which accounts for 28% of the estimated GVP of the business.

The estimated annual financial impacts on the case study FBs of linkage options are summarised in Table 4.9.

**Table 4.9 - Impact of Linkage Options on OHGPN4**

| FB | Scenario | GVP | Linkage Option 1 (two-stage minimum shareholding) | | | Linkage Option 2 (effort days in OHGN) | | |
|---|---|---|---|---|---|---|---|---|
| | | | NSW Fisheries Share Price Data | 5% Economic Rent | 10% Economic Rent | NSW Fisheries Share Price Data | 5% Economic Rent | 10% Economic Rent |
| FB1 | Base | $100,000 - $200,000 | -3.6% | -1.9% | -3.8% | 1.8% | 1.0% | 1.9% |
| | Consolidation | | -2.9% | -2.5% | -3.9% | 1.6% | 0.1% | 1.4% |
| FB2 | Base | $100,000 - $200,000 | -2.6% | -1.4% | -2.7% | -1.7% | -0.5% | -1.0% |
| | Consolidation | | -3.1% | -1.9% | -2.3% | -2.7% | -1.6% | -1.5% |
| FB3 | Base | $300,000 - $400,000 | 0.0% | 0.1% | 0.2% | -0.1% | 0.0% | 0.1% |
| | Consolidation | | 0.0% | 0.2% | 0.5% | -0.1% | 0.2% | 0.4% |

**Fishing Business 1**

- For FB1 there is a financial cost of Linkage Option 1 between 1.9% and 3.8% of annual GVP and a financial gain under Linkage Option 2 of between 1.0% and 1.9% of annual GVP;
- Consolidation of shares makes little difference to the financial cost under Linkage Option 1 but reduces the financial gain under Linkage Option 2; and
- For FB1 Linkage Option 2 is preferred based on this analysis.

**Fishing Business 2**

- For FB2 there is a financial cost under both linkage options of between 1.4% and 2.7% of annual GVP under Option 1 and between 0.5% and 1.7% under Option 2;
- Consolidation of shares increases the financial cost to FB2; and
- For FB2 the financial cost is less under Linkage Option 2.

**Fishing Business 3**

- For FB3 Linkage Option 1 is either neutral (NSW Fisheries share price scenario) or provides a slight gain of between 0.1% and 0.2% of annual GVP;
- Linkage Option 2 results in a small financial cost (-0.1% of annual GVP) under the NSW Fisheries share price scenario or a slight gain under the 5% and 10% economic rent options;
- Under both Linkage Options consolidation of shares is either neutral or increases the financial gain to FB3; and
- For FB3 the impact of Linkage Option 1 and Linkage Option 2 are relatively small and quite similar.

### *4.3.10 OHGN – Ocean Haul Garfish Net Hauling*

FB1 holds shares in ten share classes and is active in OHGN. On average it fishes 7% of its fishing days in OHGN and catches 1% of its total catch in that share class, which accounts for 13% of the estimated GVP of the business.

FB2 holds shares in ten share classes and is active in OHGN. On average it fishes 41% of its fishing days in OHGN and catches 14% of its total catch in that share class, which accounts for 30% of the estimated GVP of the business.

FB3 holds shares in ten share classes and is active in OHGN. On average it fishes 1% of its fishing days in OHGN and catches 1% of its total catch in that share class, which accounts for 1% of the estimated GVP of the business.

The estimated annual financial impacts on the case study FBs of linkage options are summarised in Table 4.10.

**Table 4.10 - Impact of Linkage Options on OHGN**

| FB | Scenario | GVP | Linkage Option 1 (two-stage minimum shareholding) | | | Linkage Option 2 (effort days in OHGN) | | |
|---|---|---|---|---|---|---|---|---|
| | | | NSW Fisheries Share Price Data | 5% Economic Rent | 10% Economic Rent | NSW Fisheries Share Price Data | 5% Economic Rent | 10% Economic Rent |
| FB1 | Base | $200,000 - $300,000 | 0.8% | 0.2% | 0.4% | 2.0% | 0.9% | 1.8% |
| | Consolidation | | -2.0% | -3.2% | -2.8% | -1.2% | -2.6% | -1.6% |
| FB2 | Base | $300,000 - $400,000 | 0.0% | 0.1% | 0.2% | -0.1% | 0.0% | 0.1% |
| | Consolidation | | 0.0% | 0.2% | 0.5% | -0.1% | 0.2% | 0.4% |
| FB3 | Base | $100,000 - $200,000 | -4.0% | -1.3% | -2.7% | -1.0% | -0.3% | -0.5% |
| | Consolidation | | -3.8% | -0.5% | -0.6% | -0.8% | 0.6% | 1.5% |

**Fishing Business 1**

- For FB1 there is a financial gain under Linkage Option 1 of between 0.2% and 0.8% of annual GVP and a financial gain under Linkage Option 2 of between 0.9% and 2.0% of annual GVP;
- Consolidation of shares reduces the financial gain (to a financial cost) under both Linkage Option 1 and Linkage Option 2; and
- For FB1 Linkage Option 2 is preferred based on this analysis.

**Fishing Business 2**

- For FB2 the impact is relatively small under both linkage options; and
- Consolidation of shares would generate a small financial gain to FB2 under both options.

**Fishing Business 3**

- For FB3 there is a financial cost under Linkage Option 1 of between 1.3% and 4.0% of annual GVP and a somewhat smaller cost of between 0.3% and 1.0% under Linkage Option 2;
- Under Linkage Option 1 consolidation of shares decreases the financial cost;

- Under Linkage Option 2 consolidation of results in a financial gain to FB3, except under the NSW Fisheries Share Price Scenario where there would be a financial cost but reduced compared to no consolidation; and
- For FB3 Linkage Option 2 provides the least financial cost.

### *4.3.11 OTISP & OTOSP – Ocean Trawl Inshore Prawn & Ocean Trawl Offshore Prawn*

FB1 holds shares in two share classes and is active in OTISP & OTOSP. On average it fishes 100% of its fishing days in OTISP & OTOSP and catches 100% of its total catch in those share classes, which accounts for 100% of the estimated GVP of the business.

FB2 holds shares in two share classes and is active in OTISP & OTOSP. On average it fishes 100% of its fishing days in OTISP & OTOSP and catches 100% of its total catch in those share classes, which accounts for 100% of the estimated GVP of the business.

FB3 holds shares in three share classes including both OTISP & OTOSP but recorded no activity in that share class in the data period. On average it fished zero days per annum recording no GVP.

The estimated annual financial impacts on the case study FBs of linkage options are summarised in Table 4.11.

**Table 4.11 - Impact of Linkage Options on OTISP & OTOSP**

| FB | Scenario | GVP | Linkage Option 1 (two-stage minimum shareholding) | | | Linkage Option 2 (effort hull unit days in OTISP & OTOSP) | | |
|---|---|---|---|---|---|---|---|---|
| | | | NSW Fisheries Share Price Data | 5% Economic Rent | 10% Economic Rent | NSW Fisheries Share Price Data | 5% Economic Rent | 10% Economic Rent |
| FB1 | Base | $400,000 - $500,000 | -0.7% | -1.5% | -3.1% | -0.4% | -1.1% | -2.2% |
| | Consolidation | | -18.1% | -18.5% | -19.0% | -18.2% | -18.7% | -19.5% |
| FB2 | Base | $50,000 - $75,000 | -0.9% | -3.9% | -7.9% | 0.8% | 1.4% | 2.7% |
| | Consolidation | | -97.4% | -93.4% | -86.8% | -97.4% | -93.4% | -86.8% |
| FB3 | Base | $0 | N/A | N/A | N/A | N/A | N/A | N/A |
| | Consolidation | | N/A | N/A | N/A | N/A | N/A | N/A |

**Fishing Business 1**

- For FB1 there is a financial cost of Linkage Option 1 between 0.7% and 3.1% of annual GVP and a slightly small financial cost under Linkage Option 2 of between 0.4% and 2.2% of annual GVP;
- Consolidation of shares increases the financial cost under both Linkage Option 1 and Linkage Option 2; and
- For FB1 Linkage Option 2 is marginally preferred based on this analysis.

**Fishing Business 2**

- For FB2 there is a financial cost under Linkage Option 1 of between 0.9% and 7.9% of annual GVP and a financial gain of between 0.8% and 2.7% under Linkage Option 2;
- Consolidation of shares increases the financial cost to FB2; and

- For FB2 Linkage Option 2 is financially more advantageous.

**Fishing Business 3**

- Based on the assumption that the business will sell shares in the sectors it is not active in, FB3 will sell all its shares. Depending on the share scenario, FB3's sale of shares will generate revenue of between $7,800 and $36,900 under either share linkage option;
- Under Linkage Option 2, there would be no immediate negative impact on FB3 in all three scenarios as the value of the shares it needs to buy to remain in the sector it operates in (i.e. OTOSP) is less than the value of the shares it sells from the sector it has shares for but does not operate in (i.e. OTISP); and
- An effort linkage option would be more advantageous than a minimum shareholding linkage option for FB3.

### *4.3.12 OTFN – Ocean Trawl Fish Northern Zone*

FB1 holds shares in three share classes and is active in OTFN. On average it fishes 78% of its fishing days in OTFN and catches 84% of its total catch in that share class, which accounts for 83% of the estimated GVP of the business.

FB2 holds shares in four share classes and is active in OTFN. On average it fishes 87% of its fishing days in OTFN and catches 93% of its total catch in that share class, which accounts for 83% of the estimated GVP of the business.

FB3 holds shares in four share classes and is active in OTFN but recorded no activity in that share class in the data period.

The estimated annual financial impacts on the case study FBs of linkage options are summarised in Table 4.12.

**Table 4.12 - Impact of Linkage Options on OTFN**

| FB | Scenario | GVP | Linkage Option 1 (two-stage minimum shareholding) | | | Linkage Option 2 (effort hull unit days in OTFN) | | |
|---|---|---|---|---|---|---|---|---|
| | | | NSW Fisheries Share Price Data | 5% Economic Rent | 10% Economic Rent | NSW Fisheries Share Price Data | 5% Economic Rent | 10% Economic Rent |
| FB1 | Base | $400,000 - $500,000 | -1.4% | -2.6% | -5.1% | -0.9% | -1.5% | -3.0% |
| | Consolidation | | -9.0% | -9.8% | -11.5% | -8.9% | -9.3% | -10.5% |
| FB2 | Base | >$500,000 | 0.0% | -2.3% | -4.6% | 0.9% | -0.5% | -1.0% |
| | Consolidation | | -16.6% | -18.4% | -19.6% | -16.1% | -17.2% | -17.3% |
| FB3 | Base | $50,000 - $75,000 | 10.1% | -4.1% | -8.2% | 14.4% | 5.8% | 11.6% |
| | Consolidation | | 9.1% | -1.8% | 1.5% | 10.9% | 3.5% | 11.9% |

**Fishing Business 1**

- For FB1 there is a financial cost of Linkage Option 1 between 1.4% and 5.1% of annual GVP and a slightly smaller financial cost under Linkage Option 2 of between 0.9% and 3.0% of annual GVP;

- Consolidation of shares significantly increases the financial cost under both Linkage Option 1 and Linkage Option 2; and
- For FB1 Linkage Option 2 is marginally preferred based on this analysis.

**Fishing Business 2**

- For FB2 there is a financial cost under Linkage Option 1 of between 0.0% and 4.6% of annual GVP;
- Under Linkage Option 2 there is a small financial cost (except under the NSW Fisheries Share Price scenario – small financial gain);
- Consolidation of shares substantially increases the financial cost to FB2; and
- For FB2 the financial cost is less under Linkage Option 2.

**Fishing Business 3**

- For FB3 there is a financial cost under Linkage Option 1 of between 4.1% and 8.2% of annual GVP (except under the NSW Fisheries Share Price scenario – financial gain) and a financial gain of between 5.8% and 14.4% under Linkage Option 2;
- Under Linkage Option 1 consolidation of shares decreases the financial cost;
- Under Linkage Option 2 consolidation of shares reduces the financial gain to FB3 (except under the 10% Economic Rent Share Price Scenario – marginal increase); and
- For FB3 Linkage Option 2 provides the greatest financial gain.

### *4.3.13 OTLD – Ocean Trap and Line Demersal Fish Trap*

FB1 holds shares in two share classes and is active in OTLD. On average it fishes 75% of its fishing days in OTLD and catches 90% of its total catch in that share class, which accounts for 90% of the estimated GVP of the business.

FB2 holds shares in two share classes and is active in OTLD. On average it fishes 32% of its fishing days in OTLD and catches 59% of its total catch in that share class, which accounts for 52% of the estimated GVP of the business.

FB3 holds shares in two share classes and is active in OTLD. On average it fishes 96% of its fishing days in OTLD and catches 93% of its total catch in that share class, which accounts for 95% of the estimated GVP of the business.

The estimated annual financial impacts on the case study FBs of linkage options are summarised in Table 4.13.

**Table 4.13 - Impact of Linkage Options on OTLD**

| FB | Scenario | GVP | Linkage Option 1 (two-stage minimum shareholding) | | | Linkage Option 2 (effort days in OTLD) | | |
|---|---|---|---|---|---|---|---|---|
| | | | NSW Fisheries Share Price Data | 5% Economic Rent | 10% Economic Rent | NSW Fisheries Share Price Data | 5% Economic Rent | 10% Economic Rent |
| FB1 | Base | $300,000 - $400,000 | -1.5% | -0.7% | -1.4% | -2.7% | -1.4% | -2.9% |
| | Consolidation | | -0.1% | -0.3% | -0.5% | -1.3% | -1.0% | -2.0% |
| FB2 | Base | $50,000 - $75,000 | -8.8% | -4.2% | -8.5% | 0.0% | 0.0% | 0.0% |
| | Consolidation | | -0.4% | -1.5% | -3.0% | 4.4% | 1.4% | 2.9% |
| FB3 | Base | $300,000 - $400,000 | -1.4% | -0.7% | -1.4% | -1.5% | -0.9% | -1.8% |
| | Consolidation | | -0.1% | -0.2% | -0.5% | -0.8% | -0.7% | -1.3% |

**Fishing Business 1**

- For FB1 there is a financial cost of Linkage Option 1 between 0.7% and 1.5% of annual GVP and a slightly higher financial cost under Linkage Option 2 of between 1.4% and 2.7% of annual GVP;
- Consolidation of shares reduces the financial cost under both Linkage Option 1 and Linkage Option 2; and
- For FB1 Linkage Option 1 is preferred based on this analysis.

**Fishing Business 2**

- For FB2 there is a financial cost under Linkage Option 1 of between 4.2% and 8.8% of annual GVP;
- Consolidation of shares significantly reduces the financial cost of Linkage Option 1 to FB2;
- For FB2 the financial cost is neutral under Linkage Option 2 (has sufficient shares to meet the requirements); and
- Based on this analysis, effort linkage option (Linkage Option 2) would be more advantageous than a minimum shareholding linkage option for FB2.

**Fishing Business 3**

- For FB3 there is a financial cost under Linkage Option 1 of between 0.7% and 1.4% of annual GVP and a similar financial cost of between 0.9% and 1.8% under Linkage Option 2;
- Under both Linkage Option 1 and Linkage Option 2 consolidation of shares decreases the financial cost; and
- For FB3 Linkage Option 1 provides a slightly lower financial cost.

### *4.3.14 OTLLW – Ocean Trap and Line – Line Fishing Western Zone*

FB1 holds shares in five share classes and is active in OTLLW. On average it fishes 60% of its fishing days in OTLLW and catches 85% of its total catch in that share class, which accounts for 87% of the estimated GVP of the business.

FB2 holds shares in three share classes and is active in OTLLW. On average it fishes 30% of its fishing days in OTLLW and catches 11% of its total catch in that share class, which accounts for 12% of the estimated GVP of the business.

FB3 holds shares in one share class and is active in OTLLW. On average it fishes 100% of its fishing days in OTLLW and catches 100% of its total catch in that share class, which accounts for 100% of the estimated GVP of the business.

The estimated annual financial impacts on the case study FBs of linkage options are summarised in Table 4.14.

**Table 4.14 - Impact of Linkage Options on OTLLW**

| FB | Scenario | GVP | Linkage Option 1 (two-stage minimum shareholding) | | | Linkage Option 2 (effort days in OTLLW) | | |
|---|---|---|---|---|---|---|---|---|
| | | | NSW Fisheries Share Price Data | 5% Economic Rent | 10% Economic Rent | NSW Fisheries Share Price Data | 5% Economic Rent | 10% Economic Rent |
| FB1 | Base | >$500,000 | -0.4% | -0.2% | -0.5% | -2.3% | -0.9% | -1.7% |
| | Consolidation | | 0.3% | 0.2% | 0.4% | -2.1% | -0.7% | -1.4% |
| FB2 | Base | $100,000 - $200,000 | -2.8% | -1.3% | -2.7% | -5.2% | -1.9% | -3.7% |
| | Consolidation | | -0.3% | 0.2% | 0.3% | 0.8% | 0.1% | 0.2% |
| FB3 | Base | $5,000 - $25,000 | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| | Consolidation | | 41.1% | 13.4% | 26.8% | 41.1% | 13.4% | 26.8% |

**Fishing Business 1**

- For FB1 there is a financial cost of Linkage Option 1 between 0.2% and 0.5% of annual GVP and a larger financial cost under Linkage Option 2 of between 0.9% and 2.3% of annual GVP;
- Consolidation of shares reduces the financial cost (becomes a financial gain) under Linkage Option 1 and marginally reduces the financial cost under Linkage Option 2; and
- For FB1 Linkage Option 1 is preferred based on this analysis.

**Fishing Business 2**

- For FB2 there is a financial cost under both linkage options of between 1.3% and 5.2% of annual GVP;
- Consolidation of shares reduces the financial cost to FB2 under both linkage options and becomes a financial gain under all scenarios (except NSW Fisheries Share Price Scenario for Linkage Option 1); and
- For FB2 the financial outcome is similar under both Linkage Options.

**Fishing Business 3**

- For FB3 there is a financial cost under Linkage Option 1 of between 4.4% and 13.7% of annual GVP and a financial gain of between 3.1% and 6.3% under Linkage Option 2;
- Under Linkage Option 1 consolidation of shares decreases the financial cost;
- Under Linkage Option 2 consolidation of shares increases the financial gain to FB3 (except under the 5% Economic Rent Share Price Scenario); and

- For FB3 Linkage Option 2 provides the greatest financial gain.

### *4.3.15 OTLSG - Ocean Trap and Line School & Gummy Shark*

FB1 holds shares in six share classes and is active in OTLSG. On average it fishes 64% of its fishing days in OTLSG and catches 66% of its total catch in that share class, which accounts for 60% of the estimated GVP of the business.

FB2 holds shares in five share classes and is active in OTLSG. On average it fishes 35% of its fishing days in OTLSG and catches 35% of its total catch in that share class, which accounts for 25% of the estimated GVP of the business.

FB3 holds shares in four share classes and is active in OTLSG. On average it fishes 21% of its fishing days in OTLSG and catches 17% of its total catch in that share class, which accounts for 12% of the estimated GVP of the business.

The estimated annual financial impacts on the case study FBs of linkage options are summarised in Table 4.15.

**Table 4.15 - Impact of Linkage Options on OTLSG**

| FB | Scenario | GVP | Linkage Option 1 (two-stage minimum shareholding) | | | Linkage Option 2 (catch quota for OTLSG) | | |
|---|---|---|---|---|---|---|---|---|
| | | | NSW Fisheries Share Price Data | 5% Economic Rent | 10% Economic Rent | NSW Fisheries Share Price Data | 5% Economic Rent | 10% Economic Rent |
| FB1 | Base | $100,000 - $200,000 | -6.0% | -0.7% | -1.4% | -25.6% | -2.8% | -5.7% |
| | Consolidation | | -2.5% | 0.5% | 1.0% | -23.8% | -2.2% | -4.4% |
| FB2 | Base | $200,000 - $300,000 | -5.8% | 0.0% | 0.0% | -34.3% | -3.2% | -6.3% |
| | Consolidation | | -3.7% | 0.7% | 1.4% | -33.2% | -2.8% | -5.6% |
| FB3 | Base | $75,000 - $100,000 | -14.9% | -1.5% | -2.9% | -1.5% | 0.3% | 0.5% |
| | Consolidation | | -2.0% | 0.0% | 0.1% | 4.9% | 1.0% | 2.0% |

**Fishing Business 1**

- For FB1 there is a financial cost of Linkage Option 1 between 0.7% and 6.0% of annual GVP and a potentially more significant financial cost under Linkage Option 2 of between 2.8% and 25.6% of annual GVP;
- Consolidation of shares reduces the financial cost under both Linkage Options; and
- For FB1 Linkage Option 1 is preferred based on this analysis.

**Fishing Business 2**

- For FB2 there is a financial cost under both linkage options of between 0.0% and 34.3% of annual GVP;
- Consolidation of shares reduces the financial cost to FB2; and

- For FB2 the financial cost is less under Linkage Option 1 with potential financial gain under the 5% and 10% Economic Rent Share Price scenarios.

**Fishing Business 3**

- For FB3 there is a financial cost under Linkage Option 1 of between 1.5% and 14.9% of annual GVP and a small financial gain under Linkage Option 2 (except under the NSW Fisheries Share Price Scenario);
- Under Linkage Option 1 consolidation of shares decreases the financial cost;
- Under Linkage Option 2 consolidation of shares increases the financial gain to FB3 (generates a financial gain under the NSW Fisheries Share Price Scenario); and
- For FB3 an effort linkage option would be more advantageous than a minimum shareholding linkage option based on this analysis.

### 4.4 Impact Summary

- As most FBs (as defined in this study) have shareholdings across multiple endorsement codes there are numerous combinations of potential linkage options that will have different consequences for an individual FB.
- No two FBs operating in a fishery are the same and hence for any given set of Linkage Options, FBs will be differentially impacted.
- The relative price of shares is a key driver of impacts and so under the same Linkage Option a FB may impacted differently depending on the relative price of shares.
- The reforms will involve an impact (positive or negative) on every fisher.
- For estuary case studies, of the 144 scenarios examined, in 25 of them the FB was least impacted under Option 1 (minimum shareholding linkage) and in 119 of them the FB was least impacted under Option 2 (a catch/effort linkage).
- The only estuary fishery where Option 1 was the most favourable across all share price scenarios was EGMC1.
- Of the 126 scenarios examined for ocean case studies, in 57 of them the FB was least impacted under Option 1 (minimum shareholding linkage) and in 69 of them the FB was least impacted under Option 2 i.e. a catch/effort linkage.
- There was no ocean fishery where Option 1 was the most favourable across all share price scenarios and the only ocean fishery where Option 2 was the most favourable across share price scenarios was OTFN.
- Recorded effort for OHGPN4 appears quite unreliable i.e. under reported. As a result, the proposed effort quota option of 0.15 days/share was met with disbelief by interviewed fishers. The effort figures could be further investigated and verified (e.g. survey of active fishers) and proposed effort based share linkage reform option revised.
- While the results are reported based on a percentage change in annual GVP, the profitability of individual FBs is unknown. Without profitability information the impact of the estimated changes in revenue is difficult to interpret. A 1% change in revenue to a profitable business may have less impact than a 1% change in revenue to an unprofitable business.
- Even where the impact on annual GVP is small, the upfront acquisition cost of shares may be problematic for some FBs.

- Consolidation of shareholdings may in some cases reduce the financial cost Linkage Options but in other cases it further increases the annuity cost to FBs.

**4.5 Other Views of Fishers**

The results of fisher consultations are reported in Attachment 2.

Key themes from this consultation included:

- General opposition to and anger about the reforms but with some FBs supporting them;
- A view among many that linking catch or effort to shareholdings without consideration of historical catch/effort by individual FBs was unfair as it rewarded latent effort and penalised the full-time fishers;
- A general view that increased management costs will reduce business profitability but with some dissenting views;
- A general view that the proposed removal and streamlining of other controls will have little impact on FBs but with some strong support for the changes proposed and some concerns raised about particular aspects;
- General scepticism as to whether there will be a benefit to individual FBs from the reforms but with some dissenting views;
- Concern at the cost of share acquisition and ability to borrow money when it will only allow FBs to keep fishing at historic levels;
- Concern at the financial and time cost to FBs of administering quota systems;
- Concern at the complexity of the proposed reforms and general perception by FBs that the reform proposals keep changing;
- That a buyout scheme similar to the introduction of recreational fishing havens and marine parks and Commonwealth buyout offers is all that is needed;
- A view that blank FB identification numbers can be tendered as part of the Exit Grant Scheme;
- That $16M for the Exit Grant Scheme is insufficient;
- That estuary general fishers need diversity of shares to make a living and are being penalised by the management fees, relative to ocean fishers;
- Opposition to options relating to a race to fish;
- That the grant scheme is wrong, it will help those who want to go not those who want to stay; and
- In the OHGPN and OHGN fisheries, fishers stated levels of effort are significantly more than their recorded level of effort.

Survey results also indicated that:

- Of the 24 FBs surveyed in the estuary fisheries, 9 opposed all Linkage Options or did not express a preference, while 4 preferred Linkage Option 1 and 11 preferred some form of catch/effort Linkage Option.
- Of the 21 FBs surveyed in the ocean fisheries, 9 opposed all Linkage Options or did not express a preference, while 3 preferred Linkage Option 1 and 9 preferred some form of catch/effort Linkage Option.

## 5 CONCLUSION

NSW commercial fisheries are input-controlled with considerable excess capacity. This can result in low or negative ROI for individual fishers as well as fisheries as a whole. At the aggregate fishery level, the existence of excess capacity indicates a waste of resources, as, by definition, the same catch could have been taken by fewer vessels, using less inputs. It also makes the industry more vulnerable to adverse resource and economic shocks.

Previous studies of the NSW commercial fisheries confirm a low or negative ROI for individual fishers, with the ROI for an average vessel in each of the Estuary Prawn Trawl, Ocean Hauling, Ocean Trap and Line and Estuary General fisheries being less than the opportunity cost of capital. The only fishery in which the average vessel was profitable was the Ocean Trawl fishery. Imputation in this study of the ROI in NSW commercial fisheries found a similar result with the average FB in all but the Ocean Hauling fishery being unprofitable. South Australian fisheries data also indicates low or negative ROI in input controlled fisheries.

Establishment of tradeable property rights such as through the Linkage of Shares to access, effort or catch can aid in the removal of excess capacity and improvement in financial and economic returns to individual FBs and fisheries as a whole. This is confirmed by studies of Commonwealth and South Australian fisheries. Commonwealth fisheries have generally improved in profitability as a result of, among other things, structural adjustment, removal of fishing effort and a shift to ITQs. Studies of fisheries in South Australia indicate that economic performance has been improved by retiring effort from fisheries and in particular with a shift to output controls rather than input controls. Linkage to catch is likely to provide a stronger property right and greater financial benefits (ROI) to FBs and the fishery than linkage to effort which in turn is likely to provide a stronger property right than linkage to minimum shareholdings.

With one of the aims of sustainable management of the NSW commercial fisheries being a viable commercial industry, there is a prima facie case for structural reforms. However, proposals to link shares to catch, effort or minimum shareholdings is confounded by a major distortion between the share allocation to FBs and their historic catch/effort. This distortion means that regardless of the Linkage Option adopted in each share class, the reforms will involve an initial financial impact (positive or negative) on every FB. Because of the heterogeneity of FBs, there is no Linkage Option or combination of Linkage Options that minimises these impacts.

For estuary fishery case studies, of the 144 Linkage Option scenarios examined, in 25 of them the FB was least impacted under Option 1 (minimum shareholding linkage) and in 119 of them the FB was least impacted under Option 2 (a catch/effort linkage). Of the 24 FBs surveyed in the estuary fisheries, 9 opposed all Linkage Options or did not express a preference, while 4 preferred Linkage Option 1 and 11 preferred some form of catch/effort Linkage Option.

For the ocean fishery case studies, of the 126 Linkage Option scenarios examined, in 57 of them the FB was least impacted under Option 1 (minimum shareholding linkage) and in 69 of them the FB was least impacted under Option 2 i.e. a catch/effort linkage. Of the 21 FBs surveyed in the ocean fisheries, 9 opposed all Linkage Options or did not express a preference, while 3 preferred Linkage Option 1 and 9 preferred some form of catch/effort Linkage Option.

The study results point to the important role that the exit grant program has to play in minimising the impacts to FB who wish to remain in the industry but because of the distortion between the share allocation to FBs and their historic catch/effort will need to acquire additional shares.

## 6 REFERENCES


Dominion Consulting Pty Ltd (2002) *Appendix G2: The NSW fishery economic survey and the OH Fishery*, In the Environmental Impact Statement on the Ocean Hauling Fishery, NSW Fisheries.

Dominion Consulting Pty Ltd (2003a) *Appendix G2: The NSW fishery economic survey and the EPT Fishery*, In the Fisheries Management Strategy for the Estuary Prawn Trawl Fishery, NSW Fisheries.

Dominion Consulting Pty Ltd (2003b) *Appendix G2: The NSW fishery economic survey and the EG Fishery*, In the Fisheries Management Strategy for the Estuary General Fishery, NSW Fisheries.

Dominion Consulting Pty Ltd (2004) *Assessment of the Economic and Social Issues in the Ocean Trawl FMS*, In the Environmental Impact Statement on the Ocean Trawl Fishery, NSW Fisheries

Dominion Consulting Pty Ltd (2006) *Appendix 1: The NSW fishery economic survey and the OTL Fishery*, In the Environmental Impact Statement on the Ocean Trap and Line Fishery in NSW, NSW Fisheries.

EconSearch 2013, *Economic Indicators for the Commercial Fisheries of South Australia: Summary Report 2011/12*, report prepared for PIRSA Fisheries and Aquaculture, October.

EconSearch 2014, *Economic Indicators for the Commercial Fisheries of South Australia: Summary Report 2012/13*, report prepared for PIRSA Fisheries and Aquaculture, December.

Flood, M., Marton, N. and George, D. (2011) *Torres Strait Prawn Fishery*, In J Woodhams, I Stobutzki, S Vieira, R Curtotti and G Begg (eds), Fishery status reports 2010" status of fish stocks and fisheries managed by the Australian Government, ABARES, Canberra.

George, D., Vierira, S. and New. R. (2012) *Australian fisheries survey report 2011: results for selected fisheries 2008-09 to 2010-2011*, Australian Bureau of Agricultural and Resource Economics and Sciences, Canberra.

George, D. and New, R. (2013) *Australian fisheries surveys report 2012: Financial and economic performance of the Eastern Tuna and Billfish Fishery, the Commonwealth Trawl Sector and the Gillnet, Hook and Trap Sector*, ABARES, Canberra.

Grafton et al. 2000, “Private property and economic efficiency: a study of a common-pool resource”, *Journal of Law and Economics*, 43, 679-713

Newby, J., Gooday, P. and Elliston, L. (2004) *Structural Adjustment in Australian Fisheries*, ABARE Report to the Fisheries Resources Research Fund, Canberra.

NSW Department of Primary Industries (2007) *Fishery Management Strategy for the NSW Ocean Trawl Fishery*, published by NSW DPI, Sydney.

NSW Department of Primary Industries (2014) *Exit Grant Information Flyer*, published by NSW DPI, Sydney.

Pascoe, S. (2007) Estimation of cost functions in data poor environment: the case of capacity estimation in fisheries, *Applied Economics*, 39, 2643-2654.

Skirtun, M. (2013) *Decomposing the drivers of profitability in two key Commonwealth prawn fisheries*,

Research by the Australian Bureau of Agricultural and Resource Economics and Sciences, Contributed paper prepared for presentation at the 57th AARES Annual Conference, Sydney, New South Wales, 5–8 February 2013.

Stevens, R., Cartwright, I. and Neville, P. (2012) *Independent Review of NSW Commercial Fisheries Policy, Management and Administration*, prepared for NSW DPI.

Stephan, M. (2013) *Trends in total factor productivity of five key Commonwealth managed fisheries*, Research by the Australian Bureau of Agricultural and Resource Economics and Sciences Contributed paper prepared for presentation at the 57th AARES Annual Conference, Sydney, New South Wales, 5–8 February 2013

Vieira, S., Perks, C., Mazur, K, Curtotti, R. and Li, M. (2010) *Impact of the structural adjustment package on the profitability of Commonwealth fisheries*, ABARE Research Report 10.01, Canberra.

Zhou, S., Pascoe, S., Dowling, N., Haddon, M., Klaer, N. and Larcombe, J. (2013) *Quantitatively defining biological and economic reference points in data poor fisheries,* report to Fisheries Research and Development Corporation, Canberra.

## ATTACHMENT 1 - SUMMARY OF NSW FISHERIES DATA

The Ocean Trawl, Ocean Trap and Line, Estuary General, Ocean Hauling and Estuary Prawn Trawl fisheries can be disaggregated by fishing method and geographic location. Table A1.1 provides catch, effort, GVP and FB information for these disaggregated fisheries. Note that on-going data validation may alter this data.

**Table A1.1 -More Detailed Breakdown of the Commercial Fisheries**

| Fishery | Code | Reported Gross Kg(annual average) | Estimated Value $ | No. of FBs with endorsement in each fishery | No. of FBs Active in fishery | Effort (Ave annual days fished in this share class) |
|---|---|---|---|---|---|---|
| **Ocean Trawl** | | | | | | |
| Deepwater Prawn | OTDP | 1,938 | $11,856 | 41 | 3 | 9 |
| Fish Northern Zone | OTFN | 1,167,521 | $4,645,600 | 45 | 29 | 1,203 |
| Offshore Prawn | OTOSP | 1,198,454 | $10,232,072 | 176 | 103 | 4,326 |
| Inshore Prawn | OTISP | 714,362 | $5,956,603 | 194 | 88 | 2,151 |
| *Sub-total* | | *3,082,274* | *$20,846,131* | *216* | *126* | *7,689* |
| **Estuary General (Regions 1- 7)** | | | | | | |
| Hand Gathering | EGHG1-7 | 54,089 | $1,382,116 | 95 | 62 | 3,568 |
| Hauling- Category 1 Hauling | EGC1H1-7 | 776,530 | $2,903,896 | 140 | 88 | 2,152 |
| Hauling - Category 2 Hauling | EGC2H1-7 | 83,551 | $346,142 | 137 | 42 | 300 |
| Hauling - Handline and Hauling Crew | EGHHC1-7 | 492,503 | $1,705,283 | 958 | 509 | 2,305 |
| Meshing | EGM1-7 | 2,176,069 | $8,862,941 | 484 | 387 | 18,786 |
| Prawning | EGP1-7 | 350,429 | $2,765,699 | 1,072 | 705 | 4,300 |
| Trapping - Eel Trapping | EGET1-7 | 81,031 | $323,423 | 169 | 72 | 1,352 |
| Trapping - Mud Crab Trapping | EGMC1-7 | 110,763 | $2,585,800 | 211 | 164 | 6,453 |
| Trapping - Trapping | EGT1-7 | 94,650 | $942,874 | 169 | 109 | 3,491 |
| *Sub-total* | | *4,219,614* | *$21,818,175* | *604* | *500* | *42,706* |
| **Ocean Hauling (Regions 1-7)** | | | | | | |
| Garfish Net Hauling | OHGN3-7 | 57,076 | $378,432 | 47 | 22 | 193 |
| General Ocean Hauling | OHG1-7 | 2,077,695 | $4,862,789 | 272 | 176 | 1,656 |
| Net General Purpose | OHGPN1-7 | 1,047,871 | $2,280,859 | 118 | 55 | 474 |
| Pilchard Anchovy and Bait Net Hauling | OHPAB1-6 | 57,460 | $304,521 | 22 | 10 | 46 |
| Purse seine | OHPS | 2,155,434 | $5,912,710 | 15 | 14 | 908 |
| *Sub-total* | | *5,395,536* | *$13,739,311* | *278* | *194* | *3,270* |
| **Ocean Trap and Line** | | | | | | |
| Spanner Crab Southern Zone | OTLSCS | 662 | $6,637 | 9 | 2 | 15 |
| School and Gummy Shark | OTLSG | 36,550 | $175,277 | 20 | 11 | 171 |
| Spanner Crab Northern Zone | OTLSCN | 78,442 | $734,597 | 30 | 17 | 640 |
| Line Fishing Eastern Zone | OTLLE | 170,375 | $1,205,831 | 79 | 56 | 923 |
| Demersal Fish Trap | OTLD | 683,216 | $4,421,239 | 205 | 107 | 5,044 |
| Line Fishing Western Zone | OTLLW | 954,582 | $5,933,786 | 334 | 248 | 8,960 |
| *Sub-total* | | *1,923,826* | *$12,477,368* | *357* | *267* | *15,753* |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Estuary Prawn Trawl** | | | | | | |
| Hunter River | EPTHU | 55,283 | $348,676 | 27 | 22 | 741 |
| Hawkesbury River | EPTHA | 164,254 | $1,160,749 | 56 | 39 | 2,243 |
| Clarence River | EPTCR | 171,381 | $1,137,911 | 92 | 58 | 1,517 |
| *Sub-total* | | *390,918* | *$2,647,336* | *169* | *114* | *4,501* |
| **Total** | | **15,012,169** | **$71,528,320** | | | **73,919** |

## ATTACHMENT 2 - QUESTIONNAIRE

### 1. Introduction

- AgEconPlus Pty Ltd has been engaged by the NSW Government to undertake an independent economic assessment of the impact on fishery businesses of the proposed reforms to the NSW Commercial Fisheries Industry, in particular the economic viability of key share classes within these fisheries and the impact of various share linkage options on the financial viability of FBs.
- As part of this economic assessment, we would like to obtain your comments and feedback in relation to the following questionnaire regarding your fisher business so as to inform our economic assessment.
- The focus of this questionnaire is on the x fishery, although we are also interested in the impacts of proposed reforms in all fisheries on your overall fishing business.
- We are grateful for any comments and feedback that you are able to provide in relation to this questionnaire and we confirm that all information provided will be kept anonymous but included in our analysis of the proposed reforms.

### 2. Single Fishery Questions

What are your views on the proposed reforms in the x fishery?

Thinking about the proposed linkage options, what would be your preferred way of linking shares in this fishery?

- Linkage Option 1: Managing endorsement numbers (minimum shareholdings) involving a two-stage minimum shareholding
- Linkage Option 2: Minimum shareholdings and 'hull unit days'
- Linkage Option 3: Optional extras: Catch quotas (or ITQs) for selected species

If the proposed reform goes ahead, are you likely to sell or buy shares in this fishery? If so, how many?

What factors are likely to influence your decision to sell or buy in this fishery?

What do you think the price of shares is **currently** in this fishery (pre linkage)? By themselves, do they have any tradable value?

Under the proposed reforms (linkage) what do you think will happen to the market price of shares in this fishery under the various linkage options (ignoring any exit grant scheme)? Will they increase, decrease, or stay the same?

(i) option 1

(ii) option 2

(ii) option 3

### 3. All Fishery Questions

What do you think the effect of buying or selling shares in this fishery (and other fisheries, if applicable) will be on your business profitability? Will it reduce, increase, have no effect or cause you to go out of business? Why?

What strategies might you use to minimise impacts on your business e.g. reduce diversification, amalgamation of your FBs, amalgamation of your fishing business with family members, other etc?

What do you think the effect of the proposed exit grant scheme will be on the market price of shares?

What do you think the impact of the proposed increase in management costs will be:

a) on your business profitability?

b) on market price of shares?

c) on share trading activity?

What do you think the proposed removal and streamlining of other controls (after linkage) will have on your business?

**4. Defining Your Fishing Business**

Which Fishing Business ID numbers do you operate together as a single fishing business?
(following information obtained from NSW DPI database – please adjust or amend if details incorrect)

Are there other FBs (ID numbers) with which you share resources (labour, boats, gear, etc.)? Which ones?

Could you provide some general information on your fishing business? See below

- How many vessels are used in your business?
- What is the average length of your vessel(s)?
- Do you use crew, with any of your vessels, if so how many? .....
- Are your vessel(s) owner operated?
- What is the main fishing gear you use? .....
- Do you have a freezer in your vessels?
- Other relevant information?

**5. Financial Information**

So that we can provide indicative estimates of how the reforms will impact individual businesses, could you please provide some financial information on your fishing business by completing where possible the tables below.

(Two options are available, detailed information or totals as per green highlighted boxes)

| | Fishery/ Endorsement Code | Units | Estimated Boat Days |
|---|---|---|---|
| **Boat days fished (Days) by Fishery** | | | |
| Fishery 1 | | Boat Days | |
| Fishery 2 | | Boat Days | |
| Fishery 3 | | Boat Days | |
| Fishery 4 | | Boat Days | |
| Fishery 5 | | Boat Days | |
| Fishery 6 | | Boat Days | |
| Fishery 7 | | Boat Days | |
| Fishery 8 | | Boat Days | |
| Fishery 9 | | Boat Days | |
| Fishery 10 | | Boat Days | |
| **Total Boat Days** | | | |
| | | | |
| **Gross Income by Fishery** | | | **Estimated Gross Income** |
| Fishery 1 | | $ | |
| Fishery 2 | | $ | |
| Fishery 3 | | $ | |
| Fishery 4 | | $ | |
| Fishery 5 | | $ | |
| Fishery 6 | | $ | |
| Fishery 7 | | $ | |
| Fishery 8 | | $ | |
| Fishery 9 | | $ | |
| Fishery 10 | | $ | |
| **Total Income** | | | |

| **Costs** | | |
|---|---|---|
| Fuel | $ | |
| Skipper and Crew wages ($) | $ | |
| Any unpaid labour (hours) | hours | |
| Repairs and Maintenance | $ | |
| Freight, marketing packaging (only if revenue is gross of these) | $ | |
| Other variable costs | | |
| Bait | $ | |
| Ice | $ | |
| Food | $ | |
| Fishing gear | $ | |
| Other | | |
| Fixed costs | | |
| Licence fee | $ | |
| Insurance | $ | |
| Interest | $ | |
| Labour- unpaid | $ | |
| Leasing | $ | |
| Legal and accounting | $ | |
| Telephone etc. | $ | |
| Slipping and mooring | $ | |
| Travel | $ | |
| Office and admin | $ | |
| Other | $ | |
| **Total Cash Costs** | $ | |
| | | |
| **Cash Operating Surplus** | $ | |
| | | |
| **Depreciation** | $ | |
| | | |
| **Market Value of Capital used in the Fishing Business (vessels, fishing gear, sheds, cars etc)** | $ | |
| **Market value of licences / shares** | $ | |

## ATTACHMENT 3 - ASSUMED SHARE PRICES

| Share classes | NSW Fisheries Data^ | 5% Economic Rent | 10% Economic Rent |
|---|---|---|---|
| EGC1H4 | $60 | $52 | $104 |
| EGC1H6 | $120 | $60 | $120 |
| EGC2H2 | $12 | $2 | $5 |
| EGC2H4 | $8 | $8 | $16 |
| EGET1 | $11* | $5 | $11 |
| EGET2 | $9 | $4 | $9 |
| EGET3 | $8 | $4 | $9 |
| EGET4 | $44 | $5 | $10 |
| EGET6 | $20 | $33 | $65 |
| EGHG1 | $144 | $16 | $32 |
| EGHG3 | $170 | $66 | $131 |
| EGHG4 | $80 | $28 | $56 |
| EGHHC1 | $44 | $5 | $10 |
| EGHHC2 | $12 | $7 | $13 |
| EGHHC4 | $24 | $8 | $17 |
| EGHHC5 | $39 | $14 | $29 |
| EGHHC6 | $9* | $4 | $9 |
| EGM1 | $40 | $24 | $47 |
| EGM2 | $15 | $40 | $79 |
| EGM3 | $32 | $32 | $65 |
| EGM4 | $96 | $55 | $110 |
| EGM6 | $100 | $40 | $80 |
| EGMC1 | $44 | $53 | $105 |
| EGMC2 | $40 | $24 | $47 |
| EGMC4 | $60 | $17 | $34 |
| EGMC6 | $32 | $0 | $0 |
| EGP1 | $16* | $8 | $16 |
| EGP2 | $15 | $7 | $14 |
| EGP3 | $65 | $6 | $13 |
| EGP4 | $80 | $22 | $44 |
| EGP6 | $120 | $30 | $61 |
| EGT1 | $80 | $4 | $8 |
| EGT4 | $44 | $14 | $28 |
| EPTCR | $21 | $21 | $41 |
| OHG2 | $26 | $47 | $95 |
| OHG3 | $100 | $218 | $437 |
| OHG4 | $200 | $150 | $300 |
| OHG6 | $52* | $26 | $52 |
| OHGN4 | $125 | $66 | $131 |
| OHGN6 | $37* | $18 | $37 |
| OHGPN3 | $233 | $90 | $181 |
| OHGPN4 | $100 | $107 | $215 |
| OHGPN6 | $274* | $137 | $274 |
| OHPAB4 | $50 | $222 | $444 |
| OHPS | $1,856 | $833 | $1,667 |
| OTDP | $1,923 | $5 | $10 |
| OTFN | $400 | $598 | $1,195 |
| OTISP | $82 | $151 | $301 |
| OTLD | $250 | $151 | $302 |
| OTLLW | $375 | $123 | $245 |
| OTLSCN | $233* | $116 | $233 |
| OTOSP | $97 | $291 | $583 |

* These share prices were imputed based on 10% economic rent.

^ The Department has provided data reported by fishers to the Department on transfer forms for the sale and transfer of shares and businesses. These reported values for a particular share class can vary significantly as they may include business packaging deals, bartering transactions and other arrangements etc.