

**FERM**

**Fisheries Economics, Research Management Pty. Ltd.**

**A REVIEW OF THE BUSINESS EXIT  
(LICENCE BUYOUT) ASSISTANCE  
COMPONENT OF THE GREAT  
BARRIER REEF MARINE PARK  
STRUCTURAL ADJUSTMENT  
PACKAGE**

**FINAL REPORT**

**PREPARED FOR THE MARINE DIVISION OF  
THE DEPARTMENT OF ENVIRONMENT AND  
WATER RESOURCES**

**FERM  
October 2007**

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## GLOSSARY

**DEH** – the Australian Government’s Department of the Environment and Heritage;

**ELFSIM** - the ‘Effects of Line Fishing on the Great Barrier Reef and Evaluations of Alternative Potential Management Strategies’ project undertaken by the CRC Reef Research Centre and used as the basis for setting the ERTs for the line fisheries at 10%

**ERTs** - Effort Reduction Targets identifying the desired level of effort to be removed from each fishery;

**GBRMP** – the Great Barrier Reef Marine Park, a World Heritage listed marine park covering an area of 38 million hectares stretching over 2000kms along the Queensland north-east coastline and encompassing the world’s largest system of coral reefs together with lagoon, seagrass, mangrove and estuarine communities;

**GBRMPA** - the Great Barrier Reef Marine Park Authority, the principal advisory body to the Australian Government on management of the Great Barrier Reef Marine Park;

**DPI&F** – the Queensland Department of Primary Industries and Fisheries;

**RAP** - the Representative Areas Program implemented by GBRMPA aimed at determining the major habitat types of the GBR region and developing a new zoning plan based on protecting ‘representative’ examples of each habitat type within a network of no-take areas;

**SAP** - the Great Barrier Reef Marine Park Structural Adjustment Package implemented by DEH in the second half of 2004;

**TAC** – the total allowable catch, usually used in the context of a quota managed fishery;

**WTO** – a Wildlife Trade Operation, as assessed by the Commonwealth Environment Minister under the provisions of the Australian Government’s Environmental Protection and Biodiversity Act.

## **EXECUTIVE SUMMARY**

The purpose of this report is to review the extent to which the fisheries licence buyout implemented in 2004/05 by the Australia Government's then Department of Environment and Heritage (DEH) prevented fishing effort displaced as a result of the Representative Areas Program (RAP) implemented by the Great Barrier Reef Marine Park Authority from having unsustainable ecological or economic impacts in other areas.

The buyout was part of a broader Structural Adjustment Package (SAP) designed to:

- i) assist fishers, fishery related businesses, employees and communities adversely affected by the rezoning; and
- ii) manage in the most cost-effective manner any displaced fishing effort that has unsustainable ecological or economic impacts.

The licence buyout was primarily aimed towards the second objective – that of managing in the most cost-effective manner any displaced fishing effort with unsustainable ecological or economic impacts.

Thirteen commercial fisheries were identified as being impacted by the rezoning. Of these, six – inshore net, mud crab, trawl, coral reef, Spanish mackerel and other reef line - were considered fully fished, such that areas unaffected by the rezoning were deemed incapable of accommodating displaced effort without having unsustainable ecological and/or economic impacts. The buyout focused on these six fisheries.

### **The setting of the Effort Reduction Targets**

For the six fisheries considered as being fully fished, Effort Reduction Targets (ERTs) were estimated to reflect the proportion of effort displaced by the rezoning. Given the different levels of data available in these six fisheries, the method used to estimate the ERT varied, but for each fishery the ERT calculations were based on using what was considered to be the best available data.

- For the net and crab fisheries, the share of the catch taken from the rezoned areas was estimated using logbook data reported in 6 nautical mile (nm) format and adjusted to represent the distribution of the catch between GBRMP and State waters.
- The ERT for the prawn fishery was estimated using a similar method but using finer-scale vessel position data obtained from the vessel monitoring system (VMS).
- For the line fishery, historical logbook data was of little use given the substantive management changes introduced in the 12 months leading up to the RAP. An alternative approach capable of isolating the impacts of the rezoning from the impacts of these management changes was thus required. Accordingly, the line fishery ERT was estimated using the results from a quantitative modelling study – the ELFSIM project - designed to evaluate the impacts of alternative management strategies in the coral reef fishery.

Generally speaking, the approaches used to estimate the ERTs are sound. However, none of the six fisheries had access to catch data on a sufficiently fine-scale spatial level such that various assumptions were required. Given uncertainty in both the data

and the assumptions used, the ERTs derived from the calculations should be interpreted as imprecise estimates of the true level of displaced effort.

The ERTs estimated for the net and crab fisheries were accepted by all members of the Technical Advisory Committee and notwithstanding the general uncertainties regarding the data used in the ERT calculations, are considered reasonable.

In contrast, the adequacy of the ERT in the prawn fishery was one of the most contentious issues of the buyout. This report argues that the Government had an obligation to use the best available data to estimate the ERT, that the VMS data represented the best available data on vessel positioning, and that the VMS data needed to be used in the ERT calculations. However, this report also considers that given the imprecise nature of the ERT estimates, the Government and industry could have made greater efforts to negotiate a mutually-agreeable ERT for the fishery and suggests undue confidence from the Government in the reliability of the estimate derived from the calculations and equally undue commitment from industry to oppose the use of VMS data were misplaced on both accounts. The report also suggests that should these negotiations have proved unsuccessful, the Technical Advisory Committee could have referred the issue to an external party for consideration.

In respect to the ERT set for the line fisheries, this report questions the interpretation of the ELFSIM results to suggest that the closures would have unsustainable economic impacts in the fishery. The ELFSIM model was primarily a biological model with a single economic indicator of questionable value and FERM considers that the subsequent decision to set the line fishery ERT at 10% – based solely on the model results of that single indicator – is likely to have overstated the level of effort required to be removed from the fishery.

### **The selection of the tender groups**

The Australian Government first announced details of the buyout program on 30 June 2004. By the November 15 2004 closing date, 584 tenders had been submitted by fishers wanting to participate. These 584 tenders were then evaluated to identify those groups of tenders that met the respective ERT for each fishery at least cost.

#### **The net fishery**

The buyout in the net fishery removed 56 active net licences representing a combined net fishery GVP of \$8.6m over the four year assessment period, at an estimated cost of almost \$5m, 15% of the total buyout cost. Licences were acquired from a range of large scale and small scale operators, with most concentrated at the smaller end of the range - 65% caught less than \$150,000 over the four year assessment period, averaging less than \$40,000/year.

#### **The crab fishery**

The buyout in the crab fishery resulted in the removal of 56 crab licences at an estimated cost of \$3.2m, 10% of the total buyout cost. Most of the crab licences acquired had only minor involvement in the fishery - reflecting the fact that the crab fishery comprises predominantly small-scale operators – with more than 40% of the licences bought-out having reported less than \$50,000 of crab catch over the three year period.

### **The prawn trawl fishery**

There were 21 trawl licences acquired - representing 136,462 effort units – at a cost of \$9.3m, 29% of the buyout cost. Price was the key criterion in selecting the tenders and licences were generally acquired on the basis of the cheapest price/effort unit.

The selection of successful tenders was not biased towards inactive vessels - 18 of these 21 licences had fished between 100-250 nights over the 2.5 year assessment period, with half of these fishing between 150-200 nights. Only 2 of the successful tenders – less than 10% of the selected vessels - fished less than 100 nights.

### **The line fisheries**

#### *The coral reef fin fish fishery*

Of the 45 reef line operators bought out, nearly 70% are considered to have been reef line specialists in that the reef line fishery represented more than 75% of their total fishery GVP. Successful reef line tenders were sourced from large, medium and small scale quota holders, in similar proportions to the tenders submitted. Around 50% of successful tenders were from operators with less than \$200,000 of reef line quota

The reef line fishery accounted for the largest share of buyout funds – estimated at over \$13m (42%) of the buyout cost. The scale of the reef fishery buyout magnifies the cost implications should the fishery's ERT have been set at too high a level. Had the line fishery ERT been set lower - say 7.5% or even 5% - considerable cost savings would have been realised which could either have been returned to the Government, been made available to address uncertainties in the ERTs set for the other fisheries, or some combination of the two.

#### *The Spanish mackerel fishery*

The end result of the buyout in the mackerel fishery was the acquiring of 39 endorsements and 67.4mt of quota. Only three of these 39 licences are considered to have been Spanish mackerel specialists such that only \$1.1m – 4% of the total buyout cost - is attributed to the Spanish mackerel fishery.

## **Effectiveness of the Licence Buyout**

The buyout achieved all the ERTs. In principle, this would suggest that in the areas remaining open to fishing, the levels of effort after the buyout would be similar to pre-buyout levels. In practice, this need not necessarily be the case, and unless management arrangements in the areas left open to fishing are capable of preventing effort increasing to unsustainable levels, unsustainable spill-over effects could still eventuate despite the ERTs having been achieved.

### **The purchase of latent effort**

The buyout sought to avoid the risk of removing inactive operators by requiring successful tenderers to have some recorded fishing history in the GBRMP during the respective assessment periods and for those fisheries where latent effort is an issue, by making GVP a key factor in the selection of tenders. This strategy was largely successful and few latent licences were bought-out.

### **The potential return of removed effort**

Fundamental to the buyout meeting its objective is the assumption that effort purchased in the buyout is permanently removed from the fishery. The validity of this assumption depends to a large extent on the effectiveness of the management arrangements applying throughout each fishery.

In the case of the net and crab fisheries, the plentiful supply of underutilised licences meant that the effort associated with any of the net and/or crab licences acquired in the buyout could readily be transferred to another licence and remain in the fishery.

Advice from industry sources suggests that this did occur and that much of the net and crab effort acquired during the buyout has remained active in the two fisheries. However, this outcome is not supported by DPI&F logbook data which indicates substantial falls in effort – and catch – in both fisheries following the buyout. Detailed analysis of logbook data would help reconcile this apparent conflict.

Presuming the logbook data is accurate, the potential risk in the net and crab fisheries of ‘removed’ effort returning using previously underutilised licences and having unsustainable impacts in areas remaining open to fishing has not eventuated. This outcome is fortunate, for there was nothing to prevent net and crab fishers successful in the buyout from returning to their respective fishery. Conceptually, 100% of the net and crab effort acquired in the buyout could have remained active.

DEH took the view that the investment warnings issued by DPI&F – in April 2002 for the net fishery and September 2003 for the crab fishery – together with the impending development of strengthened management arrangements in each fishery would discourage removed operators from reinvesting. The extent to which the DPI&F investment warnings and/or the threat of potential management changes deterred bought-out operators from reinvesting into their respective fisheries is difficult to assess. However, neither fishery has as yet introduced the envisaged new management arrangements and any net and/or crab operator that was willing to take the risk, buy an underutilised licence and continue fishing has not as yet been disadvantaged.

In contrast to the net and crab fisheries, the respective management arrangements applying in the trawl, line and mackerel fisheries are sufficiently effective such that there is negligible latent effort in any of these three fisheries. In each case the effort associated with the licences acquired in the buyout has been permanently removed.

### **Options for preventing/discouraging the return of removed effort**

The Australian Government’s policy on marine protected areas and displaced fishing states that if the zoning of a marine protected area has a fisheries impact, ‘the responsible fisheries management agencies will make any necessary revisions to the fisheries management settings’.

The policy is silent on what should happen if the envisaged interaction between the rezoning and the fisheries management arrangements is lacking, as was the case in the net and crab fisheries. Given the jurisdictional tensions experienced with the RAP – as evidenced by the Queensland Government’s early withdrawal from the RAP process and the public disagreement between the State and Australian Governments regarding responsibility for fishers affected by the complementary zoning in State waters – it is no surprise that the level of integration between the Australian Government-led RAP and the State Government-led fisheries management arrangements was less than ideal.

This report endorses the Australian Government’s policy of reviewing the fisheries management arrangements where zoning rules change or new marine protected areas are established. Further, this report suggests that unless management arrangements are capable of controlling the level of effort in the areas remaining open to fishing, a fisheries buyout of itself will not necessarily prevent displaced effort from having unsustainable impacts. A buyout and the effectiveness of the fisheries management arrangements should be viewed as being inseparable.

This report recommends, among other things, that should a new marine protected area be implemented or zoning rules change, DEH only implement a licence buyout in those fisheries for which management arrangements are effective in constraining the level of fishing effort and/or catch in the areas remaining open to fishing. Where existing management arrangements are judged to be ineffective, it is recommended that DEH make the development and implementation of appropriate fisheries management arrangements a prerequisite to any buyout program.

This report also suggests that the cost-effectiveness of the buyout cannot be properly assessed in isolation from the business restructuring assistance component of the SAP.

## 1. INTRODUCTION

### The Policy Setting

In 1998, the Great Barrier Reef Marine Park Authority (GBRMPA) – the principal advisory body to the Australian Government on the management of the Great Barrier Reef Marine Park (GBRMP) – started work on a program designed ‘to determine the major habitat types of the GBR region and develop a new zoning plan based on protecting ‘representative’ examples of each habitat type within a network of no-take areas’ (GBRMPA undated). This program – known as the Representative Areas Program (RAP) - was aimed at ‘maintaining the health and resilience of the ecosystem and providing benefits for present and future users’ (GBRMPA op cit).

The RAP was developed in the context of:

- growing worldwide concern over the declining health of coral reef ecosystems due to water pollution, climate change and overfishing;
- increasing fishing pressure, and declining population trends, for many GBRMP fish stocks;
- forecast increases in potential Park users and improvements to fishing technology; and
- growing awareness of the inadequacy of the then Park zoning arrangements (GBRMPA 2003a).

From 1998-2002, activities under the RAP focused on data collection and collation, scientific analysis and initial public consultation. Following these initial consultations, in June 2003 GBRMPA released a draft zoning plan for public consideration. The RAP generated considerable public interest - GBRMPA received over 10,000 submissions during the first consultation phase and in excess of 21,000 submissions in response to the draft plan.

Following consideration of the public submissions, in November 2003 GBRMPA released a revised zoning plan. The revised plan proposed establishing a network of fisheries closures specifically chosen so as to provide scientifically-based levels of protection – 20% - to each of the 70 bioregions identified within the GBRMP. This network of closures increased the area of the Park closed to commercial fishing to 33.3% compared to the 4.5% that was closed under the pre-existing zoning plan.

The revised plan was tabled in Federal Parliament in December 2003, approved in March 2004 and came into effect on 1 July 2004.

In a separate but related process, in January 2004 the Australian Government released a policy statement on marine protected areas and displaced fishing (Australian Government 2004). In that statement, the Australian Government:

- i) reaffirmed its long-term commitment to establish a system of marine protected areas (MPAs) to protect marine biodiversity;
- ii) committed itself to involving fishery stakeholders in the design of MPAs to ensure that MPAs have the least possible impact on existing fishing operations; and
- iii) recognised that there will at times be unavoidable impacts on existing fishing operations and that Australian Government funded adjustment assistance may be considered to support the required adjustment in fishing effort.

These two Australian Government policies – to provide increased biodiversity protection within the GBRMP and to provide assistance where warranted to support fisheries adjustment – resulted in the Australian Government – through its then Department of the Environment and Heritage (DEH) – implementing the Great Barrier Reef Marine Park Structural Adjustment Package (SAP). The SAP was implemented in the second half of 2004 and had two objectives:

- to assist fishers, fishery related businesses, employees and communities adversely affected by the rezoning; and
- to manage in the most cost-effective manner any displaced fishing effort that has unsustainable ecological or economic impacts.

There were seven components to the SAP, the main two being business exit assistance – to assist operators wanting to exit the industry – and business restructuring assistance, to assist operators remaining in the industry adjust to the new zoning arrangements. Other components of the SAP provided support to operators to obtain professional business advice, to fishing industry employees and to fishing communities.

The purpose of this report is to review the effectiveness of the business exit assistance component of the SAP – the licence buyout implemented in late 2004 - in terms of the extent to which it effectively accounted for the scale and distribution of displaced fishing effort.

Section 2 of this report describes the methods used to estimate the Effort Reduction Targets (ERTs) set for each fishery covered by the buyout and examines the extent to which these targets were achieved. Section 3 continues the discussion of the ERTs, focusing on the quality of the data available and the associated assumptions that were required, and evaluating the adequacy of the ERT set for each individual fishery.

Section 4 examines issues associated with selecting the target groups, beginning with a method of apportioning the \$31.8m cost of the buyout between the 5 affected fisheries and analysing the selection of the tender group in each individual fishery.

The effectiveness of the buyout in managing any displaced fishing effort that has unsustainable ecological or economic impacts is examined in Section 5. The implications of the latent effort in the net and crab fisheries on the effectiveness of the buyout – in particular the assumption that effort acquired during the buyout will be permanently removed from the fishery - are assessed, and possible options for dealing with latent effort in any future buyout discussed. The link between the buyout and fisheries management arrangements is identified, and the section concludes with a review of the cost effectiveness of the buyout on an individual fishery-basis.

Conclusions from this analysis and recommendations for any future buyout should a new marine protected area be implemented are presented in Section 6.

## 2. THE SETTING OF EFFORT REDUCTION TARGETS FOR EACH FISHERY AND THE EXTENT TO WHICH THEY WERE ACHIEVED

DEH, as lead agency in the implementation of the SAP, established a Technical Advisory Committee comprised of Australian and Queensland Government officials and commercial fishing industry representatives to provide advice on the implementation of the licence buyout. The Technical Advisory Committee identified thirteen commercial fisheries impacted by the rezoning which it then categorised into three separate groups:

- 6 fisheries - inshore net, mud crab, trawl, coral reef, Spanish mackerel and other reef line fisheries - were considered to be fully fished, such that areas unaffected by the rezoning were considered incapable of accommodating effort displaced by the rezoning without having unsustainable ecological and/or economic impacts. The intent of the licence buyout in these fisheries was to remove an equivalent amount of effort (as measured by catch) to that displaced as a result of the rezoning.
  - For example, 14% of the mud crab catch was estimated to have been taken from areas now closed to fishing. The buyout in the mud crab fishery was thus designed to remove effort equivalent to 14% of the mud crab catch.
- 3 fisheries - the prawn broodstock collection fishery and the aquarium fish and coral collection fisheries - were considered to be more suitably assessed under the Fishery Related Business criteria of the SAP due to their relatively large capital investment in shore-based infrastructure and were considered ineligible for the licence buyout. These three fisheries are not considered further in this report; and
- 4 fisheries - spanner crab, rock lobster, trochus and beche-de-mer - were considered capable of accommodating effort displaced as a result of the rezoning in remaining areas of the fishery without experiencing unsustainable ecological and/or economic impacts. Licence holders from these fisheries were still entitled to participate in the tender process and DEH retained the right to accept tender offers on such licences but in the context of the tender these were not considered priority fisheries.

### 2.1: Methods used to set Effort Reduction Targets

For the 6 fisheries considered as being fully fished, Effort Reduction Targets (ERTs) were estimated to identify the level of effort displaced by the rezoning. Given the different levels of data available in these six fisheries, the actual method used to estimate the ERT varied, but for each fishery the ERT calculations were based on using what was considered to be the best available data.

#### 2.1.1: The net fishery<sup>1</sup>

The gross value of production (GVP) of the net fishery was estimated based on reported logbook catch data and standard prices, and the share of the catch taken from the rezoned areas estimated using available logbook data reported in 6 nautical mile (nm) format adjusted to represent the distribution of the catch between GBRMP and State waters<sup>2</sup>.

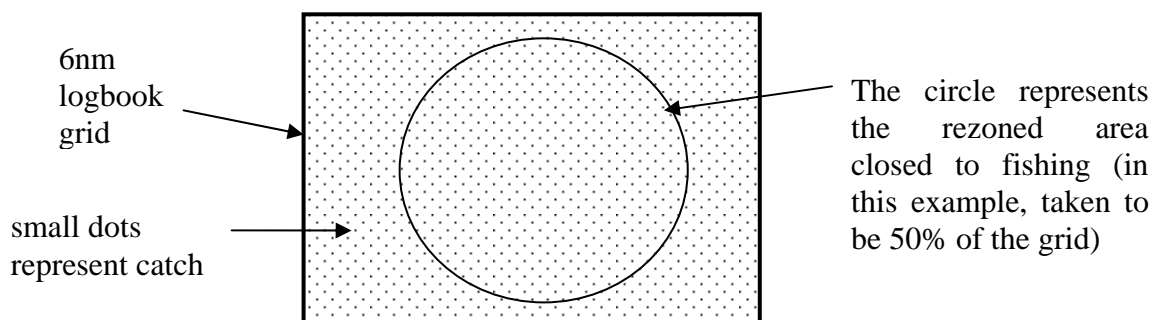
<sup>1</sup> formally known as the Queensland East Coast Inshore Finfish Fishery, but referred to throughout this report as the net fishery

<sup>2</sup> Logbook reporting requirements changed during the assessment period to require catch to be reported in 6nm grids compared to the former 30nm grids. Approximately 60% of the GVP reported during the assessment period for the net fishery is in 6nm scale.

### Distribution of catch within each grid

A key assumption in the approach used to estimate the share of the catch taken from the rezoned areas is that catch is uniformly distributed throughout each grid (Figure 1).

**Figure 1: Assumption that catch is uniformly distributed throughout each grid**



If the catch in a particular grid was 10mt (the grid being the rectangle shown in Figure 1) and 50% of that grid was rezoned (as represented by the circle), then it is assumed that 50% of the catch was taken from the rezoned area – in this example 5mt.

### Separating the GBRMP catch from the catch taken in State waters

Estimation of the ERT in the net fishery was complicated by an Australian Government-Queensland Government jurisdictional issue, in that the GBRMP boundary – and thus the extent of Australian Government jurisdiction - is defined by the average low tidal mark. The inter-tidal zone – the area between the low and high tidal marks – is outside the GBRMP boundary and under Queensland State Government jurisdiction.

- In some areas, the inter-tidal zone – and associated mangroves and mudflats – covers a considerable area and represents highly productive grounds for mud crabs and some inshore finfish species.
- The same jurisdictional issue arises in respect to estuaries - some of which are also productive fishing grounds for mud crabs and some net species - which are also under State jurisdiction.

Both State and Australian Government agencies were involved in the early stages of the RAP but Queensland withdrew from the process in 2002 after the first round of public consultations (Thompson, Jago, Fernandes and Day undated). In effect, the Queensland Government ‘chose to defer any decisions on the zoning of State waters until after major Australian Government decisions under the RAP was finalised’ (Queensland Government 2004).

In July 2004 the Queensland Government subsequently decided to implement complementary zoning in adjoining State Government waters, such that the zoning rules in State waters were to mirror those applying in adjacent GBRMP waters. The Queensland Government took the view that these changes were forced on the State by the Australian Government’s RAP program, that as a result the Australian Government had an obligation to compensate commercial fishers disadvantaged by the change, and encouraged disaffected fishers to take advantage of the Commonwealth’s compensation offer (Mickel 2004 a, b).

The Australian Government held a different view and considered that the rezoning of State waters was a State issue, that the State Government had financial responsibility to assist fishers disaffected by the change, and that it was ‘outrageous’ for the State

Government to encourage disaffected fishers to seek compensation from the Australian Government (Campbell 2004 a, b, c).

The two governments were unable to resolve their difference of opinion such that the licence buyout – and indeed the entire SAP - only applied to waters inside the GBRMP.

This complicated the calculation of the ERTs for the net and crab fisheries, for the inter-tidal areas are highly productive net and crab fishing grounds. Logbook data makes no distinction between GBRMP and State waters, and with the SAP only applying to effort displaced from the GBRMP, logbook data needed to be adjusted to separate the GBRMP catch from the catch taken in State waters.

- In the net fishery, this was achieved by apportioning the 6nm logbook data according to the relative shares of sea and land in each respective 6nm grid. For example, if a grid was 80% sea and 20% land, then 80% of the catch from that grid was assumed to have come from the GBRMP and 20% from State waters: if a grid was 60% sea and 40% land then 60% of its catch was assumed to have come from the GBRMP and 40% from State waters, and so on.

#### Estimating the ERT

For each grid, the estimated catch in the GBRMP - obtained using this GBRMP-State apportionment approach - was multiplied by the percentage of that grid that was rezoned to derive an estimate of the catch taken from the GBRMP rezoned area. The results from each grid were then added to estimate the total share of the GBRMP catch taken from the rezoned areas.

- Using this approach, 14.5% of the catch of the net fishery was estimated as having come from the rezoned areas. The net fishery ERT was thus set at 14.5%.

The GVP of the net fishery over the four-year assessment period to 8 April 2002<sup>3</sup> was estimated by multiplying logbook catch data from the net fishery over that four year assessment period by standard prices set for each key species. The resulting GVP was estimated to be \$51.4m over the four years, or \$12.9m/year on an annual basis.

- The ERT was expressed in GVP terms by applying the 14.5% catch figure to the estimated \$51.4m four-year GVP, which equated to the removal of \$7.5m of the net catch over the four year assessment period (or \$1.9m/year).

#### **2.1.2: The crab fishery**

The approach used to estimate the ERT for the Queensland mud crab fishery (hereafter referred to as the crab fishery) was similar to that used for the net fishery, but with an additional adjustment in which the end figure was reduced by a further 33.3% to account for the higher abundance of mud crabs in the inter-tidal zone.

- Using this approach, an estimated 14.2% of the GBRMP crab catch was identified as having been taken from the rezoned areas. The ERT for the crab fishery was thus set at removing 14.2% of the GBRMP effort.
- The estimated GVP of the crab fishery – derived using the same approach used for the net fishery but based on a three year assessment period to 30 June 2003 – was \$28.4m, or \$9.5m/year.

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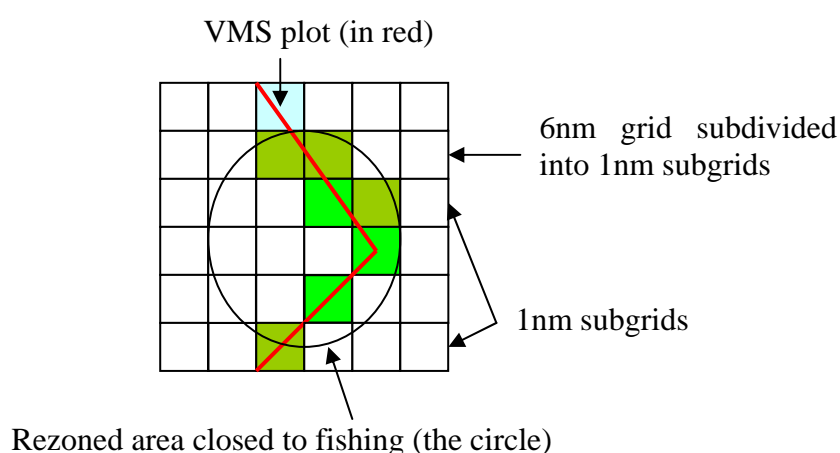
<sup>3</sup> This assessment period was chosen to be consistent with a separate DPI&F process aimed at addressing latent effort issues in the fishery through the removal of underutilised net endorsements.

Applying the 14.2% catch figure to the estimated \$28.4m three-year GVP, the ERT for the crab fishery was set at removing just over \$4m in GVP over the three year assessment period, or around \$1.3m/year.

### 2.1.3: The prawn trawl fishery

For the Queensland East Coast Otter Trawl fishery (hereafter referred to as the prawn fishery), the ERT was estimated using a similar method to that used for the net and crab fisheries but using data at a finer scale based on vessel position data obtained through the vessel monitoring system (VMS). VMS data is available for the prawn fishery on a 1nm basis from 1 January 2001 onwards, and this VMS data was applied to the 6nm catch data from the logbooks to estimate the distribution of trawl catch on a 1nm basis within each 6nm grid.

**Figure 2: The fine-scale methodology using VMS data<sup>4</sup>**



Under this approach, each 6nm grid was subdivided into 36 1nm grids, and a vessel's reported logbook catch within each 6nm grid was assumed to be spread uniformly along the number of 1nm subgrids crossed by that vessel's VMS track. For example, if the catch of a vessel within a 6nm grid was 800kg and the VMS data indicated the vessel passed through 8 1nm subgrids (the shaded grids in Figure 2), it was assumed that the 800kg catch was divided equally among the 8 subgrids crossed such that each subgrid was assumed to have contributed 100kg of catch.

An estimate was then made of the number of subgrids along the VMS plot that are inside the rezoned area. In Figure 2, this is represented by three full grids (shaded green) and part of four other grids (shaded olive). The proportion of these partial grids inside the rezoned area was then estimated and the total area of the sub-grids inside the closed area expressed as a percentage of the total subgrids crossed. In this example, the four portions are estimated to be equal to three full grids, such that an estimated 6 complete grids are in the rezoned area. With each grid contributing 100kg, this is taken as meaning that the rezoning accounts for 600 of the 800kgs caught by that vessel in that 6nm grid.

This exercise was completed for each vessel in that 6nm grid and the results added to estimate the share of the catch taken in that grid from the rezoned areas. This was then repeated for each 6nm grid, and the results from each grid then added to estimate the share of the total catch taken from rezoned areas.

<sup>4</sup> This methodology was developed as part of FRDC Project 2002/056, Innovative stock assessment and effort mapping using VMS and electronic logbooks (source: Peel and Good (undated))

- Using this approach, 6.2% of the prawn catch was estimated to have been taken from rezoned areas. The ERT for the prawn fishery was thus set at removing 6.2% of the effort in the fishery.

#### Expressing the ERT in terms of effort units

Unlike the inshore fisheries where latent effort is an issue - such that the ERT needed to be set in terms of GVP – underutilisation of effort units in the trawl fishery is considered minimal (DPI&F 2004). Accordingly, the ERT for the trawl fishery was set not in terms of GVP but in terms of effort units.

- The ERT was set at removing 6.2% of the available 2.2 million effort units allowed to operate in the GBRMP, which equated to removing 136,400 effort units. Given a then market value of \$50/unit, the ERT equated to the removal of \$6.8m in capital from the fishery.

#### **2.1.4: The line fisheries**

Substantial management changes were implemented in the GBRMP line fisheries in the 12 months prior to the rezoning taking effect on 1 July 2004.

- The Coral Reef Fin Fish fishery (hereafter referred to as the coral reef fishery) – covering coral trout, red throat emperor (RTE) and other reef species - was established as a separate fishery in December 2003, at which time the number of operators entitled to operate in the fishery was reduced from the 1700 previously licensed line fishers to 412 coral reef endorsed fishers (with a corresponding newly established RQ endorsement). Individual transferable quotas were subsequently introduced on 1 July 2004 - coinciding with the rezoning taking effect – and the allowable commercial catch set at 3061mt, this being based on the 1996 catch and significantly below the 2002 harvest of 4500mt.
- Similarly, the East Coast Spanish Mackerel fishery (hereafter referred to as the Spanish mackerel fishery) was established as a separate fishery in early 2004 and the number of eligible operators reduced to around 300. ITQs were introduced on 1 July 2004, with the commercial total allowable catch set at 620mt, this being based on the average annual catch from 1992/93-2000/01 but lower than the catch that was being taken at that time.
- The management arrangements for those species not covered by the coral reef and Spanish mackerel fisheries – referred to as ‘other line’ species – were not directly changed and licensed line fishers could continue to catch ‘other line’ species as before. However, given that much of the other line fishing was undertaken as an adjunct to fishing activities in the coral reef or Spanish mackerel fisheries, the management changes in these two fisheries had a substantial indirect effect on the level of fishing activity in the other line fishery.

#### Estimating the catch taken in rezoned areas

Using catch logbook information and applying the same process to that used for the inshore fisheries, the estimated catch displaced by the rezoning was estimated at 18.4%.

However, given the substantive changes in catch and effort resulting from the introduction of ITQs, logbook data pertaining to the pre-ITQ fishery was of little benefit in forecasting the impact of the rezoning in a post-ITQ fishery. An approach needed to be found that was capable of isolating the impacts of the rezoning from the impacts of these other changes.

*The Coral Trout Fishery*

Fortunately, at the time of the buyout a quantitative modelling study designed to evaluate the impacts of alternative management strategies in the coral reef fishery was nearing completion (Mapstone et al 2004). The study – hereafter referred to as the ELFSIM project - estimated the long-term (25 year) biological and economic impacts of various levels of fishery closures and effort level reductions in the coral trout sector of the fishery. Two scenarios in which effort was restricted to its 1996 level – the corresponding level of effort on which the TAC was set – were of particular interest:

- i) a scenario in which around 16% of the reef perimeter was closed to line fishing. In the context of the SAP this scenario was interpreted as representing the fishery operating under the old zoning arrangements; and
- ii) a scenario in which around 30% of the reef perimeter was closed to line fishing, which in the context of the SAP was interpreted as representing the fishery operating under the new rezoning arrangements (around 32% of the reef perimeter is closed to line fishing under the new zoning) (Larcombe undated).

Comparing the model results from these two scenarios, the coral trout line fishery operating under the new zoning arrangements was forecast to experience an 11% fall in CPUE and a 10% decline in catch relative to estimates of how the fishery would have performed under the old zoning.

Based on this result, the ERT for each sector of the coral reef fishery – coral trout, RTE and other reef species – was set at 10%. Expressed in terms of quota, and with initial TACs of 1350mt, 700mt and 1011mt respectively, the ERTs were set at removing 135mt of coral trout quota, 70mt of RTE quota and 101mt of other reef fish quota.

*The Spanish mackerel and other line fisheries*

In the absence of any other information, the ERTs for the Spanish mackerel and other line fishery were also set at 10%. Given a Spanish mackerel TAC of 620mt, this equated to 62mt of quota, while given the other line GVP of \$18m – based on reported logbook data and using standard prices - the ERT for the other line sector was set at \$1.8m.

**2.2: Selection of the target groups in each fishery**

The Australian Government announced details of the SAP on 30 June 2004 and by the November 15 2004 closing date, 584 tenders had been submitted by fishers wanting to participate in the licence buyout.

These 584 tenders were then evaluated to identify those groups of tenders that met the respective ERTs for each fishery at least cost.

**2.2.1: The net fishery**

The buyout attracted tenders from 193 active net-endorsed licence-holders - active being defined as having reported some net catch from the GBRMP at some time during the four year assessment period.

- Given an estimated 385 active net fishers at the time, around 50% of active net fishers submitted a tender.
- These 193 tenderers accounted for \$31.6m in GVP over the four year period – or just over 60% of the total GVP over that period.

In a separate process implemented by DPI&F in 2004/05, ongoing access to the net fishery was restricted to those licence-holders that could demonstrate having caught

500kgs or more in at least three of the four years from 1998-2002 or at least 3mt over those four years. Licences were assessed against the eligibility criteria at the time of their annual renewal. This process ultimately achieved a 40% reduction in the number of net licences (DPI&F 2005).

Although the buyout preceded the completion of the DPI&F process, only those licence-holders that were deemed likely to satisfy the eligibility criteria were considered eligible.

- Of the 193 net-endorsed licence holders that submitted tenders, 44 were excluded because they did not meet the ongoing eligibility criteria.

The key criterion in ranking the remaining 149 tenders was value for money – defined in the tender documentation as ‘the amount of GVP being removed for the price sought’ (DEH 2004).

The market rate for net licences at the time of the buyout ranged from \$50,000-\$100,000 depending on the additional endorsements held on that licence and the level of catch history (licences with a good catch history commanded a premium in the expectation that a future allocation process may be based to some extent on catch history). To avoid paying excessively above market values, DEH established criteria to determine whether the offer price for net licences was set at a reasonable market price, based on a ceiling tender price for a combined net and crab licence of \$250,000.

- The ceiling price did not apply to licence-holders that were particularly affected by the rezoning – if more than 25% of the licence’s GVP was sourced from the rezoned areas, the licence could still be considered for the buyout even if its offer price exceeded the \$250,000 ceiling.
- This reasonable offer price criteria excluded a further 33 of the remaining 149 net tenders from further consideration as their offer price was considered to exceed reasonable market price.

ABARE was contracted by DEH to assess the remaining 116 net tenders on the basis of value for money. ABARE developed an algorithm to identify that set of tenders that satisfied the net fishery ERT – to remove \$7.5m in GVP - at least cost.

- 38 active netters were identified with a combined net fishery GVP of \$7.6m.

#### Secondary considerations

Consistent with the tender documentation, the target group of 38 licences was reviewed against two secondary criteria:

- i) whether the regional distribution of effort from the target group reflects the current spread of industry effort and the likely distributional impacts of the rezoning; and
- ii) whether the target group’s catch of different species represents the potential impacts of the rezoning at the species level.

#### *Regional distribution*

The regional implications of the rezoning – and of the buyout – were assessed by subdividing the GBRMP into 8 regions<sup>5</sup>. For each region the GVP taken from rezoned areas was identified – using the same logbook data used to determine the ERT – and expressed as a percentage of the total fishery GVP taken from the rezoned areas over the

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<sup>5</sup> These 8 regions were: 16.5°-north (Port Douglas north); 16.5°-17.5° (Port Douglas–Innisfail); 17.5°-18.5° (Innisfail–Lucinda); 18.5°-19.5° (Lucinda–Ayr); 19.5°-20.5° (Ayr–Shaw Island); 20.5°-21.5° (Shaw Is–Glendower Pt); 21.5°– 23° (Glendower Pt–Yeppoon); and 23°-24.5° (Yeppoon–Baffle Ck).

four year assessment period. This same percentage was then applied to the ERT - \$7.5m – to determine regional ERTs.

Mindful of the latent licences in the fishery, the regional ERTs, and the perceived limited mobility of net fishers, DEH established a secondary ERT for the net fishery - - the removal of 14.5% of the 385 net endorsements active at that time - equating to the removal of 56 licences.

The regional distribution of effort from the 38 licences identified by the ABARE algorithm was compared against the regional ERTs. In response to some regions being under-represented, and consistent with the secondary goal of removing 56 licences, a second-round selection process was implemented that identified an additional 18 net licences to be purchased. Seven of these additional licences were identified as offering good value for money in reducing regional shortfalls and the balance (up to the 18) were selected based on cost-effectiveness (though a few cheap licences were overlooked on the basis they did not represent adequate value for money). The net fishery GVP of these 18 additional licences totalled just over \$1m.

The end result of the buyout in the net fishery was the removal of 56 active net licences representing a combined GVP of \$8.6m.

Of the initial 193 net licences tendered:

- ii) 44 were excluded for not meeting the DPI&F eligibility criteria;
- iii) 33 were excluded for exceeding the reasonable market price criteria;
- iv) 56 were accepted; and
- v) 60 were considered but not accepted.

#### *Species considerations*

Following the completion of the buyout, DEH subsequently purchased two additional net licences. Both licences caught considerable quantities of shark and were purchased to address concerns that shark catches had been under-represented in the original buyout. Given that these licences were purchased outside the context of the buyout, they are not considered further in this report.

#### **2.2.2: The crab fishery**

The buyout in the crab fishery attracted tenders from 167 ‘active’ crabbers – active defined as having had some reported logbook catch from the GBRMP during the three year assessment period. These 167 crabbers accounted for 60% of the crab catch reported in those three years.

Of these 167 tenders, 33 were excluded since their offer price did not meet the reasonable market price criteria (the \$250,000 ceiling for net and crab licences described earlier). The remaining 134 tenders were then assessed on the value for money criteria as used for the net fishery.

The ABARE algorithm tasked with selecting the least-cost combination of crab tenders to meet the \$4m ERT identified 43 licences with a combined GVP of \$4.04m.

#### Secondary regional targets

The same procedure used for the net fishery was used to set regional targets for the crab fishery. An analysis of the catch distribution of the 43 operators identified in the ABARE algorithm against these regional targets identified a number of regions where the target

had not been met. Consequently, 13 additional licences were selected and added to the buyout list. Thus, of the initial 167 crab tenders:

- i) 33 were excluded for not meeting the reasonable market price criteria;
- ii) 43 were accepted on the basis of representing best value for money;
- iii) a further 13 were accepted to satisfy secondary regional targets; and
- iv) 78 were considered but not accepted.

The end result of the buyout in the crab fishery was the removal of 56 crab licences, representing a combined crab GVP of \$5.6m.

### **2.2.3: The prawn fishery**

Of the 235 trawler operators that tendered:

- i) 21 were accepted;
- ii) 167 were considered but not accepted;
- iii) 39 were rejected on basis of having no GBR GVP; and
- iv) 8 were rejected as no longer having access to the fishery having sold their licence/all effort units.

Virtually all trawl licences submitted for tender had restricted access to the line fishery (allowing the use of only 1 tender vessel) and around 15% had access to the crab and net fisheries. In the vast majority of cases these other endorsements were not utilised.

#### Selection criteria

Of the 188 valid tenders, the ABARE algorithm was used to select 21 trawl licences representing 136,462 effort units - thus satisfying the ERT target of 136,400 units.

Price was the key criterion in selecting the prawn trawl tenders – 19 of the 21 licences acquired were the 19 cheapest tenders, on a price/effort unit basis. The remaining two licences were selected not on the basis of price/unit but in order to meet the remaining balance of the ERT at the least cost:

- the 19 cheapest price/unit tenders provided 131,883 effort units, leaving 4517 more units to be acquired to satisfy the 136,400 ERT. The question then became how to acquire 4517 units at the lowest cost.
- this was achieved by selecting two further tenders whose combined unit holdings totalled 4579 units. These two licences were not the cheapest available on a price/unit basis – other licences with a cheaper price/unit but larger unit holdings were overlooked, as they were not the least cost option of acquiring the remaining 4517 units required.

Having made the earlier assumptions that the goal of the buyout was to remove an equivalent amount of effort from the fishery as affected by the rezoning, it was appropriate that price be used as the key determinant in choosing the successful tenders. However, some inconsistencies were encountered at the margin, in that priority was given to paying a higher price/unit for two relatively small unit holdings compared to paying a higher overall amount - but at a lower price/unit – for larger unit holdings.

Notwithstanding this issue at the margins, the approach used to satisfy the prawn fishery ERT in the most cost effective manner – that is, at least cost – is supported.

### 2.2.4: The line fisheries

#### *The Coral Trout fishery*

There were 191 tenders submitted by licensed reef line operators. Of these:

- i) 32 were rejected as their catch history was limited to other line species or spanner crabs only;
- ii) 7 were rejected on the basis that they were predominantly net and/or crab operators and that their offer price exceeded the \$250,000 maximum net/crab bid criterion as previously explained; and
- iii) 152 were assessed using the ABARE algorithm which resulted in:
  - tenders being accepted from 45 RQ holders, representing quota holdings of 135mt of coral trout (42 fishers), 73mt of RTE (43 fishers) and 103mt of other reef species (42 fishers); and
  - 107 tenders being rejected on the grounds of being not cost-effective.

#### *The Spanish mackerel fishery*

There were 116 Spanish mackerel quota holders that submitted tenders. Of these:

- i) 1 was rejected for not having GBR GVP;
- ii) 12 were rejected on the basis that they were predominantly net and/or crab operators and that their offer price exceeded the \$250,000 maximum net/crab bid criterion; and
- iii) 103 were assessed for cost-effectiveness using the ABARE algorithm, resulting in:
  - 35 being selected as the most cost-effective means of satisfying the ERT;
  - a further 4 being included as part of the additional 18 inshore licences selected to address regional concerns; and
  - 64 tenders being rejected for having a less than competitive offer price.

The initial 35 licences selected by the ABARE algorithm represented 64.3mt of Spanish mackerel quota with a notional GVP of \$2m, satisfying the respective ERTs of 62mt and \$1.95m. The additional four mackerel licences bought-out in association with the inshore licences represented a further 3mt of quota and \$100,000 in notional GVP. The end result of the buyout in the mackerel fishery was thus the acquiring of 39 endorsements and 67.4mt of quota.

#### *The 'Other Line' fisheries*

More than half of all valid tenders had 'other line' GVP and it was estimated that any set of offers would meet the 10% ERT of \$1.8m. Consequently, the value of other line GVP was excluded from the analysis. The additional cost thus incurred in achieving the 'other line' ERT was zero.

### 2.3: Were the ERTs achieved?

The licence buyout, finalised in late 2004/early 2005, achieved the respective ERT for each fishery (Table 1).

**Table 1: ERTs by fishery set for the Licence Buyout**

<b>Fishery</b>	<b>ERT (% of effort/catch/ units/quota)</b>	<b>ERT (GVP/units/quota)</b>	<b>GVP/units/quota removed</b>	<b>ERT achieved?</b>
Net	14.5% (of effort/catch)	\$7.5m in GVP over 4 years (\$1.9m/year)	\$8.6m	YES
Crab	14% (of effort/catch)	\$4m in GVP over 3 years (\$1.3m/year)	\$5.6m	YES
Prawn	6.2% (of trawl units)	136,400 units	136,462 units	YES
Coral Trout	10% (of quota)	306mt of quota <sup>6</sup>	311mt of quota <sup>3</sup>	YES
Spanish Mackerel	10% (of quota)	62mt of SM quota	64.3mt of quota	YES
Other Line	10% (of quota)	\$1.8m in GVP	\$3.4m in GVP	YES

Remaining sections of this report evaluate the apparent success of the buyout in more detail. Particular attention is given to the adequacy of the ERTs, the selection of the target groups in each fishery, and the extent to which effort acquired during the buyout was permanently removed from the fishery.

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<sup>6</sup> represents total quota for coral trout, red throat emperor and other quota species

### **3. ISSUES RELATING TO THE SETTING OF EFFORT REDUCTION TARGETS**

As was noted in the Introduction, the objective of the licence buyout was to manage in the most cost-effective manner any displaced fishing effort that has unsustainable ecological or economic impacts.

This objective is appropriate. However, operationalising this objective is problematical, largely due to limitations in the available data in each of the fisheries targeted in the buyout. None of the fisheries had access to catch data on a sufficiently fine-scale spatial level to definitively calculate an ERT such that various assumptions had to be made to estimate the ERTs.

This first part of this section reviews the assumptions that had to be made as a result of the limitations in the available data. The latter part of this section makes specific comments on the ERTs used in each individual fishery.

#### **3.1: Underlying assumptions used to estimate the ERTs**

##### **3.1.1: That the logbook data is correct**

The logbook data is the sole source of catch information for all targeted fisheries and the sole source of vessel position information for the net and crab fisheries. The analysis assumed that the logbook data was correct and no attempt was made to verify any of the logbook data. Should logbook data misrepresent either total catch or the location of the catch, the resulting ERT will be biased.

It is relevant to note that Huber (2003) previously raised doubts about the accuracy of reported logbook data in the prawn fishery and suggested that the logbook data be independently validated, such as through an at-sea observer program or the auditing of processor records of landed catch.

However, data verification is a costly and time-consuming process. Huber, for example, did not comment on the cost-effectiveness of verifying the prawn data. Given the scale of the buyout – 584 tenders scattered over a number of ports and involved in a number of fisheries over a multi-year assessment period - and the tight timeframes applying to the buyout, it would have been near impossible to verify the logbook data within the time available. Further, verification would have been relevant only to the estimate of the total catch and not to the proportion of catch taken in the rezoned areas.

- Given these limitations, the use of unverified logbook data in the SAP is supported.

##### **3.1.2: That catch is uniformly distributed according to known vessel positions**

For the net and crab fisheries, information on a vessel's position was obtained through logbook records. If a vessel reported catch from a certain grid, the vessel was assumed to have been in that grid, and the reported catch was assumed to have been caught uniformly throughout that grid.

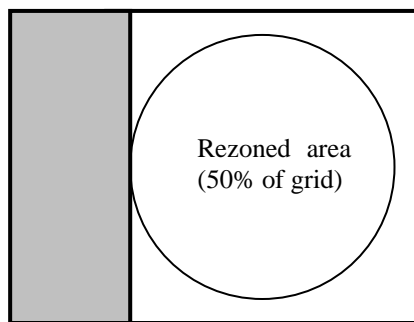
For the prawn fishery, vessel position data was obtained through VMS and if a vessel reported catch from a certain grid, the reported catch from that particular grid was assumed to have been caught uniformly throughout the vessel's VMS plot from that grid.

### The net and crab fisheries

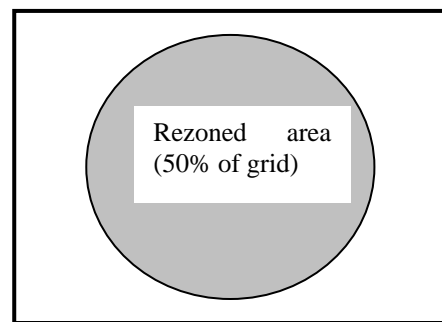
In reality, catch will rarely if ever be spread uniformly throughout a grid. Continuing the example used in Figure 1 (section 2.1.1) in which 50% of a 6nm grid is rezoned and closed to fishing:

- at one extreme, there may be grids where all the catch is taken from the 50% of the grid that remains open to fishing, such that the closure will have no impact on catch. The impact of the rezoning in this case is zero (as depicted in Figure 3 with the shaded area representing the high catch area).
- at the other extreme, there may be grids in which the rezoned area coincides with the fishing hotspot of that grid, such that then 100% of the catch could be affected (Figure 4).

**Figure 3: Catch sourced totally from outside the rezoned area**  
(true impact of the rezoning is zero)



**Figure 4: Catch sourced totally from inside the rezoned area**  
(true impact of the rezoning is 100%)



shaded areas represent high catch areas

The true impact of the rezoning in each grid depends upon the manner in which catch is distributed throughout that grid in relation to the rezoned area. Herein lies the problem – the data required to accurately distribute catch throughout the grid is simply unavailable.

- In the absence of any data to indicate the true distribution of catch, the assumption used in the buyout for the net and crab fisheries that catch is uniformly distributed throughout each grid is supported.

### The prawn fishery

The prawn fishery has additional data available – the VMS data - on which to draw conclusions regarding the distribution of catch within each 6nm grid. Using VMS data to distribute catch is predicated on two assumptions:

- that catch within each 6nm grid is spread uniformly along the number of 1nm subgrids on the VMS plot; and
- that the VMS position data can be interpreted as indicating where the vessel has been fishing on a 1nm basis.

The first assumption is really an extension of the assumption used for the net and crab fisheries that catch is uniformly distributed throughout each 6nm grid, though on a finer geographical scale. Similarly, the second assumption is really an extension of the assumption used in the net and crab fisheries that fisheries logbook indicates where a vessel has been fishing - and is likely to be improvement given that VMS data is likely to be a better indicator of vessel position than logbook data.

The principles underlying the two approaches – the 6nm approach and the VMS approach - are the same, in that an estimate is made of where the vessel has been fishing and catch is then uniformly distributed across that estimated fishing area. Both approaches also share the common use of catch data reported in 6nm format.

- The sole difference between the two approaches is the data used to identify the position of the vessel:
  - the net and crab fisheries base the vessel’s position on the 6nm grid in which catch is reported on the logbook;
  - the prawn fishery uses the VMS data.

Applying the same approach in the prawn fishery as that used for net and crab – based only on the 6nm logbook data – produced an ERT estimate of 10.5%. That the finer scale 1nm grid analysis produced a lower estimated impact - 6.2% - suggests that the vessel position reports - and hence catch - were more concentrated in the areas that remained open to fishing rather than in the closed areas. This result implies that the pattern of fishing effort in the trawl fishery over the 2.5 year assessment period is more similar to the situation portrayed in Figure 3 rather than Figure 4<sup>7</sup>.

Industry representatives consistently opposed the use of VMS data to fine-tune the logbook data and voiced concern when the concept was first suggested at a meeting of the Technical Advisory Committee. Industry argued that the same approach used for net and crab – based on the 6nm logbook data – should have also been used for prawn.

FERM does not support the industry position. Instead, FERM argues that the VMS approach is an extension of the 6nm approach, that VMS data is a more reliable indicator of vessel position than logbook data, and that DEH was obliged to estimate the ERTs using the best available information – that is, using the available VMS data.

- The use of VMS data to estimate the ERT in the prawn fishery is supported.

### **3.1.3: That displaced effort is limited to effort from the rezoned areas only**

Formerly, an operator’s fishing strategy on any particular trip may have included fishing in both rezoned and unchanged areas. In some cases, that trip may no longer be viable following the rezoning of some of the former fishing grounds from that trip.

- This situation is more likely to occur with closures introduced on more distant fishing grounds, in that the operator now has less grounds available to fish and thus less opportunity to experience high catches – or conversely, less opportunity to spread the risk of a poor catch. The risk of a reduced overall catch may be too high to justify the costs of travelling to those grounds.

Effort displaced as a result of the rezoning may thus include effort from both the rezoned areas and the complementary areas formerly fished but no longer viable on their own.

DEH advise that some operators have used this argument to claim financial support to help their business adjust to changed economic conditions under the Full Business Restructuring Component of the SAP but note that this has not been a common request.

The difficulty in taking this interconnectedness into account when estimating the level of displaced effort is acknowledged. It is also acknowledged that this scenario is more likely to apply to the prawn fishery – where vessels are relatively more mobile and travel

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<sup>7</sup> This result is also consistent with the position stated by Government officials that where possible, the boundaries of the closed areas were chosen so as to avoid known fishing areas. Industry representatives did not share this view.

greater distances – than to the more localised net and crab fisheries, and that only a relatively small number of operators may be affected.

- The decision not to include this effect into the ERT calculations is supported. However, this issue should have been taken into account when interpreting the ERT result for the prawn fishery (this is discussed in more detail in section 3.2.3)

#### **3.1.4: That the available fine-scale data – 6nm logbook data for net and crab and VMS data for trawl – accurately reflects long term fishery performance**

For the net and crab fisheries, coverage of the 6nm logbook data was limited - approximately 50% for net and 60% for crab – and it was assumed that the sample of vessels for which the 6nm data was available was representative of the total fleet.

In the case of the prawn fishery, the VMS data was only available for a limited timespan – two and a half years. It was assumed that the spatial distribution of effort observed during this time span reflected true long-term spatial distribution patterns.

DEH advise that the Technical Advisory Committee considered the representativeness of the available data and was satisfied that the total fishery performance over the chosen assessment years appeared ‘typical’ for each fishery. In other words, the Technical Advisory Committee was satisfied that the chosen snapshot was consistent with longer-term fishery performance:

- In the net and crab fisheries, the 6nm data was found to represent more recent information for a large number of vessels and the Committee considered the recent net and crab catch to be reasonably consistent with previous years.
- In the prawn fishery, the Committee considered that the areas used by trawlers in recent years were broadly similar to historical fishing patterns.

The Technical Advisory Committee’s assessment that the data sufficiently reflected long-term fishing patterns is accepted.

#### **3.1.5: That the adjustments made to the inshore fisheries adequately reflects the sharing of catch between State and GBRMP waters**

As previously outlined, the buyout only applied to GBRMP waters and an additional adjustment was needed in the net and crab fisheries to separate the catch taken in the GBRMP from the catch taken in State waters. The approaches used in the net and crab fisheries to separate GBRMP and State catch have already been described (Sections 2.1.1 and 2.1.2).

Three earlier studies faced this same issue and either apportioned catch using an arbitrary figure or otherwise declined to differentiate:

- Hand (2003) shared the catch of those grids adjacent to the coast 50:50 between GBRMP and State waters, using the same approach for both the net and crab fisheries;
- Hundloe, McPhee and Toon (undated) assumed that all the mud crab catch is taken in State waters but did not differentiate the catch for the net fishery;
- GBRMPA (2003b) did not differentiate catch for either fishery.

The reality of the situation was that there was simply no quantitative information available to separate GBRMP catch from State catch. In such a data poor situation, whatever approach is used will be largely a subjective decision. That the approach used in the buyout was supported by the Technical Advisory Committee is significant.

- An alternative approach would have been to consult with industry and use local knowledge to designate relative shares on a grid-by-grid basis. However, this process may have been more time consuming, would still have been subjective, and results may have been biased given the incentive for industry to overstate the share of the GBRMP catch.
- In this context, the approach used in the buyout of linking the share of the State catch with the relative share of land in the grid appears reasonable.

The decision to make a secondary adjustment for the crab fishery to reflect the known high crab productivity of the inter-tidal and estuary areas is also considered reasonable. There is no information on which to assess whether 33.3% was an appropriate secondary adjustment, but it is relevant to note that the figure would have been 100% - meaning that the ERT for the crab fishery would have been set to zero - had the approach used by Hundloe, McPhee and Toon been followed.

### 3.2: Specific comments on the ERTs for each fishery

In principle, the methodologies used to calculate the ERTs for the net, crab and prawn fisheries are sound and the calculations were made using the best available data. However, this best available data still had substantial limitations. Because of these limitations, the ERTs produced from those calculations should have been viewed as an indicative rather than precise estimate of the effort to be removed from each fishery.

The situation is comparable to much of the quantitative fisheries modelling of 10-15 years ago, when the best available – yet still highly uncertain - data was used to generate single point estimates of biomass or maximum sustainable yield. The contemporary practice is for models to take account of uncertainties in the data and to present the associated confidence intervals for any results.

#### 3.2.1: The net fishery

In principle, the methodology used to estimate the ERT for the net fishery is sound. The main uncertainties in the estimated ERT for the net fishery arise from the assumption that catch is uniformly distributed throughout each grid and from the subjective method used to separate the GBRMP catch from the State catch. The resulting estimate is lower than the two other estimates of the level of disaffected net effort due to the rezoning (Table 2).

**Table 2: Alternative estimates of displaced effort in the GBRMP net fishery**

Source	Estimated level of displaced catch (%)
Hand (2003)	22 <sup>a</sup>
GBRMPA (2003b)	21 <sup>b</sup>
<b>Licence buyout</b>	<b>14.5</b>

a: the Hand estimate is based on the assumption that the catch from those logbook grids adjacent to the mainland is shared 50:50 between GBRMP and State waters;

b: the GBRMPA estimate is based on total net fishery catch inclusive of State waters, such that GBRMPA's estimate of the proportion of GBRMP catch displaced by the RAP is greater than 21%.

Despite the estimated level of displaced net effort used in the buyout being considerably lower than other estimates, the 14.5% figure was considered reasonable by all members of the Technical Advisory Committee and appears to have been generally well accepted by industry.

- On this basis, the estimated ERT for the net fishery is considered reasonable.

### 3.2.2: The crab fishery

The situation in the crab fishery mirrors that for net, in that the main issue concerning the crab ERT is not the methodology but the limited data available for the analysis particularly in relation to the assumption that catch is uniformly distributed throughout each grid and the subjective apportioning of GBRMP and State catch. Similar to net, the estimated ERT used in the buyout is considerably less than other estimates (Table 3).

**Table 3: Alternative estimates of displaced effort and catch in the GBRMP crab fishery**

Source	Estimated level of displaced effort (%)
Hand (2003)	35 <sup>a</sup>
GBRMPA (2003b)	41 <sup>b</sup>
<b>Licence buyout</b>	<b>14</b>

a: the Hand estimate is based on the assumption that the catch from those logbook grids adjacent to the mainland is shared 50:50 between GBRMP and State waters;

b: the GBRMPA estimate is based on total crab catch, ie inclusive of State waters, such that GBRMPA's estimate of the proportion of GBRMP catch displaced by the RAP would be greater than 41%.

The considerable variation in estimates of displaced effort shown in Table 3 is also reflected in corresponding estimates of the value of the GBRMP crab fishery (Table 4).

**Table 4: Comparative estimates of GVP in the mud crab fishery**

Source	Estimated annual GVP from the GBRMP region, inclusive of state waters (\$m)
Hundloe, McPhee and Toon (undated)	1.9 (all from State waters)
Hand (2003)	1.5 <sup>a</sup>
GBRMPA (2003b)	1.8
<b>Licence buyout</b>	<b>9.5</b>

a: the Hand estimate is based on GBRMPA analysis and assumes that the catch from logbook grids adjacent to the mainland is shared 50:50 between GBRMP and State waters;

Part of the difference in the GVP estimates is likely to be due to different crab prices having been used in the respective analyses. However, the greater than five-fold difference between the GVP estimated in the buyout and that estimated in other studies is too large to be caused solely by price.

To some extent, the contrasting estimates from Tables 3 and 4 cancel each other out, in that the buyout applied a considerably lower rate of displaced effort to a considerably higher estimated GVP compared to previous studies which applied a higher rate of displacement to a lower valued fishery. In GVP terms, the final difference is relatively small, with the ERT from the buyout \$600,000 more than the other studies (Table 5).

**Table 5: Alternative estimates of displaced GVP in the GBRMP crab fishery**

Source	Estimated annual displaced GVP (\$m)
Hundloe, McPhee and Toon (undated)	0
Hand (2003)	0.5
GBRMPA (2003b)	0.7
<b>Licence buyout</b>	<b>1.3</b>

The 14% estimated ERT was considered reasonable by all members of the Technical Advisory Committee and appears to have been generally well accepted by industry.

- The discrepancy between the results estimated in the buyout and previous studies should have been detected at an early stage of the ERT process and should have triggered closer analysis of the reasons for the discrepancy.
- Notwithstanding this uncertainty, compared to other issues concerning the crab buyout identified later in this report, the setting of the ERT is not considered to be a major issue.

### 3.2.3: The prawn fishery

The ERT for the prawn fishery, estimated using VMS data, was set at removing 6.2% of the effort from the fishery, lower than alternative estimates (Table 6).

**Table 6: Comparative estimated impacts, trawl fishery**

Source	Estimated displaced catch (%)
<b>Licence buyout (VMS data)</b>	<b>6.2</b>
Hand (2003)	6.6
GBRMPA (2003b)	9
Licence buyout (6nm logbook data)	10.5

#### Extent to which displaced trawl effort could be accommodated in other areas of the fishery

As shown in Table 6, all previous studies that forecast the impact of the rezoning on the trawl fishery concluded that effort will be displaced. However, these studies differed regarding the extent to which they considered the displaced effort could be accommodated in other areas of the fishery:

- Hand (2003) considered that given the high mobility of the trawl fleet and the major rationalisation that had occurred since the introduction of the new trawl plan in 2001, the fishery had a high capacity to adapt to the new zoning arrangements.
- GBRMPA similarly considered that because the trawl fleet is highly mobile and that most trawlers operate in several areas and travel vast distances, ‘progression of the revised Zoning Plan will have minimal impact on the fishery’ (GBRMPA 2003a).
- Hundloe et al (undated) argued that displaced effort could not be accommodated in other sectors of the fishery. Hundloe et al expressed the estimated impact of the rezoning on the prawn fishery in terms of lost GVP rather than as a percentage and estimated a greater impact than that forecast by Hand and GBRMPA.

The licence buyout adopted Hundloe’s view and considered that the fishery was fully-fished, such that there was no opportunity for other areas to absorb the displaced effort. This approach is supported given that:

- i) at the time of the buyout DPI&F considered that under-utilisation of individual effort allocations in the fishery was minimal, such that the fishery can be considered to have been fully fished; and that
- ii) the substantial restructuring in the fishery since the introduction of the trawl plan – effort fell by 40% between 2000 and 2001 (DPI&F 2004) and nearly 250 vessels were removed (Huber 2003) - indicates that the fishery has historically suffered from excess effort and capacity. Further, the ongoing effort reduction mechanisms

built-in to the plan imply that future effort reductions continue to be required. GBRMPA itself identifies the potential for increases in real fishing effort as one of the fishery's key management concerns (Huber 2003).

In this context, it seems contradictory to suggest that the areas that remained open to fishing could have sustainably supported effort displaced by the rezoning. This study supports the approach taken in the SAP that displaced trawl effort needed to be removed from the fishery.

#### Overall assessment of the approach used to estimate the ERT in the trawl fishery

The adequacy of the ERT in the prawn fishery has been one of the most contentious issues of the buyout. Industry representatives have consistently argued that the 6.2% estimate obtained using the VMS data was too low while Government representatives have argued that since the calculation was based on the best available data, the resulting 6.2% estimate is the best available estimate.

FERM considers the following points relevant when considering this issue:

- i) the Government's obligation to use the best available data to estimate the ERT;
- ii) VMS provides better information on vessel position than the alternative – the vessel grid position information provided in the logbook – and so needed to be used;
- iii) the availability of the VMS data means that the method used for the net and crab fisheries based on using 6nm logbook data is redundant for the prawn fishery;
- iv) there is uncertainty in both the data and the assumptions used in the VMS analysis, such that the ERT estimate should be considered as being an imprecise estimate;
- v) the resulting estimate is lower than alternative estimates, particularly the 9% impact estimated by GBRMPA;
- vi) industry consistently stated that the 6.2% estimate understated the true impact; and
- vii) stakeholder support for the ERT is highly desirable.

FERM believes that the Government and industry should have made greater efforts to negotiate a mutually-agreeable ERT for the prawn fishery. Undue confidence from the Government in the reliability of the 6.2% estimate derived from the calculations, or equally undue commitment from industry to using the 10.6% estimate derived from the 6nm grid approach, seems misplaced on both accounts.

Providing the Government and industry wanted agreement, there does appear to have been some middle ground between the two positions argued by the Government and industry representatives that may have been agreeable to both parties.

Should the Technical Advisory Committee have been unable to negotiate agreement, the issue could have been referred to an external party for consideration. This represents, in effect, a dispute settlement mechanism for the Technical Advisory Committee. This need not have required an elaborate process – perhaps as simple as a single person independent of DEH and industry but accepted by both groups being contracted for a few days to review the issue.

#### **3.2.4: The line fisheries**

As stated previously, the ERTs for the coral reef fisheries were based on the results of a quantitative modelling study of the coral trout fishery and were set at removing 10% of the available quota in each of the three sectors in the fishery. In the absence of any other information, the ERTs for the Spanish mackerel fishery and for other line species were also set at 10%.

### Comparison with other estimates

As with the other fisheries, Hand (2003), Hundloe et al (undated) and GBRMPA (2003b) also estimated the impact of the closures on the line fisheries. However, none of these other estimates isolated the impact of the rezoning from the impact of the fisheries restructuring such that they do not provide a valid comparison with the ELFSIM estimate. There are thus no comparable estimates to that used in the buyout.

### Assessment of the approach used in the line fisheries

In both scenarios estimated by the ELFSIM model – the first reflecting the former situation where around 16% of the reef perimeters is closed to fishing and the second in which 30% of the reef perimeters is closed reflecting the new zoning arrangements - the status of coral trout populations remained relatively robust and above generally accepted indicators of a harvested stock<sup>8</sup>. This was attributed to the conservative minimum size limit set for coral trout - which ensures that most fish spawn in at least one year before reaching harvestable size - and the probable supply of recruits from areas closed to fishing (Mapstone et al 2004).

- The implication of this is that there was no biological justification to reduce the coral trout TAC by 10% in response to the rezoning.

Instead, the justification for the buyout was based on the relative change in economic conditions between the two scenarios forecast by the ELFSIM modelling – more specifically, the forecast 11% decline in catch per unit effort (CPUE) experienced for the scenario with 30% closures compared to the scenario with 16% closures (Mapstone et al 2004, Table 9, pg 101).

The ELFSIM model was primarily a biological model. It did not have an explicit economic modelling component but instead used a single biological indicator – CPUE - as an indicator of economic viability. If catch rates increased by 10%, ELFSIM interpreted this as meaning profits had also increased by 10%. This is quite simplistic, as it equates profit with revenue and makes no allowance for costs. Interpreting CPUE in this manner also assumes that coral trout prices and input costs will change in the same proportion but there is little justification for changes in fish prices to be proportional to changes in fishing costs.

At a more fundamental level, the ELFSIM model was developed on the basis that the fishery would continue to be managed as an effort controlled fishery. That basis no longer applies and the introduction of ITQs will have resulted in a fundamental change in fishing behaviour. This raises considerable doubt as to the accuracy of the ELFSIM CPUE forecasts given that the fishery is now quota-managed.

- For example, it is not apparent why, in a lightly harvested quota fishery, the rezoning will result in a 10% fall in catch. A more likely outcome is that the TAC will continue to be fully caught but with an increased level of effort.

The rezoning will have an economic impact on the line fishery, in the form of increased fishing costs and lower profitability, compared to had the closures not been introduced. However, the buyout was not designed to compensate fishers for lost profitability. The buyout did have an economic aspect, in terms of addressing any unsustainable economic impacts, yet the ELFSIM model was not designed to estimate the economic impacts of

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<sup>8</sup> The ELFSIM project considered a range of scenarios beyond just the two considered in this report. In all scenarios considered, the coral trout population remained robust (Mapstone et al 2004).

the forecast 10% drop in CPUE. Should the 10% fall in CPUE predicted in the model be realised, the fishery may still be profitable – just less profitable than it otherwise would have been.

It should be noted that the ELFSIM scenario taken to represent the introduction of ITQs and the new closures forecast CPUE remaining stable at current levels, such that catch rates in the fishery were not forecast to fall. Further, the ELFSIM model found that changes in effort levels have a greater impact on CPUE than changes in the level of closed areas. The coral trout TAC was set at the 1996 catch: the ELFSIM results suggest that should the introduction of ITQs improve efficiency in the fishery, such that the post-ITQ fishery can take the 1996 catch level using less effort than was needed in 1996, fishery profits would increase considerably. This situation appears likely, and would boost the chances of the fishery being able to sustain a subsequent 10% fall in CPUE.

This report supports the use of the ELFSIM model to estimate the impacts of the closures on the line fishery and supports the interpretation of the ELFSIM results as suggesting that from a biological perspective, the effort displaced as a result of the RAP could be accommodated in other areas of the fishery.

However, this report questions the interpretation of the ELFSIM results suggesting that the closures would have unsustainable economic impacts in the fishery. The ELFSIM model was primarily a biological model with a single economic indicator of questionable value. FERM considers that the subsequent decision – based solely on the results of that single indicator – to set the line fishery ERT at 10% is likely to have overstated the level of effort required to be removed from the fishery.

*Extension of the 10% figure to other line species*

The model results were specific to coral trout. There was no comparable information available to estimate the impact of the closures on the other sectors of the Coral Reef Finfish fishery, the Spanish Mackerel fishery or the Other Line fishery, such that the results from the ELFSIM model were also taken to apply.

In the absence of any other information, using the coral trout ERT as a proxy for the RTE, other RQ line, Spanish mackerel and other line species, is supported.

## 4. THE SELECTION OF THE TENDER GROUPS

The licence buyout cost \$31.8m. With the exception of reef line quota, the buyout removed licence packages, not individual fishery endorsements. Given that virtually all licence packages had endorsements for two or more fisheries, it is not immediately apparent how the \$31.8m was attributed between the various fisheries.

- In the net fishery, for example, 56 active licences were bought out, at a cost of \$9.4m. However, given that most of these 56 fishers were also active in other fisheries – particularly crab and reef line - only a portion of the \$9.4m should be attributed to the buying of licences from the net fishery.

Section 4.1 describes the method used in this report to apportion the costs of the buyout between the 5 affected fisheries. Sections 4.2-4.5 analyse the selection of the tender group in each individual fishery.

### 4.1: Apportioning buyout expenditure between fisheries

FERM used a simple decision rule to apportion the total buyout cost across fisheries.

- Where an operator was deemed to specialise in a particular fishery, the full offer price of that licence was attributed to this main fishery. FERM deemed an operator to specialise if a single fishery generated 75%<sup>9</sup> or more of total GVP.
- In all other cases, the operator was considered to be a mixed fisher and the offer price apportioned between fisheries relative to each fishery's contribution to GVP. For example, if the GVP of a particular licence was sourced 30% from the net fishery, 30% from crab and 40% from reef line, the offer price of that licence was apportioned 30%, 30% and 40% across the three fisheries.

This approach has its limitations and the results should be interpreted as giving a general rather than definitive guide as to how the funds were distributed across the fisheries. FERM also acknowledges that DEH's objective was to purchase sufficient licences to meet all the targets at least total cost and that DEH was not concerned with how much was spent on each individual fishery. Notwithstanding these comments, the results from the FERM analysis indicate that:

- more money was spent on the reef line fishery than any other individual fishery;
- the trawl fishery accounted for \$9.3m (just under 30%) of the buyout funds<sup>10</sup>;
- considerably less was spent in the net and crab fisheries compared to line and trawl, with more spent in net than in crab; and
- only a small amount was spent in the Spanish mackerel fishery.

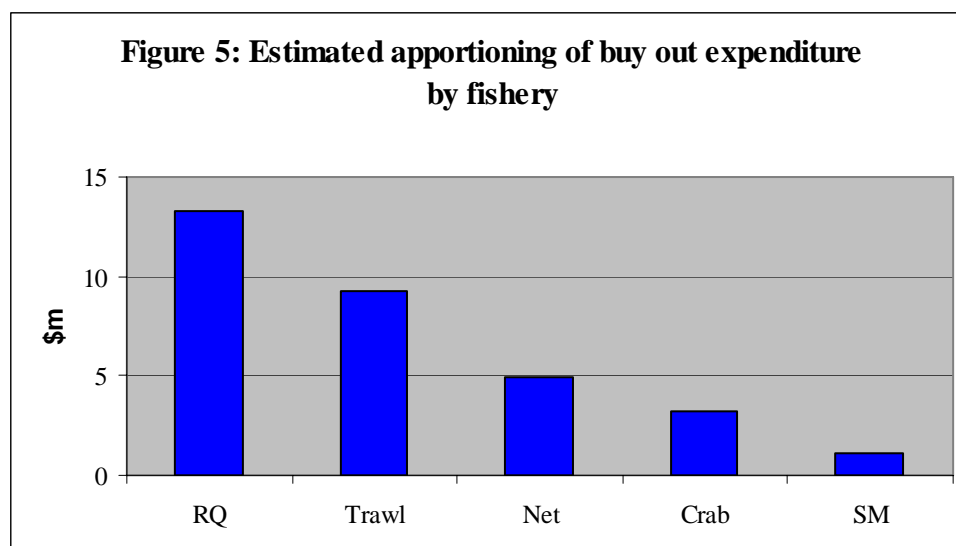
Results from the analysis are shown in Table 7 and Figure 5.

**Table 7: Indicative apportioning of buyout expenditure by fishery**

	Buyout funds (\$m)	% of total buyout funds
Reef line	13.3	42
Trawl	9.3	29
Net	4.9	15
Mud crab	3.2	10
Spanish mackerel	1.1	4
Total	31.8	100

<sup>9</sup> the choice of 75% was a subjective decision

<sup>10</sup> every trawl licence bought out had negligible involvement in any other fishery



That the line fishery accounted for the largest share of buyout funding – an estimated \$13m or around 40% of the total cost – increases the significance of the concern raised in the previous Section that the 10% ERT set for the line fishery may have overstated the level of effort required to be removed from the fishery.

Had the line fishery ERT been set at a lower level - say 7.5% or even 5% - considerable cost savings would have been realised which could either have been returned to the Government, been made available to address uncertainties in the ERTs set for the other fisheries, or some combination of the two.

#### 4.2: The Net fishery

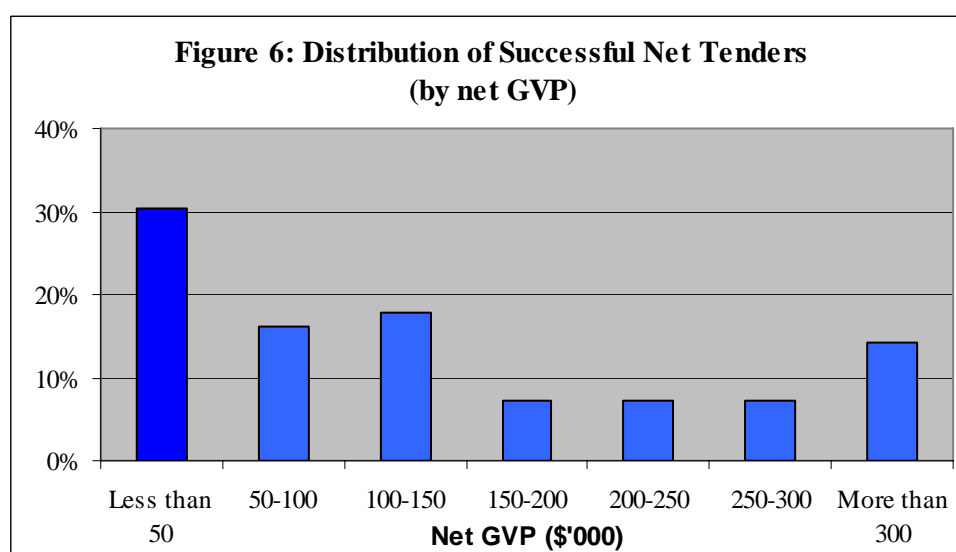
The buyout acquired net licences from a broad range of net fishers, from specialist to infrequent fishers, with net fishing being the dominant fishery for just under 50% of the net licences bought out (Table 8).

**Table 8: The apportioning of net operators bought-out**

Category	Definition	No. of operators bought out	% of net operators bought out
	GBRMP GVP in excess of \$30,000 over the assessment period of which....		
Specialist netters	....the GVP from the net fishery represents more than 75%	18	32
Semi-specialist netters	....the GVP from the net fishery represents between 50-75%	9	16
Mixed netters	....the GVP from the net fishery represents between 25-50%	15	27
Infrequent netters	....the GVP from the net fishery represents less than 25%	10	18
Infrequent fishers	GBRMP GVP less than \$30,000 over the assessment period	4	7

Net licences were acquired from a range of large scale and small scale operators, with most concentrated at the smaller end of the range - 30% of the acquired licences caught less than \$50,000 in GVP from the net fishery over the four year assessment period, while nearly 65% caught less than \$150,000 – averaging less than

\$40,000/year. At the other extreme, around 15% of the acquired licences caught more than \$300,000 from the net fishery over the four years, averaging more than \$75,000/year (Figure 6).



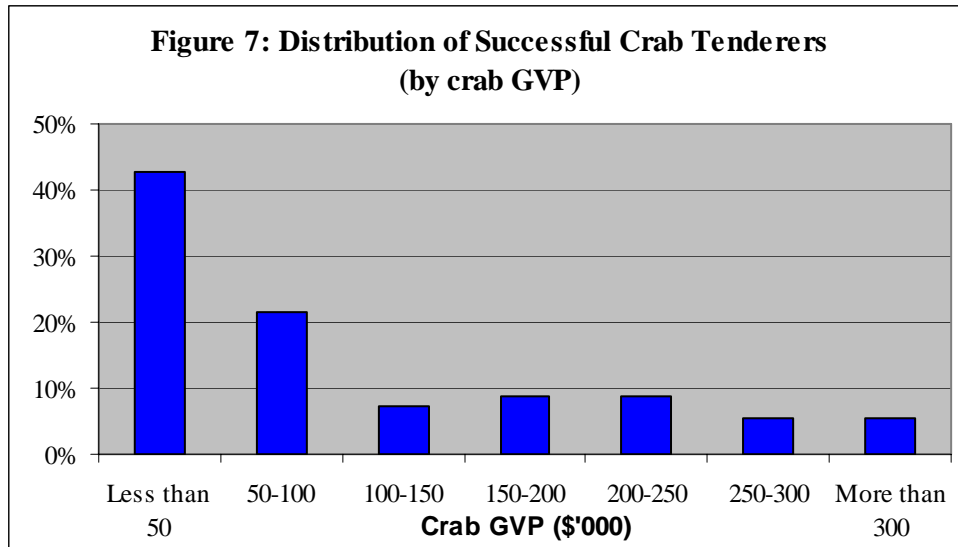
Based on the FERM analysis described in Section 4.1, around \$5m – 15% of the buyout funds – were spent acquiring the net portion of these 56 licences.

### 4.3: The Crab fishery

As with the net fishery, the crab licences bought out ranged from specialist crabbers to infrequent fishers. Some highly productive crab fishers were bought out, but the majority of the crab operators bought out had negligible involvement in the crab fishery and more than 40% of the licences purchased earned less than \$50,000 from the fishery over the three year assessment period – indicative of the crab fishery comprising predominantly small-scale operators (Table 9, Figure 7).

**Table 9: The fishing intensities of the crab operators bought-out**

Category	Definition	No. of operators bought out	No. of operators as a % of the 56 crab licences
	GBRMP GVP in excess of \$30,000 over the assessment period of which....		
Specialist mud crabbers	....mud crab GVP represents more than 75%	13	23
Semi-specialist crabbers	....mud crab GVP represents between 50-75%	7	13
Mixed mud crabbers	....mud crab GVP represents between 25-50%	7	13
Infrequent crabbers	....mud crab GVP represents less than 25%	26	46
Infrequent fishers	GBRMP GVP in the assessment period less than \$30,000	3	5



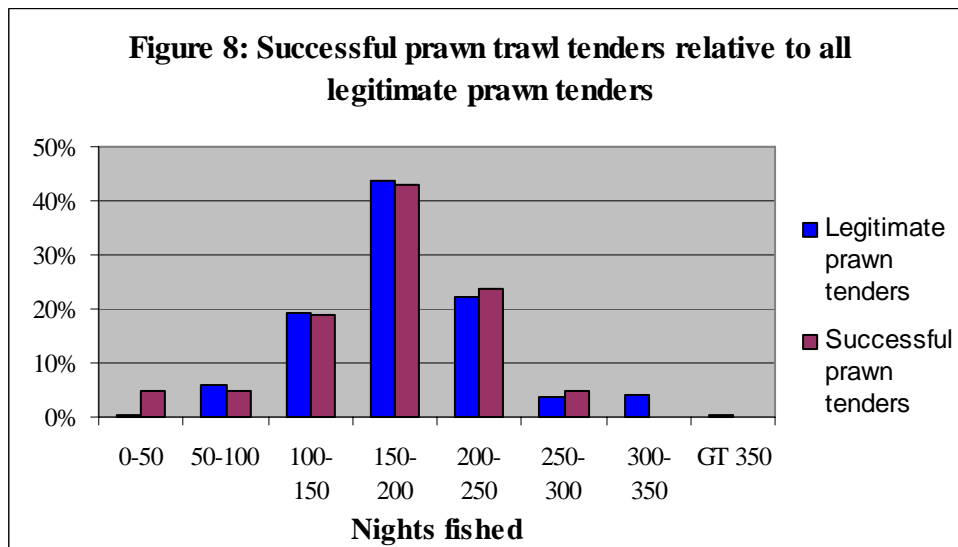
Based on the FERM analysis described in Section 4.1, around \$3m was spent in acquiring the crab component of these 56 licences – 10% of the total buyout cost.

#### 4.4: The Prawn Trawl fishery

The 21 trawlers selected for the buyout had negligible activity in any other fishery such that they can all be considered as specialist trawl operations. The cost of buying these 21 licences was \$9.3m.

##### Representativeness of the selected prawn tenders

While the successful tenders were selected purely on price, the subset of 21 selected tenders was remarkably reflective of the 188 valid tenders in terms of nights fished over the 2.5 year assessment period (Figure 8).



18 of the 21 selected tenders were for vessels that had fished between 100-250 nights over the 2.5 years, with half of these fishing between 150-200 nights. Only 2 of the successful tenders – less than 10% of the selected vessels – fished less than 100 nights. Those vessels that fished more than 300 nights were under-represented in the set of selected tenders, but such vessels reflected only 5% of the pool of valid tenders and would have warranted only the one successful tender in any case.

It is worth noting that the tender selection process was not designed to produce a representative sample of submitted tenders. That it did so is purely coincidental and indicates that the level of fishing was not a key determinant of the price/effort unit of the tender bids. This result dismisses any suggestion that the selection of successful tenders was biased towards inactive vessels.

#### 4.5: The Line fisheries

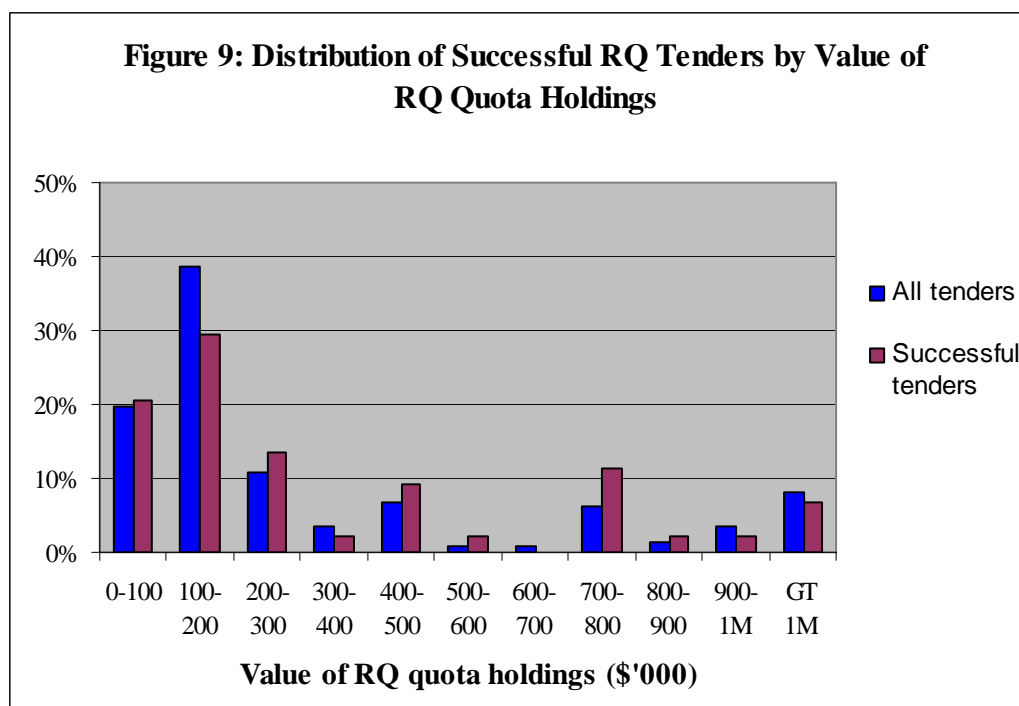
##### The reef line fishery

Many line operators diversify their fishing operation and spread their effort over the coral reef, mackerel, inshore net and crab fisheries. However, of the 45 reef line operators bought out, nearly 70% are considered to have been reef line specialists with the reef line fishery representing more than 75% of their total fishery GVP (Table 10).

**Table 10: The apportioning of reef line operators bought-out**

Category	Definition	No. of operators bought out	No. of operators as a % of the 45 reef line licences
	GBRMP GVP in excess of \$30,000 over the assessment period of which...		
Specialist reef line fishers	...reef line GVP represents More than 75%	30	67
Semi-specialist reef line fishers	...reef line GVP represents between 50-75%	2	4
Mixed reef line fishers	...reef line GVP represents between 25-50%	7	16
Infrequent reef line fishers	...reef line GVP represents Less than 25%	5	11
Infrequent fishers	GBRMP GVP less than \$30,000 over the assessment period	1	2

Successful RQ tenders were sourced from large, medium and small scale RQ quota holders, in similar proportions to the tenders submitted. Around 50% of successful tenders were from operators with less than \$200,000 of reef line quota (Figure 9).



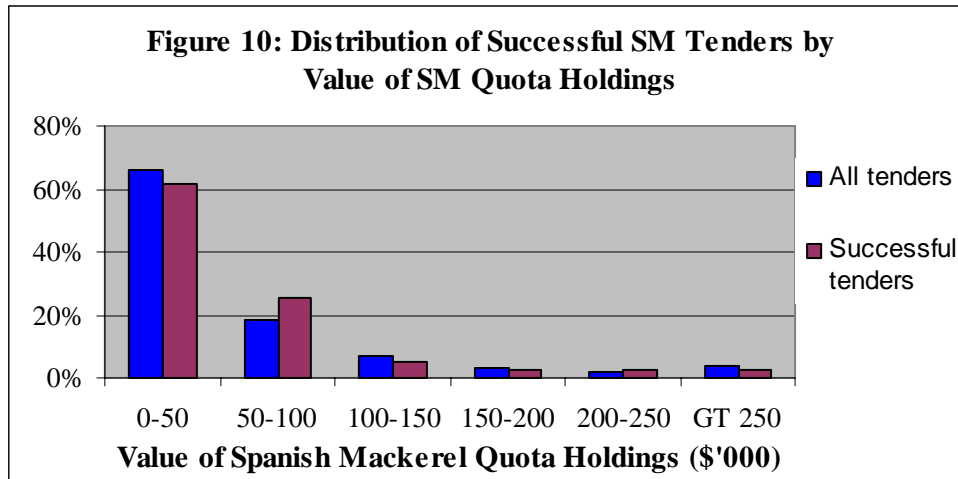
### The Spanish Mackerel Fishery

Although the purchase of the 39 Spanish Mackerel licences cost \$13.2m, the FERM break-down of the total licence buyout funds indicates that around \$1.1m – 4% of the total buyout cost of \$31.8m - is attributed to the Spanish mackerel fishery. This is because Spanish mackerel fishing represented a negligible part of the overall fishing operation for 85% of the 39 Spanish Mackerel operators bought-out: only three of the 39 are considered to have been Spanish mackerel specialists (Table 11).

**Table 11: The apportioning of Spanish mackerel operators bought-out**

Category	Definition	No. of operators bought out	No. of operators as a % of the 45 reef line licences
	GBRMP GVP in excess of \$30,000 over the assessment period of which...		
Specialist Spanish mackerel fishers	.... Spanish mackerel GVP represents more than 75%	3	8%
Semi-specialist Spanish mackerel fishers	.... Spanish mackerel GVP represents between 50 and 75%	1	3%
Semi-specialist Spanish mackerel fishers	....Spanish mackerel GVP represents between 25-50%	2	5%
Infrequent Spanish mackerel fishers	....Spanish mackerel GVP represents less than 25%	33	85%

As with the other fisheries, successful tenders were received across the spectrum of Spanish mackerel quota holdings (Figure 10).



There were 16 specialist Spanish mackerel operators among the 103 valid Spanish mackerel tenders analysed by the ABARE algorithm, three of which were accepted. The three accepted had the lowest offer price/unit of mackerel quota.

Analysing the relative price competitiveness of non-specialist Spanish mackerel operators is complicated by the mixed nature of their fishing activities. Given the largely incidental nature of the Spanish mackerel fishery for most operators, no further analysis is warranted.

## 5. EFFECTIVENESS OF THE LICENCE BUYOUT

The buyout was not designed to help fishers adjust their fishing businesses in response to the RAP - assistance in that regard was to be sourced from the business restructuring component of the SAP. Instead, the objective of the licence buyout was to prevent effort displaced as a result of the closures from having unsustainable spill-over impacts on areas left open to fishing. This objective was to be achieved by buying-out an equivalent amount of effort to that displaced as a result of the closures, expressed in terms of the ERTs.

- As stated in Section 2, this strategy was fully implemented and the buyout met all the ERTs.

In principle, this would suggest that in the areas remaining open to fishing, the levels of effort after the introduction of the RAP would be similar to pre-RAP levels, thus negating the risk of any adverse spill-over impacts. In practice, this need not necessarily be the case, and unless the management arrangements applying in the areas left open to fishing are capable of preventing effort increasing to unsustainable levels, adverse spill-over effects could still be considerable despite ERTs having been achieved.

This section of the report begins with a review of two Australian fisheries adjustment experiences. The implications of the latent effort in the net and crab fisheries on a key assumption underpinning the buyout - that effort acquired during the buyout will be permanently removed from the fishery – are assessed, and possible options for dealing with latent effort in any future buyout discussed. The link between the buyout and the effectiveness of the fisheries management arrangements is identified, and the section concludes with a review of the cost effectiveness of the buyout on an individual fishery-basis.

### 5.1: Lessons from two previous Australian fisheries adjustment programs

The following two examples identify contrasting approaches to fisheries adjustment - the first relying on anecdotal information to set a notional ERT and then offering fishers a predetermined surrender price, the second involving a restricted competitive tender - available only to disaffected fishers - without setting any specific ERT.

#### The South East Fishery Adjustment Program, Australian Government, 1998

This adjustment program was established with four objectives:

- i) to reduce effort (both latent and active);
- ii) to help non-viable operators adjust out of the fishery;
- iii) to stimulate the quota market and encourage autonomous adjustment; and
- iv) to restore confidence in management and provide greater certainty and stability to the management arrangements.

The program included a buyout scheme intended to reduce fishing effort by 30% which equated to the removal of around 50 permits. The 30% target was based more on anecdotal information than formal quantitative analysis - the general industry view at that time being that 30 per cent of effort should be removed (South East Fishery Adjustment Working Group 1996). The buyout acquired fishing permits - but not quota – at a predetermined purchase price of \$25,000/permit (representing a 25%

premium on the assumed market rate of \$20,000/permit) plus an additional 10% of the value of the associated quota, up to a maximum of \$75,000 vessel.

#### Licence Buyout following the introduction of Dugong Protection Areas, Australian Government, 1997

In 1997 GBRMPA responded to scientific evidence indicating a dramatic decline in dugong numbers in the southern area of the GBRMP by establishing a system of dugong sanctuaries to minimise the risks of dugong being taken as bycatch in commercial netting operations. The system consisted of a two-tiered system of Dugong Protected Areas, with 7 'Zone A' areas being closed to gillnetting and a further 9 potentially sensitive 'Zone B' areas identified where fishing was allowed to continue but with more stringent management measures introduced.

GBRMPA implemented an adjustment scheme to help commercial net fishers respond to these restrictions. The scheme had three components - ex-gratia payments for loss of income to disaffected licence holders and redundant crew members and a voluntary licence buyout to stop displaced net effort moving into other areas or other fisheries.

- The buyout used a tender process. The tender was open to all licence holders with N1 and N2 net fishery endorsements, though preference was given to those licence holders that could demonstrate fishing history in a Zone A area in 1996.
- The aim of the buyout was 'to enable as many licences as possible to be purchased for the funds available' (GBRMPA Ministerial Council as quoted in Plunkett, Meany and Ramsey 1997).
- Licences offered under the tender were categorised according to whether there had been any reported catch using that licence from a Zone A or Zone B area in 1996. However the level of catch was not a consideration – a vessel that caught 50kgs in a Zone A area was treated the same as a vessel that had landed 10.
- 38 tenders were accepted from the 105 eligible offers submitted, at a cost of just under \$2m, with the final selection criteria being to accept offers:
  - up to \$60,000 for licences that had fished in a Zone A area in 1996;
  - up to \$55,000 for licences that had fished in a Zone B area in 1996, and
  - up to \$50,000 for other licences.

#### Lessons from these two examples

A review of the effectiveness of the South East Fishery Adjustment Program found that the program fell far short of its target of removing 50 permits from the fishery, with 27 permits being removed of which 13 were latent. The buyout – which cost \$1.7m – was found to have little impact on fishery effort levels, with the permits that were acquired having accounted for only 1% of the effort in the fishery during the previous 12 months (AMC Search 2000).

Similarly, the extent to which the Dugong Protected Areas buyout removed real effort from the net fishery appears questionable. GBRMPA had recognised the danger of successful tenderers using the money received for their licence to purchase another licence and upgrade their vessel and fish in another area (Plunkett, Meany and Ramsey 1997). Marsh (2000) implies that this outcome did in fact eventuate, and citing anecdotal evidence suggesting that many fishers used their buyout funds to acquire another licence and continue fishing, was critical that the program failed to introduce regulations preventing those fishers that had successfully surrendered their licences from re-entering the fishery.

The results from these two adjustment programs highlight the need to remove active as opposed to latent effort, and the risk that effort removed from the fishery may return using another licence.

- The buyout addressed the first of these concerns by requiring successful tenderers to have some recorded fishing history in the GBRMP during the respective assessment periods and, for those fisheries where latent effort is an issue, by making GVP a determining factor in the selection of tenders. Aside from 11 of the 18 inshore licences acquired as part of the second-round process to address regional concerns (as described in section 2.2.1), the removal of latent licences does not appear to have been a substantial issue with the buyout.
- The second issue – that of removed effort returning to the fishery under another licence – was a far greater concern.

## **5.2: Assumption that effort acquired by the buyout is permanently removed from the fishery**

Fundamental to the buyout meeting its objective is the assumption that effort purchased in the buyout is permanently removed from the fishery. The validity of this assumption depends to a large extent on the effectiveness of the management arrangements applying throughout the fishery.

### **5.2.1: Net and crab fisheries**

#### Latent effort in the net fishery

Notwithstanding the 40% reduction in licences achieved in 2004 under the DPI&F restructuring, latent effort remains a problem in the net fishery. DEH recognised this in November 2005 when assessing the fishery under the provisions of the Australian Government's Environmental Protection and Biodiversity Act (the EPBC Act) and cited possible latent effort issues as one of the reasons why the net fishery was granted only a temporary 6 month approval as a Wildlife Trade Operation (WTO).

After a second 6 month approval in May 2006, DEH subsequently granted the net fishery a two-year approval as a WTO in November 2006. While commending the 40% licence reduction achieved in 2004, DEH reiterated its concern with the level of latent effort in the fishery and recommended, among other things, that 'DPI&F undertake a review of latent effort in the fishery and incorporate controls into the management arrangements to ensure that the activation of latent effort does not jeopardise the long-term sustainability of the fishery' (DEH 2006).

#### Latent effort in the crab fishery

The crab fishery is managed using a combination of input controls – with limits on the number of licences available (879 crab endorsements as at June 2005) and the number of pots each licence can use (50) - size restrictions and a ban on the taking of females.

- Latent effort is prominent in the fishery, with the present limit on the number of licences far from binding - around 40% of the available licences are considered to be inactive and there is considerable scope to increase the level of fishing effort for those licences that are active (as was illustrated in Figure 7).
- As with the net fishery, DEH highlighted latent effort as an issue when completing its 2004 assessment of the ecological sustainability of the crab fishery under the EPBC Act. While the assessment considered the fishery to be relatively well-managed, DEH's three-year approval of the fishery as a WTO was subject to, among other things, DPI&F developing a strategy to remove or

substantially reduce the amount of latent effort. Coincidentally, the strategic assessment process occurred at around the same time as the licence buyout – WTO approval was granted in August 2004, two months prior to the DEH’s finalisation of the tender documentation.

#### The potential return of effort ‘removed’ by the buyout

All net and crab fishery licences/endorsements purchased by DEH through the buyout have been surrendered to DPI&F and have thus been removed from their respective fishery. However, the plentiful supply of underutilised licences in the two fisheries at the time of the buyout meant that the effort associated with any of the acquired licences could readily be transferred to another licence and remain in the fishery.

This returning of effort may have occurred in several ways:

- i) where the holder of a net or crab licence acquired in the buyout purchases/leases an unused licence and continues fishing;
- ii) where an operator that had multiple net or crab licences, one of which was acquired in the buyout, transfers the effort from the former licence to the remaining licence and continues fishing; or
- iii) where an operator formerly operating under a leased licence acquired in the buyout leases a different licence and continues fishing.

Given that the successful tenderers:

- i) retained ownership of their vessel and fishing gear;
  - ii) retained their fishing skills and knowledge;
  - iii) in some cases received a premium for their tendered licences (as will be discussed under Section 5.6.1); and
  - iv) in some cases have limited mobility/opportunities for alternative employment;
- a substantial amount of the ‘removed’ effort associated with the net and crab buyout could reasonably be expected to have returned to the fishery.

#### Estimated levels of returned effort in the net and crab fisheries

Advice from industry sources suggests that:

- i) of the 15 top-catching net fishers ‘bought-out’, 7 are thought to still be actively participating in the net fishery. These 7 ‘returned’ operators accounted for 40% of the net fishery GVP of the top 15 operators. Should these 7 returned fishers be operating at the same level of fishing intensity as they were prior to the RAP, then 40% of the net effort ‘bought-out’ from the top 15 operators has not actually left the fishery;
- ii) the situation is more extreme in the crab fishery, where 10 of the top 15 crab operators bought-out are thought to still be active in the fishery<sup>11</sup>. These 10 ‘returned’ operators accounted for almost 70% of the ‘bought-out’ crab effort of the top 15 operators<sup>12,13</sup>.

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<sup>11</sup> The number of returned operators from the top 15 may even be higher, as the status of 4 other fishers was not known: for the purpose of this report all four are assumed to have left the fishery.

<sup>12</sup> It was considered inappropriate for FERM to investigate current activities of successful tenderers to verify industry claims. If required, DEH should liaise with Queensland fisheries officials to substantiate the number of successful net and crab tenderers that remain active in their respective fishery.

<sup>13</sup> It needs to be stressed that any operator that sold a licence to the buyout and subsequently remained active in that same fishery using a different licence did not violate any laws. Any such decisions were legitimate business decisions.

### Change in effort levels according to logbook data

The industry advice suggesting that much of the net and crab effort acquired during the buyout may have returned under another licence is not supported by DPI&F logbook data which indicates substantial falls in effort – and catch – in both fisheries immediately following the buyout.

- Effort in the net fishery fell by around 18%, from around 33,000 days in 2004 to around 27,000 days in 2005, with DPI&F attributing most of the fall to the rezoning and associated licence buyout. (DPI&F 2006a).
- The crab catch from the GBRMP area fell by 27%, from 736mt in 2004 to 534mt in 2005. Total effort in the crab fishery fell around 10% - from around 45,000 days to 40,000 - and the number of vessels accessing the fishery fell 15% - from 498 to 424<sup>14</sup>. Effort, catch and boat numbers in the fishery have continued to fall in 2006 (DPI&F 2006b, 2007a).

Unless there are significant problems in the reliability of the logbook data – and there is no evidence to suggest this – effort in the net and crab fisheries fell substantially following the buyout. The potential risk to the buyout in these two fisheries of removed effort returning using previously underutilised licences and having unsustainable impacts in areas remaining open to fishing has not eventuated<sup>15</sup>.

This outcome is fortunate, for there was nothing to prevent net and crab fishers successful in the buyout from returning to their respective fishery. Conceptually, 100% of the net and crab effort acquired in the buyout could have returned.

### DEH's approach to the likelihood of removed effort returning

DEH advises that it was aware of the danger of effort removed from the net and crab fisheries accessing a previously underutilised licence<sup>16</sup>. However, DEH took the view that the investment warnings issued by DPI&F – in April 2002 for the net fishery and September 2003 for the crab fishery – together with the impending development of strengthened management arrangements to address latent effort in line with the conditions underlying DEH's approval of each fishery as a WTO – were sufficient to discourage removed operators from reinvesting in the two fisheries.

- For the net fishery, the strengthened management arrangements envisaged in 2004 to address latent effort have not as yet eventuated and the last tangible management response to address latent effort was the eligibility criteria applied by DPI&F at the time of the licence buyout in 2004/05.

DPI&F is in the process of developing new management arrangements for the net fishery, consistent with the DEH recommendation and draft future management arrangements are expected to be released for public comment in the near future<sup>17</sup>.

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<sup>14</sup> Effort and boat figures are state-wide and include the Gulf of Carpentaria and south of the GBRMP.

<sup>15</sup> Detailed analysis of logbook data is required to identify which operators have reduced effort. This analysis would help reconcile the industry advice suggesting that many bought-out operators remained actively fishing and the DPI&F data indicating a substantial reduction in fishing effort.

<sup>16</sup> As noted in Section 5.1, a DEH-administered licence buyout - coincidentally also in the GBRMP and also involving the Queensland net fishery - implemented following the creation of Dugong Protected Areas in 1997 was criticised for its failure to introduce regulations preventing those fishers that had surrendered their licences from re-entering the fishery (Marsh 2000).

<sup>17</sup> Following extensive stakeholder consultation in late 2006/early 2007, the draft management arrangements were expected to be released in August 2007 (DPI&F 2007b)

As part of the consultation process, DPI&F produced a series of five background papers designed to provide detail about the key management issues surrounding the fishery. One of the discussion papers covered commercial netting arrangements, though it was focused more on issues of mesh sizes, net lengths and attendance rules rather than individual allocations between licence holders and options to address latent effort. Presuming that the discussion papers canvass the issues likely to be addressed in the draft management changes, the draft changes are unlikely to involve the allocation of future access entitlements based on the catch history of the licence. Should this be true, those net operators that sold a licence through the buyout and then returned to the fishery using another licence are unlikely to be disadvantaged.

- A similar situation applies in the crab fishery, where the only tangible sign of the strengthened management arrangements envisaged in 2004 to address latent effort is a new licensing and fees policy introduced on 1 July 2006. The new policy appears to have had some effect, with the number of crab symbols issued falling from 859 in June 2006 to 781 as at October 2007.

Despite this reduction, there remains ample latent effort in the fishery. DPI&F intends to monitor the effects of the new licensing arrangements to determine whether crab endorsement holders surrender previously unused symbols. Should these arrangements not remove latent effort, DPI&F is to investigate additional measures (DPI&F 2007a). Despite this undertaking, DPI&F considers that latent effort poses minimal risk to the sustainability of the mud crab stock, noting that current size limits and the ban on the taking of females effectively caps the harvestable proportion of the population to around 25% (DPI&F 2007a).

As with the net fishery, those crab operators that sold their licence to the buyout and then returned to the fishery using another licence have not as yet been disadvantaged by altered management arrangements.

The extent to which the DPI&F investment warnings and/or the DEH recommendation to review management arrangements discouraged crab and net operators successful in the buyout from reinvesting into their respective fisheries is difficult to assess. However, those operators that were willing to take the risk, acquire a different licence and return to their fishery have not as yet been disadvantaged and appear unlikely to be disadvantaged by any changes in management arrangements in the immediate future.

### **5.2.2: Trawl, line and mackerel fisheries**

In contrast to the net and crab fisheries, the management arrangements applying in the trawl, line and mackerel fisheries are sufficiently effective such that there is negligible latent effort in any of these three fisheries. In each case the effort associated with the licences acquired in the buyout can be considered to have been permanently removed.

- The trawl fishery is managed using a system of transferable effort units, with operators assigned individual allocations of effort units that when combined with the specifics of their fishing vessel equate to a set number of fishing days.
  - The effort units associated with the trawl licences purchased through the buyout have been transferred to a single licence held by DEH and are to be surrendered - along with that licence - as part of the review of the current trawl management plan. All other trawl licences acquired through the buyout have already been surrendered.

- Operators that sold effort units to the buyout can only re-enter the fishery by acquiring existing units from another operator, and underutilisation of individual effort allocations is considered minimal (DPI&F 2004).
- The reef line and mackerel fisheries are managed using ITQs, with the TAC in both fisheries set at a level below the annual catch of the years immediately prior to ITQs being introduced.
  - Similarly to the situation in the trawl fishery, all reef line and Spanish mackerel quota purchased in the buyout has been transferred to two licences held by DEH and will be surrendered as part of the next line fishery management plan review, while all other reef line and Spanish mackerel licences obtained in the buyout have been surrendered to DPI&F.

### **5.3: Options for preventing/discouraging the return of removed effort**

#### **5.3.1: A legal approach - restricting the re-entry of successful tenderers**

DEH did consider the possible inclusion of a condition restricting re-entry to the fishery on the purchase contract for each successfully-tendered licence. However, after considering legal advice, DEH decided not to pursue this approach.

The legal issue in question is whether restricting the re-entry of successful tenderers is consistent with the provisions of the Trade Practices Act (1974).

- FERM understands that a restraint of trade does not automatically imply a violation of the Trade Practices Act and that there is provision under that Act to allow restraints of trade that are deemed to be ‘the minimum necessary’ in regards the interests of the parties concerned and the general public<sup>18</sup>.
- DEH advise that this ‘minimum necessary’ criteria would have meant taking different approaches to restricting former licence holders from the trawl and line fisheries – where effort units or quota was purchased – compared to licence holders from the net and crab fisheries - where licences were purchased - and that these differences were considered too difficult to apply.

Notwithstanding questions surrounding the legality of restrictive provisions included as part of the tender contract, such restrictions would not cover situations where the licence holder was not actively involved in the fishing operation. For example, if the original licence was being leased to a second party, imposing restrictions on the re-entry of the licence holder would be ineffective since the person expending the fishing effort – in this case the lessee - could continue fishing after the buyout simply by leasing an underutilised licences. Such restrictions would also be problematic in the case of a multiple licence holder that only offers one licence for tender.

There would also be considerable practical difficulty in enforcing re-entry restrictions.

- A legal approach is unlikely to solve the problem of ‘removed’ effort returning to the fishery.

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<sup>18</sup> Subsequent to the buyout, DEH purchased two high-catching shark licences and included restrictive re-entry conditions as part of the purchase contract for those licences. These conditions were accepted by the respective licence holders.

### 5.3.2: The surrendering/removal of fishing vessels

In a review of the effectiveness of fisheries adjustment schemes, Holland, Gudmundsson and Gates (1999) identify a number of adjustment programs that in addition to the surrender of fishing licences also imposed restrictions on the use of the associated fishing vessels. Such restrictions have taken a variety of forms:

- i) the compulsory surrender of the vessel to the Government with the Government subsequently reselling acquired vessels, as was used in Canada in the British Columbia salmon fishery in the 1970s and 1980s;
- ii) vessel owners being responsible for the compulsory scrapping/permanent removal of their vessel from the fishery, as used in the 1990s in the United States northeast multispecies groundfish fishery and in fisheries adjustment schemes in Norway, Denmark, Holland and the United Kingdom; and
- iii) providing incentives to encourage vessel owners to remove their vessel from the fishery, as used in the Washington State (United States) salmon fishery where fishers received a 30% additional payment if they 'promised' not to use their vessel in the fishery for at least 10 years.

Holland et al (1999) found a common theme emerging in the outcomes from these programs – they were largely ineffective.

- In one of the vessel surrender programs in the British Columbia salmon fishery, 47% of the participating fishers bought another vessel and continued fishing.
- A similar vessel surrender program in the Washington State salmon fishery resulted in 40% of participants selling an unwanted licence or vessel and then continuing in the fishery using upgraded vessel and gear, with the program removing marginal as opposed to serious fishers from the fishery.

Holland et al (1999) also noted that tender bids are higher in the case of a compulsory vessel surrender compared to only a licence surrender, resulting in less licences being removed for the same amount of funds, and that a program with vessel surrender incurs higher management and administration costs. Not surprisingly, Holland et al (1999) found that most adjustment programs place no restrictions on the subsequent use of the vessel.

Fisheries adjustment programs in Australia have usually focused on removing the fishing concession rather than the fishing vessel.

- The tender component of the Australian Government's 'Securing our Fishing Future' adjustment package implemented in 2006 did provide a \$25,000 incentive to encourage successful tenderers to scrap their vessel but vessel scrapping was not a prerequisite to participate in the tender.

This report agrees with the findings from Holland et al (1999) that including restrictions on the vessel and/or fishing gear in the tender process would be difficult to administer and enforce, would make the adjustment program more expensive, and would most likely follow the experiences of other countries and be largely ineffective in removing real effort from the fishery. Accordingly, this report does not consider that including the vessel and/or gear as part of the tender process would have been effective in preventing removed effort from returning to the net and crab fisheries.

- The approach used in the buyout to exclude vessels and fishing gear is endorsed.

#### 5.4: Stronger links between the buyout and fisheries management arrangements

Rather than trying a legal approach to restrict the re-entry of the bought-out operators, an alternative approach is to strengthen the fishery management arrangements so that the total amount of effort and/or catch in the areas remaining open to fishing is limited to a sustainable level. Were this achieved, the re-entry of operators is not an issue.

- The return of operators was not a problem in the quota managed line and Spanish mackerel fisheries since any ‘removed’ operators wanting to return were required to purchase quota from existing quota-holders. Provided the overall TAC was set at a sustainable level, the return of the bought-out operators will have no impact on sustainability.

Prior to their restructure to quota-managed fisheries, the line and mackerel fisheries suffered from the same latent effort problems as the net and crab fisheries. Had the restructuring not occurred in the line and mackerel fisheries, the buyout in these fisheries would also have been exposed to the risk of bought-out effort returning to the fishery.

- Similarly, the return of operators is not a problem at least in the short-term in effort-managed fisheries that have a meaningful cap on effort - such as the trawl fishery - since the total number of effort units needs to remain within the agreed total. Provided the total effort cap is set at a sustainable level, reinvestment by bought-out operators poses no immediate sustainability concerns<sup>19</sup>.

The Australian Government’s policy statement on marine protected areas and displaced fishing (Australian Government 2004) recognises the interaction between marine protected areas and fisheries management. More specifically, the policy notes that if the zoning of a marine protected area has a fisheries impact, ‘the responsible fisheries management agencies will make any necessary revisions to the fisheries management settings’. The policy also notes that ‘there is merit in aiming for co-ordination with other initiatives if and when an adjustment assistance program is required’.

Consistent with this policy, the buyout was linked with the eligibility criteria then being applied by DPI&F in the net fishery, in which fishers had to satisfy minimum levels of past involvement in the fishery to maintain future access.

- Such coordination was appropriate, and it is noted that over 20% of the tenders received from the net fishery were from operators whose licences were not to be renewed. Such tenders were rightly excluded from further consideration.
- The problem, though, is that the eligibility criteria did not go far enough. The criteria was not onerous – needing to demonstrate having caught 500kgs or more in at least three of the four years from 1998-2002, or at least 3mt over those four years – and while 40% of licences were unable to meet this criteria and were thus not renewed, latent effort remained a significant issue in the fishery after the eligibility criteria had been applied.

The Australian Government policy is silent on what should happen if the envisaged interaction between the rezoning and the fisheries management arrangements is lacking, as occurred in the net and crab fisheries. Given the jurisdictional tensions

<sup>19</sup> Though there may be a need to adjust the overall effort cap over time to account for increases in effective effort resulting from effort creep and/or unit trading whereby more efficient operators purchase effort units from less efficient operators.

experienced with the RAP – evidenced by the Queensland Government’s withdrawal from the RAP process at a relatively early stage and the public disagreement between the State and Australian Governments regarding responsibility for assisting fishers affected by the complementary zoning in State waters – it is no surprise that the level of integration between the Australian Government-led RAP and the State Government-led fisheries management arrangements was less than ideal.

Against this background, it could be argued that the problems in the net and crab fisheries lay not with the buyout – which successfully removed the desired levels of effort from the two fisheries - but in the inadequacy of the fisheries management arrangements in being unable to effectively control the level of effort in the two fisheries - and thus the return of effort removed through the buyout.

Fundamental to this issue is an understanding of what the buyout was trying to achieve, namely to prevent displaced effort from having unsustainable impacts in the areas remaining open to fishing. The removal of the displaced effort was merely the strategy to achieve the goal rather than a goal in itself. It is expected that DEH would have derived little comfort from successfully achieving the ERTs had all the acquired effort returned to their former fisheries using underutilised licences and continued fishing in the areas remaining open.

The different jurisdictional arrangements affecting the RAP are likely to have caused additional administrative, communication and political challenges that would not otherwise have occurred had the buyout involved only a single jurisdiction. While noting the added complexity associated with this jurisdictional issue, the thrust of the Australian Government policy – the need for interaction between the marine protected area and the fisheries management arrangements – remains paramount.

### **5.5: No significance given to the level of individual impact**

A key assumption underpinning the buyout is that for those fisheries where displaced effort was considered to have unsustainable ecological or economic effects, effort within the fishery is sufficiently mobile such that the effort to be removed could be sourced from anywhere in the GBRMP. In other words, no preference was given to removing the particular effort most affected by the rezoning. Provided a licence had a history of use in the GBRMP, it was eligible for consideration under the buyout.

Even for those fisheries where secondary regional effort reduction targets were set, there was no specific linking of the effort directly affected and the effort removed.

- The licences subsequently bought out were not necessarily those most impacted by the rezoning;
- Conversely, the licences most impacted were not necessarily bought-out.

Considering the objective of the buyout - to prevent displaced fishing effort from having unsustainable ecological or economic impacts in other areas of the fishery - in isolation, the approach taken is valid. For example, if the ERT indicated that 10% of the effort needed to be removed, the buyout was designed to remove 10% of the effort at least cost, irrespective of where this effort was actually utilised.

DEH advise that over 90% of the licences operating in the GBRMP were directly impacted to some extent by the rezoning. Opening the tender to all vessels with GBRMP history thus led to a more competitive tender process, enabling a wider set of

applicants to participate in the tender than would otherwise have been the case had eligibility been more restricted.

However, the SAP was designed to do more than manage displaced effort and had the additional objective of assisting fishers (and fishery related businesses, employees and communities) adversely affected by the rezoning. There is a risk that the increased competitiveness at the tender stage of the buyout may have been at the expense of a more costly business restructuring assistance component of the overall adjustment package.

- For example, licence-holders that were substantively impacted by the rezoning but not accepted in the buyout could presumably demonstrate a strong case for business restructuring assistance.
- Anecdotal reports from fisheries advisers claim that in some individual cases, the government assistance provided under business restructuring has exceeded that fisher's tender bid – meaning that more public funds have been invested to keep that fisher's business going than it would to have bought the fisher out.

The full financial implications of the decision not to give preferential treatment to those operators most affected by the rezoning should be assessed once the business restructuring assistance component of the package is complete<sup>20</sup>.

## **5.6: Cost-effectiveness of the buyout**

The tender documentation included the provision that 'licences may be excluded from the buyout process where the offer price is considered significantly above market valuation'. This section examines the extent to which the prices paid for licences were in line with market values.

### **5.6.1: Net and crab fisheries**

The market rate for net licences at the time of the buyout ranged from \$50,000-\$100,000 depending on the additional endorsements held on that licence and the level of catch history (licences with a good catch history commanded a premium in the expectation that a future allocation process may be based to some extent on catch history). The market rate for crab licences ranged from \$50,000-\$75,000.

To avoid paying excessively above market value for net and crab licences, DEH set a ceiling tender price for a combined net and crab licence of \$250,000<sup>21</sup>.

- The ceiling price did not apply to licence-holders that earned more than 25% of their GVP from the areas now closed to fishing. For such operators there was no cap and their licence could still be considered for the buyout even if its offer price exceeded the \$250,000 ceiling.
  - In effect, DEH was willing to pay above market prices to acquire licences from operators with considerable fishing history inside closed areas.

The setting of a ceiling price based on market value to avoid paying excessive prices for net and crab licences was appropriate. However, the ceiling price established - \$250,000 – seems excessive, given that licences with net and crab endorsements were readily available at the time of the buyout for under \$100,000. While it is recognised

<sup>20</sup> The business restructuring component of the SAP is beyond the scope of this particular report

<sup>21</sup> For net and crab operators active in other fisheries such as reef line, the ceiling price was adjusted higher by \$1 for every \$ of GVP generated from these other fisheries

that a premium above market price was needed to attract the interest of more active net fishers, the 150% premium used in the SAP seems overly generous.

DEH paid considerably above market value to obtain the 65 net and crab licences that it acquired from active net and crab fishers.

- Of the 65 active net and/or crab operators bought-out, 40 can be considered to have been specialist net or net/crab fishers– specialist in this context being defined as having a GBRMP GVP in excess of \$30,000 over the assessment period of which the net and crab fisheries contributed more than 90%.
- 17 of these 40 specialists received \$150,000 or more for their licence, with 10 of them receiving \$200,000 or more.

Paying above market rates could possibly be justified in order to attract - and permanently remove - high catching/high effort operators. However, this justification is weakened given the context of the two fisheries where the abundant latent effort was always going to jeopardise the extent to which effort acquired through the buyout was permanently removed.

- Any one of the 17 specialist net and crab operators that received \$150,000 or more for their licence could have re-entered their fishery(ies) immediately after the buyout by acquiring another licence – at a maximum cost of \$100,000 - and continued fishing as before, having made a substantial gain on the deal.
- Admittedly, this gain involved exchanging the catch history from their former licence with that of their new licence and the associated risk that of lost future entitlements if DPI&F introduced new management arrangements basing future entitlements on catch history.
  - As explained in section 5.2.1, DPI&F has not as yet developed new management arrangements in either fishery linking future entitlements to catch history. Operators that sold licences to the buyout and then returned to the fishery have not as yet incurred any consequences.
- Anecdotal industry information suggests that of the 17 net and crab specialists that sold licences to the buyout:
  - 13 operators – or 75% – are still active in one or both fisheries;
  - 2 operators – 12% – are known to have left the fishery; and
  - the status of the remaining 2 (12%) is unknown<sup>22</sup>.

The likelihood that many of the more active operators that sold licences to the buyout for a premium price may have remained active in the two fisheries casts doubts over the cost-effectiveness of the net and crab buyout. However, as explained in the previous section, it is difficult to assess the cost-effectiveness of one aspect of the SAP – in this case the buyout - in isolation of the other main component of the SAP – the business restructuring assistance.

- Paying a premium to include high catching operators in the licence buyout has effectively excluded those operators from seeking business restructuring assistance and may thus have saved restructuring assistance costs.

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<sup>22</sup> As stated previously, it was considered inappropriate for FERM to investigate the current activities of the successful tenderers to verify the industry claims. It is suggested that DEH liaise with Queensland fisheries officials if it wishes to substantiate the number of specialist net and crab fishers that remained active in the two fisheries.

### 5.6.2: The prawn trawl fishery

Unlike the input controlled inshore fisheries, latent effort is not a significant issue in the trawl fishery, and operators that sold effort units to the buyout could only re-enter the fishery by acquiring existing units from another operator. The trawl effort acquired during the buyout can thus be considered as having been permanently removed from the fishery.

The buyout purchased 136,462 units and 21 trawl licences, at a total cost of \$9.3m. Using an estimated value of \$50,000 for each trawl licence<sup>23</sup>, the average price paid per unit of effort is estimated at around \$60. Given that at the time of the buyout there was a plentiful supply of effort units on the market for \$50/unit, units purchased through the buyout received a 20% premium above market price.

- Had DEH been able to pay \$50/unit instead of the estimated \$60/unit, and still allowing \$50,000/licence, the trawl buyout would have cost \$7.9m compared to the \$9.3m actually spent, a potential saving of \$1.4m. Alternatively, a greater amount of effort could have been removed for the same amount of money - for example, the 'saved' \$1.4m could have been used to acquire an additional 20,000 units and 8 more licences.
- The same argument holds true, though on a smaller scale, had DEH paid only a 10% premium for purchased units. The saving in this case would have been around \$700,000, or the equivalent of an additional 10,000 units and 3 extra licences.

It is recognised that some of the above benefits may have been lost should sellers have increased their asking price once they became aware that the Government was actively buying units.

Perhaps of more significance is that not all prawn operators fish in the GBRMP – 16% of the prawn tenderers were rejected on the basis that they had no recent fishing history in the GBRMP. DEH, mindful that numerous past fisheries adjustment programs had bought inactive effort, rightly linked the buyout to active GBRMP operators. Had it sought to buy units on the open market, it would have needed to implement some sort of screening process to ensure that it was dealing only with operators with GBRMP history, adding complexity to the buying process. It is also unclear how many of the \$50 units available on the market had GBRMP history.

The potential savings that may have been realised from purchasing units through the open market may have been at greater risk of buying inactive units – in terms of not having recently fished in the GBRMP. This is recognised as a significant risk.

- The use of the competitive tender system to acquire the desired number of prawn units is supported, despite the premium paid for trawl units.

#### Did the buyout need to purchase trawl licences?

To participate in the trawl fishery, an operator needs both a trawl licence and effort units. Both were acquired in the buyout.

Conceptually, the buyout need only have purchased effort units - a licence without units cannot be used in the fishery. However, because of this limited use, a trawl

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<sup>23</sup> This is an estimated value only - the true market value of a prawn licence with no trawl units is difficult to determine but is expected to be modest.

licence without units is likely to be of modest value, and the cost of purchasing the 21 licences is expected to account for only a small portion of the \$9.3m spent on the trawl buyout. Accordingly, the question of whether the buyout needed to acquire trawl licences is not considered to be a significant issue.

Should the tender bids have implicitly included the value of the trawl vessel?

A number of industry representatives were of the view that Government officials encouraged fishers to determine their tender price in the context of their tendering their fishing business rather than just their effort units and fishing licence.

- Based on their interpretation of the officials' advice, it appears that some fishers subsequently included the value of the fishing vessel in their tender bid.

In a study examining fisheries adjustment in the south east trawl fishery, FERM (2005) found that some operators had unrealistic expectations regarding the market value of their vessel. FERM considered this to be a major impediment to autonomous adjustment in the fishery, with fishers reluctant to sell their permit or quota until they also had a buyer for their vessel. It is reasonable to expect that some operators in the Queensland trawl fishery held similarly inflated views regarding the true market value of their vessel.

That some operators have unrealistic expectations regarding their vessel's worth is not the issue. What is of concern is that some fishers may have understood that their vessel price – or any capital loss from the subsequent sale of their vessel – should have been factored into their tender bid.

The key issue from a DEH perspective is that all operators receive clear and consistent information/advice regarding the tender.

- It is then up to each individual operator to determine their tender bid, taking account of their own personal circumstances and their own attitude towards risk. If some operators want to include their expected loss from the sale of their vessel into their tender price, and in so doing take the risk that they may price themselves out of the tender market, that is their prerogative.

### **5.6.3: Line fisheries**

The move to quota management and the setting of the TAC at a level considerably below the 2003/04 catch meant that at least for the target species – coral trout – latent effort was not going to be an issue. Similar to the situation with trawl, coral trout quota removed by the buyout was not going to reappear in the fishery under some other guise.

The situation is less clear in regard to RTE and other line quota, where there is considerable underutilisation of quota. However, given that in most cases the catch of these species is taken in association with targeted fishing for coral trout, detailed consideration of the effectiveness of the buyout in regard to these species is not warranted.

The use of a competitive tender system to acquire the desired levels of reef line quota and Spanish mackerel quota is likely to have resulted in a reasonably cost-effective outcome for all species.

## **5.7: Regional issues**

### The net and crab fisheries

The efforts made in the buyout to set regional ERTs for the net and crab fisheries are supported. However, just as the return of 'removed' effort jeopardises the overall success of the buyout, the potential return of effort threatens the effectiveness of these regional objectives and undermines the rationale for the second-round purchase of additional licences to meet the regional targets.

### The prawn trawl fishery

Industry reports that subsequent to the buyout, there has been a general southerly shift in the pattern of prawn trawl effort out of the GBRMP and into the eastern king prawn grounds, adversely affecting those operators that have traditionally targeted the inshore grounds and also potentially the eastern king prawn stock.

Effort can readily move between the various sectors of the east coast prawn fishery, and this southerly movement had actually started before the buyout - a DPI&F report estimates there was a 6% increase in effort in the eastern king prawn sector in the first two years of the new trawl plan (2001-2002) (DPI&F 2004).

The inadequacy of the current management arrangements in dealing with spatial partitioning of effort and effort reductions, should this be required, had previously been noted in DEH's November 2004 strategic assessment of the trawl fishery under the EPBC Act provisions. DPI&F is presently considering the feasibility of finer scale spatial management in the fishery.

The point made here is that not all the current pressures experienced in the eastern king sector of the fishery are attributable to the rezoning. Such pressures were occurring prior to the rezoning and most likely would have continued to increase even had the rezoning not occurred.

At the same time, it needs to be recognised that the rezoning may have accelerated the southern movement of effort, particularly if the ERT for the trawl fishery understated the true fishery impacts. In this situation, some – but not all – of the pressures in the eastern king prawn sector of the fishery can be attributed to the rezoning, though the true impact is difficult to quantify.

## 6 CONCLUSIONS/RECOMMENDATIONS

Given the scale of the RAP – with the area of the GBRMP closed to fishing being increased from 4.5% to 33.3% - other external pressures on the Australian fishing industry and the associated Australian Government-Queensland Government jurisdictional issues, the structural adjustment program implemented to prevent displaced fishing effort from having adverse spill-over effects in other areas was bound to be contentious and politically sensitive.

### **Regarding the setting of the ERTs**

The objective of the licence buyout was to prevent effort displaced as a result of the closures from having unsustainable spill-over impacts on areas left open to fishing. This objective was to be achieved by buying-out an equivalent amount of effort to that displaced as a result of the closures.

In principle, the approach used to estimate the ERTs was sound. However, in practice, the limitations of the available data meant that there was a fair degree of uncertainty surrounding the resulting ERT estimates and the resulting estimates were best interpreted as being an imprecise estimate of the true level of displaced effort. Recognising this uncertainty, the ERTs were appropriately subject to scrutiny by a Technical Advisory Committee comprised of both government and industry representatives. In cases where the Technical Advisory Committee was unable to reach agreement on an ERT – such as in trawl – consideration should have been given to implementing some form of dispute settlement procedure to resolve the deadlock.

#### Recommendation 1:

That for future buyouts, ERTs should continue to be calculated using the best available data, including VMS data where this is available. Consideration should be given to verifying logbook data, though noting that data verification is usually time consuming and resource intensive.

#### Recommendation 2:

That the ERTs should continue to be subject to negotiation between industry and Government representatives, using the results from the ERT calculations but also recognising the level of uncertainty associated with the data used to make those calculations.

#### Recommendation 3:

That all parties should strive to reach consensus on the ERTs. In cases where consensus is not reached, consideration should be given to referring the issue to an independent third party.

### **The selection of the tender groups**

This report supports the approach taken in the buyout of attempting to meet the respective ERTs in the most cost effective manner – that is, at least cost.

- This strategy was fully implemented and the buyout met all ERTs at least cost.

#### Recommendation 4:

That future buyouts continue to use cost as a key determinant in the selection of successful tenders.

### **The effectiveness of the buyout**

The buyout achieved the ERTs for each fishery. Provided the ERTs were set at the appropriate level, it would seem reasonable to assume that effort levels in the areas remaining open to fishing after the introduction of the RAP would have been kept to their pre-RAP levels, thus negating the risk of any adverse spill-over impacts.

In practice, this assumption need not necessarily hold true.

- Should the management arrangements in the areas remaining open to fishing be incapable of controlling the level of effort, a buyout cannot of itself ensure that effort in these areas will be kept to sustainable levels.

The fisheries management arrangements in the net and crab fisheries were inadequate at restricting the level of potential effort in the areas remaining open to fishing. The success of the buyout in these fisheries was thus jeopardised by the potential return of 'removed' effort utilising underutilised net and/or crab licences.

- Despite unverified reports that a substantial number of operators successful in the buyout remain active in the net and crab fisheries, logbook data indicates substantial falls in catch and effort in both fisheries since the buyout.
- This outcome is fortunate, for conceptually, 100% of the net and crab effort acquired in the buyout could have returned to its respective fishery.

In contrast, the fisheries management arrangements in the prawn and line fisheries are much more robust, such that the return of effort in these fisheries was not an issue.

#### Recommendation 5

When new marine protected areas are established or zoning arrangements change, DEH should only implement a fishery licence buyout in those fisheries in which management arrangements are considered to be effective in constraining the level of fishing effort in the areas remaining open to fishing.

#### Recommendation 6

Where new marine protected areas are established or zoning arrangements change and existing fishery management arrangements are judged to be ineffective in controlling the level of effort in the areas remaining open to fishing, DEH should make the development and implementation of appropriate fisheries management arrangements a prerequisite to any fisheries buyout.

In the case of the trawl and line fisheries, where the fisheries management arrangements are effective in controlling the level of effort/catch in the areas remaining open to fishing, the key issue regarding the buyout concerns the setting of the respective ERTs.

- In the trawl fishery, the concern is that the 6.2% ERT may have understated the level of displaced effort and that remaining displaced effort is having adverse biological and economic impacts in areas remaining open to fishing.
- In the line fishery, the concern is that the 10% ERT may have overstated the level of displaced effort. This is not an issue from a sustainability perspective, but it does raise the question of whether too much was spent purchasing line quota and whether these funds could have been more effectively used offsetting concerns in these other fisheries or as cost savings to the Government.

## **Vessels and fishing gear**

This report supports the view that including restrictions on the vessel and/or fishing gear as part of the tender process would be difficult to administer and enforce, would make the adjustment program more expensive, and would most likely follow the experiences of other countries and be largely ineffective in permanently removing real effort from the fishery.

### Recommendation 7

Future adjustment programs should adopt the same approach used in the SAP whereby the tender applies solely to the fishing entitlement and does not include the fishing vessel/or fishing gear.

## **The decision not to give preferential treatment to the most affected operators**

A key assumption underpinning the buyout was that for those fisheries where the displaced effort was considered to have unsustainable ecological or economic effects, effort is sufficiently mobile within the fishery such that licences can be bought from anywhere in the GBRMP. Accordingly, the licences subsequently bought out were not necessarily those most disaffected by the rezoning.

The rationale for separating effort and eligibility was to have a more competitive tender process, opening-up the tender to a wider set of applicants than would otherwise have been the case had eligibility been restricted to those licence holders directly affected. However, there is a risk that the increased competitiveness at the tender end may have been at the expense of a more costly business restructuring assistance component of the overall adjustment package.

### Recommendation 8

That DEH review the decision not to give preferential treatment to those operators most impacted by the rezoning once the business restructuring assistance component of the SAP is completed.

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