

# Review of ABARES' Social and Economic Assessment of the Proposed Commonwealth Marine Reserves Network

Commonwealth Fisheries Association

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# 1. Executive summary

The Commonwealth Fisheries Association has engaged Ernst & Young to review ABARES's socio-economic impact assessment of the Commonwealth Marine Reserves Network Proposal (the Marine Reserves Proposal). Ernst & Young has found that the ABARES study lacks the consideration of the full impacts of the Marine Reserves Network Proposal. In particular, it does not consider the following costs:

- ▶ The loss of prospective revenues and earnings associated with current licences
- ▶ The impacts on the downstream processing industry
- ▶ The impacts on charter fishing, tourism and recreational fishing
- ▶ The costs of implementing the Marine Reserves Proposal, including enforcement costs.

ABARES' approach to the study in the five regions affected by the Marine Reserves Proposal is limited to three main elements, which are summarised below.

Component	Method	Key metric
1. Direct displacement of commercial catch	Examining catch information based on historical logbook and spatial catch data.	Gross Value of Production (\$GVP) displaced
2. Social impact assessment	Surveys, focus groups and interviews	Various qualitative responses to questions around impacts on fishing business as well as personal and community impacts.
3. Economic impact analysis	CGE analysis by inputting GVP displaced into the AusRegion Model.	Gross Regional Product and Regional Employment

While each of these elements can be informative in the right context, no attempt was made to combine and assess these impacts in an integrated manner. We understand, however, that ABARES' scope was limited to a social and economic impact assessment that would be fed into the Department of Sustainability, Environment, Water, Population and Communities' Regulatory Impact Statement (RIS).

ABARES' work is therefore insufficient to assess whether implementing the Marine Reserves Proposal delivers a net public benefit. In assessing significant policy changes of this nature, it is good practice to adopt a full cost benefit analysis (CBA) approach to enable policy makers to consider the merits of the proposal. Specifically, CBA is a policy assessment tool that considers the following policy questions:

- ▶ Does society stand to gain or lose, and what is the dollar value of the net gain or loss?
- ▶ How are the benefits and costs distributed among members of society?

ABARES' analysis does not answer these critical questions.

In undertaking a full CBA, it would be expected that (at a minimum), impacts presented in Table 1 are quantified and compared to assist in determining if the Marine Reserves Proposal is in the public's interest. These factors were not quantified in ABARES' study.

Table 1 also summarises the key limitations to ABARES' study and the areas that would warrant further investigation before a decision could be made on the merits of the proposal, notwithstanding the measurement difficulties that are likely to arise.

**Table 1: Summary of key limitations to the ABARES analysis**

Item	Comment on ABARES study
<b>Costs</b>	
Reduced producer surplus (profits) to:	
Commercial fishers	<ul style="list-style-type: none"> <li>▶ Only GVP displaced for a representative year is considered. GVP is only a partial metric. A true measure of "economic value" needs to net off the associated production costs from GVP (i.e., the producer surplus)</li> <li>▶ No consideration of prospective impacts on producer surplus (i.e., GVP foregone with the development of new fisheries or increases in production costs due to operational inefficiencies caused by the marine reserves)</li> <li>▶ No consideration of the (discounted present) value of the future stream of impacts</li> <li>▶ Any reduction in industry profits caused by the proposal will ultimately lead to a reduction on license asset values (which effectively represent the capitalisation of current and future industry profits).</li> </ul>
Downstream processing businesses	<ul style="list-style-type: none"> <li>▶ Downstream impacts on industries such as processing and wholesaling businesses were not directly measured. The exclusion of analysis of the foregone profits to downstream industries represents a major limitation to the ABARES study</li> <li>▶ ABARES uses a computable general equilibrium (CGE) model to model flow on impacts of reduced GVP in terms of wider GRP and employment losses. Appropriateness of applying this CGE approach to small regional production changes is open to question.</li> </ul>
Charter fishing businesses	▶ Reduced profit to chartered fishing businesses not measured.
Tourism businesses	▶ Reduced visitation to regional towns and associated reduced profits to tourism industry (accommodation, restaurants and retail) not measured. Any increases in tourism that might arise (e.g., eco-tourism) need to be netted off against these costs.
Reduced consumer surplus from restricted recreational activities	▶ Social values from reduced fishing opportunities (or reduced quality of opportunities) were not measured.
Implementation costs	<ul style="list-style-type: none"> <li>▶ No consideration of: <ul style="list-style-type: none"> <li>▶ Enforcement costs</li> <li>▶ Administrative costs of raising public funds for industry assistance</li> <li>▶ Cost of administering structural assistance</li> <li>▶ Deadweight losses.</li> <li>▶ Management costs (including research and community and industry education)</li> </ul> </li> </ul> <p>The exclusion of these implementation costs represents a major limitation of the ABARES study.</p>
<b>Benefits</b>	
Improved environmental and conservation values to households	▶ Improved environmental and conservation values not measured.
<b>Net results</b>	
Cost benefit ratio	▶ No comparison of costs and benefits undertaken to enable a view on whether proposal delivers a net benefit to society.
Net present value	▶ No consideration of the benefits and costs over an adequate time horizon.

From the perspective of assessing the merits of the Commonwealth Government's Marine Reserves Proposal, the ABARES work does not adopt a comprehensive approach to assessing costs and benefits. In other words, it cannot be used to establish whether the benefits outweigh the costs.

In addition to not considering the full costs of the proposal indicated above, it does not consider the benefits that it is meant to provide (i.e. in terms of improved environmental and conservation outcomes). Therefore it provides no indication of the magnitude or materiality of these benefits.

Therefore, it is not possible, within the context of this review, to ascertain what would be the net result of a more appropriate approach to assessing the merits of the Marine Reserves Proposal.

It is clear, however, that it provides no basis on which to assess whether the benefits of the Commonwealth Government's Marine Reserves Network Proposal would likely outweigh its costs.

Moreover, the ABARES studies did not consider the cost of any industry assistance package in their assessment. It is unclear how the recently announced \$100 million assistance package was developed and whether, if at all, the ABARES analysis was used to inform its development. If it has been used by the Commonwealth Government to infer the quantum of any adjustment assistance, it is likely to be insufficient for that purpose also.

The industry displays a wide variation in the profitability and thus value of the licences and quota they currently possess. The adjustment costs could also be expected to vary widely for the affected fishers, regions and towns, in part depending on the extent to which they rely on the fishing industry.

## 2. Introduction

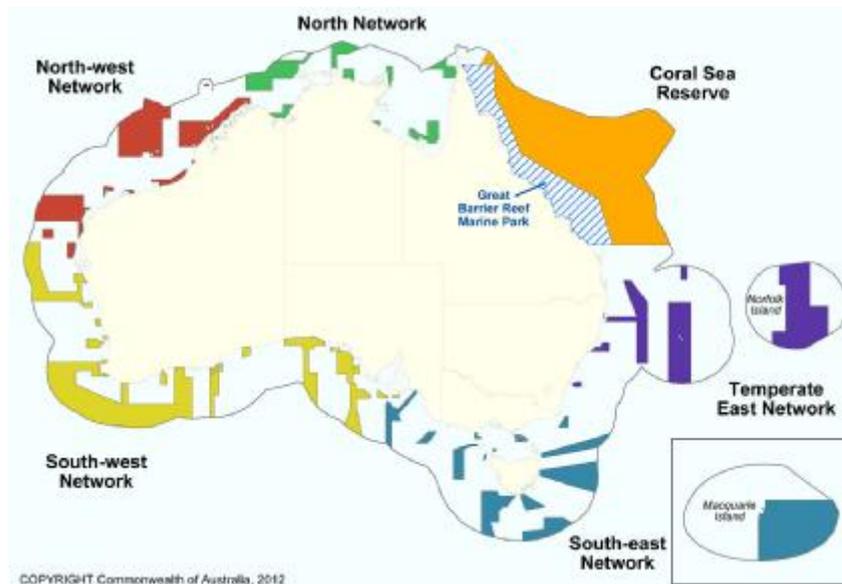
### 2.1 The Commonwealth Marine Reserves Network Proposal

On 14 June 2012, the Australian Government announced its final proposals for a marine reserves network (the Marine Reserves Proposal) covering five regions in Commonwealth waters (which generally extend from three nautical miles offshore to the boundary of Australia's Exclusive Economic Zone). The five regions that have been designated are:

- ▶ Coral Sea
- ▶ Temperate East
- ▶ South-west
- ▶ North-west
- ▶ North.

The reserves are being established to conserve marine biodiversity by protecting different marine ecosystems and habitats and the life they support. The activities that may or may not be permitted in these reserves can differ in each proposed zone. In designated National Park zones within these Marine Reserves, recreational, charter, and commercial fishing (along with mining activities) will be prohibited. In other zones, there will be restrictions placed on the type of gear that commercial fishers can use (e.g., demersal trawl fishing is prohibited across the South-west Network).

Figure 1: Final Commonwealth Marine Reserves Network Proposal



Source: Department of Sustainability, Environment, Water, Population and Communities website <http://www.environment.gov.au/coasts/mbp/reserves/index.html>

The implementation of this proposal will create both benefits and costs to the Australian community. From a fishing industry point of view, there are costs associated with restrictions on fishing production within Commonwealth waters, which translate into economic costs for the community.

## 2.2 ABARES Studies

As part of the development of the Commonwealth Marine Reserves Network Proposal, socio-economic assessments were conducted in each region to determine the extent of the direct impacts on industry of the proposed marine reserves networks and the flow-on effects to regional communities.

The assessments were prepared after consultation with the fishing industry and government fisheries management agencies, and have informed government decisions on the final network of reserves proposal. They were published in June 2012 and the key documents are:

- ▶ ABARES (2012a) *Coral Sea Commonwealth Marine Reserve: social and economic assessment of the impacts on commercial and charter fishing, June 2012*
- ▶ ABARES (2012b) *Temperate East Commonwealth Marine Reserve: social and economic assessment of the impacts on commercial fishing, June 2012*
- ▶ ABARES (2012c) *South-west Marine Region Commonwealth Marine Reserve: social and economic assessment of the impacts on commercial and charter fishing, June 2012*
- ▶ ABARES (2012d) *North-west Marine Region Commonwealth Marine Reserve: social and economic assessment of the impacts on commercial and charter fishing, June 2012*
- ▶ ABARES (2012e) *North Marine Region Commonwealth Marine Reserve: social and economic assessment of the impacts on commercial and charter fishing, June 2012.*

The reports above are structured into two parts:

- ▶ The first (Draft Part) was released in May 2011
- ▶ The second part (Final Part) being a supplementary section released in 2012 that takes into account revised and updated data and information received during the consultation phase.

The principal findings of the assessments are reported in the Regulation Impact Statement (RIS) that was also considered by the Australian Government in finalising the Marine Reserves Proposal.<sup>1</sup>

## 2.3 Recent Ministerial announcement

On 14 June 2012, the Australian Government indicated that an industry assistance package of \$100 million to the fishing industry would precede the proposed Commonwealth Marine Reserved Network.<sup>2</sup>

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<sup>1</sup> Department of Sustainability, Environment, Water, Population and Communities (2012) *Completing the Commonwealth Marine Reserves Network: Regulatory Impact Statement*.

<sup>2</sup> Tony Burke and Joe Ludwig (2012) Industry assistance to precede marine reserves, Media Release.

It should be noted that the ABARES studies did not consider the cost of any industry assistance package in their assessment. It is unclear how the \$100 million assistance package was developed and whether, if at all, the ABARES analysis was used to inform its development.

## 2.4 Scope of this review

The Commonwealth Fisheries Association has engaged Ernst & Young to review ABARES's socio-economic impact assessments for the five regions, and to report on any limitations of the work carried out. Our work considers:

- ▶ The evaluation methodology
- ▶ The reliance of key metrics such as Gross Value of Production
- ▶ The appropriateness of using ABARES' AusRegion computable general equilibrium model in calculating regional impacts and downstream impacts
- ▶ Any material omissions (including other non-core socio-economic impacts and structural adjustment costs).

In undertaking a high level assessment of the approach, and in reviewing its application in detail in the context of the South-west marine region reserves, we focus on where the approach and its application may be inadequate.

Ernst & Young's scope is limited to preparation of a report on the limitations of the socio-economic impact assessments which have been undertaken. Recalculation or redetermination of the impacts is outside the scope of this review.

## 3. Overview of the ABARES studies

### 3.1 ABARES' objectives and approach

As noted in ABARES' scope of work (ABARES 2012c, p22) the goals of their study were to:

- ▶ Develop and refine estimates of the potential displacement of commercial fishing activity (including charter fishing) from the draft marine reserves network
- ▶ Provide quantitative and qualitative information about the way commercial fisheries' inputs and outputs interact with regional economies and associated local communities. This includes potential short-term and longer term responses of those economies and communities to the levels and types of displacement estimated for the draft marine reserves network. This information is required to assess potential short-term and longer term impacts on employment and economic flows at local (e.g. key ports) and regional levels
- ▶ Provide quantitative and qualitative information about the degree of economic dependence of individual fishers and local communities on fisheries that will potentially be displaced by the draft marine reserves network
- ▶ Provide sufficient data and information about the methods, structure and patterns of potentially affected fisheries to ensure that changes in the design of draft marine reserves can be evaluated for their relative social and economic impacts
- ▶ Provide suitable information to be incorporated in the regulatory impact statement for the draft marine reserves network to ensure that the economic and social costs of the proposals are transparent to government.

ABARES' approach to the study comprises three main elements:

1. *Direct displacement of commercial and charter fishing* - estimating the volume and Gross Value of Production (GVP) of catch that would be displaced under the proposal.
2. *Social impact assessment* - qualitative analysis based on:
  - ▶ Responses to surveys of commercial and charter fishing businesses as well as interviews with selected industry and community groups to understand changes to business costs, investments and behaviour, ability to adapt, and personal and community impacts
  - ▶ Narrative case studies of the impact on specific regions, with discussion focused on business impacts, supply chain and community impacts.
3. *Subregional economic modelling* - ABARES' computable general equilibrium model was used to model the economic impacts (Gross Domestic Product, Gross State Product and Gross Regional Product and jobs) associated with the direct displacement of GVP.

These are summarised in detail in Appendix A.

## 4. Limitations of the ABARES studies

This section presents the key limitations of the ABARES studies. Overall, the ABARES analysis does not provide any conclusions as to whether implementing the proposed Commonwealth Marine Reserves Network is in the public's interests (i.e., whether the benefits obtained will be sufficient enough to outweigh the costs to industry and the wider community).

### 4.1 Lack of integrated cost benefit evaluation

ABARES' analysis is limited in scope and adopts three separate methods to assess socioeconomic impacts:

- ▶ Measuring impacts to commercial and charter fishers in (foregone) GVP terms
- ▶ Measuring wider economic impacts to the regional economies, using a CGE analysis to derive changes in GDP and employment
- ▶ Qualitative assessments of impacts to fishing businesses and communities.

It specifically notes that:

*The scope of work does not include potential impacts on non-commercial activities, including recreational fishing, customary fishing and tourism, nor does it attempt to cost or quantify any loss of asset values (e.g. fishing access rights, boats and shore-based infrastructure). The costing and design of any Australian Government assistance (structural adjustment) were also not part of the scope*

While each of these elements can be informative in the right context, no attempt was made by ABARES to combine and assess these impacts in an integrated manner. On their own, they are insufficient to assess whether implementing the Commonwealth Marine Reserves Network Proposal delivers a net public benefit.

ABARES' analysis also appears to be focussed on understanding economic impacts rather than the economic benefits/costs of the change (see discussion of the differences between these concepts in Box 1). In assessing significant policy changes of this nature, it is good practice to adopt a full cost benefit analysis (CBA) approach to enable policy makers to consider the merits of the proposal.<sup>3</sup> Specifically, CBA is a policy assessment tool that considers the following policy questions:

- ▶ *Does society stand to gain or lose, and what is the dollar value of the net gain or loss?*
- ▶ *How are the benefits and costs distributed among members of society?*

The key principle of CBA is to convert the costs and benefits of a particular proposal into dollar terms wherever possible. Decisions on whether the project is desirable can then be informed by whether the project can reasonably be expected to yield benefits that are over and above its costs. Costs and benefits are also considered over a period of time and the stream of impacts is converted into present values (using an appropriate discount rate). An economic CBA differs from a financial CBA in that it is performed from the view point of

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<sup>3</sup> For instance, see Council of Australian Governments (2007) *Best Practice Regulation: A Guide for Ministerial Councils and National Standard Setting Bodies*.

society (that is, Australia) and considers a broad range of cost benefit impacts (including non-market impacts).<sup>4</sup>

**Box 1: Difference between economic impact versus cost benefit analysis**

Policy makers are often required to undertake economic analysis of proposals in the spirit of evidence-based policy. Types of economic analysis include:

- ▶ Economic impact studies - these studies are used to measure the impact of policy changes or interventions, with the metric expressed in terms of changes to Gross Domestic Product (GDP), employment and other macroeconomic indicators. Economic impact studies (and the use of CGE models) gained popularity in the 1980s when they were used by the then Industry Assistance Commission to assess the impact of tariff reforms. Economic impact studies were useful tools at the time as such reforms had large scale ramifications on the Australian economy
- ▶ Economic cost benefit studies - cost benefit studies are about assessing change. They compare the costs of change versus the benefits of change. These studies add an extra dimension by considering the measurement of impacts that are not transacted in the economy (such as environmental and social benefits). Cost benefit studies have become increasingly popular in project evaluation because they give an indication of economic efficiency.

Given that these approaches express results in dollar figures, the terms economic impact and benefit are often used interchangeably. As a result, there is often confusion surrounding the comparability of reported results. Watson, Wilson, Thilmany and Winter (2007) define economic impact as follows:<sup>5</sup>

*An "economic impact" should be reserved for the narrow results where an industry, event, or policy has the result of either: 1) bringing new revenues into the region that would otherwise not occur in the region or 2) keeping revenues in the region that would otherwise be lost to the region. Economic impacts are de-fined as the net changes to the economic base of a region that can be attributed to the industry, event, or policy that would otherwise not be there.*

Thus, the key to economic impact studies is an understanding of the quantum of new expenditures (or loss of expenditures) to an economy (taking account any substitution effects on other industries).

Economic impacts, however, do not necessarily reflect economic costs or benefits. For instance, while an increase in GDP and employment is a positive impact, this comes at a cost in terms of higher wages and higher input costs. Economic impact studies do not provide any insight into whether this change is net beneficial from a *social welfare* perspective. They simply a measure changes in economic activity. The alternative cost benefit assessment approach should not be confused with the economic impact assessment. As noted by Watson, Wilson, Thilmany and Winter (2007):

*The term "economic benefit" is reserved for an entirely different type of analysis: a cost-benefit analysis. Cost-benefit analysis is an economic efficiency analysis that, unlike economic activity analysis, is concerned with overall economic efficiency and social welfare measures.*

CBA studies include the full range of impacts (both market and non-market impacts). Non-market impacts are not typically included in economic impact studies as they are not transacted and therefore do not contribute to economic activity. However, these items should be included in cost benefit studies (if they can be valued) as the intention is to understand changes to social welfare (which is beyond financial or economic benefits).

ABARES' analysis does not answer these important policy questions (although we understand that ABARES' scope was limited to a social economic impact assessment that would be fed into the Department of Sustainability, Environment, Water, Population and Communities Regulatory Impact Statement (RIS)).<sup>6</sup> In undertaking a full CBA, it would be expected that (at a minimum) impacts presented in Table 2 be quantified and compared.

<sup>4</sup> By comparison, a financial CBA looks only at the financial impacts from a project perspective.

<sup>5</sup> Watson, Wilson, Thilmany and Winter (2007) Determining Economic Contributions and Impacts: What is the difference and why do we care? *Journal of Regional Analysis and Policy* 37 (2):140-146.

<sup>6</sup> In a cursory review of this RIS (as this is outside the scope of our work), there was discussion of the costs and benefits of the proposal. However, Ernst & Young was unable to find any analysis in this RIS to enable a true cost benefit analysis that compares costs and benefits on a 'like with like' basis.

Table 2: Range of costs and benefits that could be considered in a cost benefit framework

Costs	Benefits
<ul style="list-style-type: none"> <li>▶ Reduced producer surplus (profits) to                             <ul style="list-style-type: none"> <li>▶ Commercial fishers</li> <li>▶ Downstream processing businesses</li> <li>▶ Charter fishing businesses</li> <li>▶ Tourism businesses</li> </ul> </li> <li>▶ Reduced consumer surplus from restricted recreational activities</li> <li>▶ Implementation costs to government.</li> </ul>	<ul style="list-style-type: none"> <li>▶ Improved environmental and conservation values to households</li> </ul>

## 4.2 Limitations of using GVP measures

A large component of ABARES' study focuses on quantifying the impact of the proposal on displacing fishing production in GVP terms. While there are issues around how these values have been derived (as they are based on historical values that have been affected by volatile market conditions and past closures of fisheries areas for stock rebuilding), there are also conceptual issues surrounding the appropriateness of using foregone GVP as the key indicator of industry direct cost.

As noted by ABARES (2011) in a separate document:<sup>7</sup>

*“GVP is a useful economic indicator for measuring economic activity in fisheries. Importantly, this activity underpins employment in the sector. However, this indicator cannot provide any information about the underlying economic returns being generated in the sector—the so called economic objective of fishery management.”*

This section looks at the limitations associated with using the GVP measure.

### ***Producer surplus and asset values not considered***

Using GVP metrics only may overstate the value of the fisheries to the industry as it does not net off the industry costs incurred in harvesting the resource. In cost benefit studies, it is good practice to use *producer surplus* measures to estimate the value forgone to industry. Effectively, producer surplus is the profit to the industry (i.e., GVP less production costs).

Intuitively, the lost value to industry can be estimated by calculating the reduced stream of surpluses or profits associated, and converting this into a net present value (NPV) estimate applying appropriate discount rates.<sup>8</sup>

This can be reflected in the reduction in the asset value of fishing licences, which is the present value of the future profit stream for the duration of the licence. For instance, if profit for a fishery is reduced by \$1 million per annum, the present value of this reduced stream of profit into perpetuity (assuming a discount rate of 8%)<sup>9</sup> equates to around \$12.5 million in present value terms.

<sup>7</sup> ABARES (2011) Australian fisheries - outlook and economic indicators.

<sup>8</sup> The discount rate that should be used is often contentious (see discussion in Appendix B). Social (real) discount rates that have been used in cost benefit studies can range between 3.5% and 8%. However, in valuing commercial fishing licences, a commercial discount rate, which takes into account commercial risk, is probably appropriate. Discussion of social discount rates is discussed at length in Productivity Commission (2010) *Valuing the Future: the social discount rate in cost-benefit analysis*.

<sup>9</sup> Based on Productivity Commission (Harrison) suggestion in Appendix B.

ABARES' analysis focuses on impacts for a representative year, and does not consider this reduced stream of profits to industry. Nor does it consider how asset/licence values are impacted by the Marine Reserves Proposal.

The licences/quotas traded on the open market, for instance, might provide an indication of the future industry profits from Commonwealth fisheries as valued by the market. These values can be quite high, as indicated in Box 2.

**Box 2: Asset Values in Timor Reef and Demersal Fishery**

Prior to the move to quota system there were 11 licences in the Timor Reef fishery. The last known sale price of a licence was \$2 million.

Feedback from the industry brokers suggest that quotas could trade for the following prices:

- ▶ Goldband quotas at \$20,000 per tonne
- ▶ Red Snapper quotas at \$10,000 per tonne
- ▶ By Product \$12,000 at per tonne

With the current combined total annual allowable catch (TAC) for the Timor Reef and Demersal Fisheries as being

- ▶ 1,800 tonnes for Goldband
- ▶ 3,800 tonnes for Red Snapper
- ▶ 1,330 tonnes for By Product

This implies an asset value of around \$90 million for these fisheries. Thus, a 10% reduction in profitability for these fisheries would imply a loss of values of \$9 million for these fisheries.

*Source: Quota Values in Timor Reef and Demersal Fishery information provided to Ernst & Young by industry brokers.*

***Impact of production inefficiencies (compliance costs) on industry profits***

Producer surplus is not only impacted by the reduced value of harvests (i.e. GVP), but also by increases to production costs.

The implementation of the Marine Reserves Proposal may impact on the cost structure of the industry and introduce production inefficiencies and compliance costs (due to area access restrictions as well as restrictions on the type of gear that fishers can use). Responses to the ABARES survey indicate that some businesses will make up their catch shortfalls in other areas, or move into an alternative fishery. This could increase fuel and time costs and reduce the overall profitability of the businesses.

In addition, businesses that are required to downsize their operations may experience higher average costs due to the absence of economies of scale in their operations. In discussions with the Commonwealth Fisheries Association, it was noted that reduced efficiencies and increased costs may arise as the fleet contracts (i.e., mothership and chain logistic costs).

These production inefficiencies, and their impact on producer surplus, were not quantified by ABARES, although we note that information constraints might make this difficult.

***Surpluses to downstream industries***

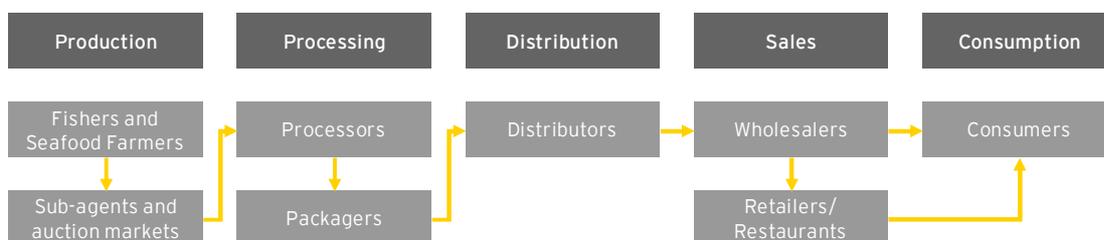
As discussed, GVP only represents the value of production at landed or beach prices. The beach price ignores the potential value adding activity that can occur in the economy to transform the catch into processed or manufactured food items for domestic consumption or export.

Value added activities that would not be captured in the GVP measure included:

- ▶ Fish cleaning or filleting fish, dried or smoked, manufacturing
- ▶ Fish loaf or cake manufacturing
- ▶ Fish paste or pate manufacturing
- ▶ Scallops, preserved, manufacturing
- ▶ Seafood, canned, manufacturing
- ▶ Crustacean processing, including manufacturing (incl. cooked and or frozen).

As Figure 2 shows, there are various steps in between the catching of fish and its final consumption. While the exact process will vary between the different types of seafood, this diagram represents a supply chain for generic fish and fish products<sup>10</sup>.

**Figure 2: Seafood industry supply chain and value adding**



The size of the downstream industries can be significant. For instance, the combined profits of seafood processing and fish wholesaling businesses in Australia is greater than that of the primary fishing sector.

Table 3 illustrates the significant value that is generated further down the supply chain after the initial harvest. The exclusion of analysis of the foregone profits to downstream industries therefore represents a major limitation to the ABARES study.

**Table 3: Revenues and profits of the Australian seafood industry (2011/12)**

	Revenue	Profit
Ocean fishing and seafood farming	\$2.2 billion	\$211.1 million
Seafood processing	\$1.4billion	\$151.1 million
Fish wholesaling	\$4.1 billion	\$65.0 million

*Note: "Ocean fishing and seafood farming" includes aquaculture and products destined for export markets. "Seafood processing" and "Fish wholesaling" includes valuing adding activities associated with imported seafood. Thus, caution should be applied in interpreting the profitability and flow on impacts associated Commonwealth Fisheries from this table.*

*Source: IBISWorld Industry Report (2011) Seafood Processing in Australia, IBISWorld (2012) Ocean Fishing and Seafood Farming in Australia. IBISWorld (2011) Fish Wholesaling in Australia.*

It should be noted that ABARES *did* consider downstream impacts using its AusRegion CGE model (although results are reported in Gross Regional Product terms rather than producer

<sup>10</sup> "The Role of Supply Chains in Addressing the Global Seafood Crisis", United Nations Environment Programme, 2009, accessed from <http://www.unep.ch/etb/publications/Fish%20Supply%20Chains/UNEP%20fish%20supply%20chains%20report.pdf>

surplus terms). The appropriateness of using a CGE model for this analysis is open to question as using complex CGE models for small industry changes (i.e., less than \$100 million) may yield misleading results, particularly when impacts are converted into percent changes on the base data.

As noted by ABARES (2012c, p.114) themselves, there were issues associated with modelling small regional impacts in a national aggregated models:

*"Given the computational limits of the model, the smaller the percentage impact on a region (subregion, state or nation), the greater the uncertainty around the results. As a result, percentage changes of less than 0.005 were considered to be negligible and actual values derived from them are not reported."*

While impacts may be small, they are not necessarily insignificant/unimportant and should be given due consideration (for instance, comparing regional costs to regional benefits associated with the marine reserves network proposal).

### 4.3 Prospective impacts not considered

ABARES' analysis is static and only considers the impact for a representative year. Future impacts are not considered, including:

- ▶ *New and prospective fisheries* - Fishing activity and GVP displaced are based on historical activity associated with existing fisheries. ABARES notes that fisheries that have not yet developed, or those that are still developing, were not quantified in the analysis. ABARES does present cases studies of where prospective fisheries are expected (including prospects for the Great Australian Bight Trawl Fishery and the Western Tuna and Billfish Fishery).<sup>11</sup> The exclusion of prospective fishing activities will therefore understate the loss of productivity from the creation of marine reserves. Some fisheries impacted have long investment histories in licences, and historical investment decisions (such as capital outlays on fleet) were based on expectations about the future and a continuation of the existing policy setting. Leaving this unacknowledged understates the costs (both current and future) to fishing rights holders, including the costs associated with the underutilisation of existing assets and the cost of fisheries management funded by industry levies.
- ▶ *Improvements to markets conditions such as exchange rates* - ABARES notes that the value of Australian fisheries production in the past has been affected by the appreciation of the Australian dollar, which has made exports of fisheries products less competitive in overseas markets. The current GVP estimates are based on historical activity over the last 10 years, and this period corresponds with an appreciation of the Australian Dollar.<sup>12</sup> However, if the Australian Dollar was to depreciate and if more favourable export conditions occur, greater fishing activity, GVP and profits to industry could arise.<sup>13</sup> The ABARES analysis does not consider these alternative scenarios.
- ▶ *Technological and productivity changes* - Technological advances and efficiencies going forward can improve the productivity of the industry. ABARES notes an example of an operator who invested heavily in a small fishery and substantially increased production

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<sup>11</sup> See ABARES (2012c) p.90.

<sup>12</sup> See ABARES (2012c) p.83.

<sup>13</sup> While exchange rates are notoriously difficult to predict, market commentators have indicated that a long term correction to the Australian dollar is likely. For instance, see Westpac Bank (2012) *Westpac Market Insights 2012, August 2012* and Access Economics (2012) *Business Outlook, June 2012*. Access Economics predicts depreciation of the USD/AUD from \$1.026 in 2011/12 to \$0.811 in 2016/17.

of saucer scallops to supply local markets.<sup>14</sup> These technological and productivity changes are not considered in ABARES' estimate of GVP.

#### 4.4 Social and environmental impacts not quantified

The ABARES study does not quantify the lost value to the community from reduced recreational fishing opportunities stemming from the Commonwealth Marine Network proposal. By the same token, it does not value the gains to marine conservation.

Measuring non-market values such as these can be challenging as they tend not to be observed or transacted.

In a separate study, Gillespie and Bennett (2011) quantified the non-use values associated with marine conservation in the Southwest Region using choice modelling / contingent valuation techniques. This involves a survey approach and econometric analysis to gauge the value that Australian households place on marine conservation. They found that, on average, Australian households would be willing to pay \$104 each for the establishment of marine protection areas that cover 10 per cent of the South-west Marine Region. This equates to a value of \$400 million when applied across relevant households.<sup>15</sup>

However, conservation benefits need to be balanced against the associated costs. As noted by Gillespie and Bennett:

*“Whether the establishment of MPAs in the South-west Marine Region is economically efficient requires a consideration of all the potential costs and benefits. Other relevant costs and benefits for inclusion in a benefit cost analysis would include those associated with displacement of commercial and non-commercial uses, additional planning, compliance and monitoring costs as well as any predicted increases in commercial and non-commercial use values.”*

The National Land and Water Resources Audit (NLWRA) also notes that undertaking a full benefit-cost analysis of options to address resource management problems is expensive, particularly in quantifying non-market social and environmental impacts.<sup>16</sup>

There are nevertheless alternative approaches to expensive choice modelling and contingent valuation studies.<sup>17</sup> The discussion below presents “benefit transfer” techniques to quantify “non-use” and “use” values using secondary data.

##### ***Non-use values of conservation***

Non-use values refer to the benefits to Australians who derive value even if they never have and/or never will use the marine areas. That is, they derive satisfaction by knowing that an area is conserved for wildlife etc. As noted above, Gillespie and Bennett attempted to value this for the South-west Marine Region using choice modelling and contingent valuation techniques.

An alternative high level approach is the benefits transfer approach. The NLWRA has published a set of benefit transfer guidelines to assist with the quantification of non-market social and environmental impacts associated with natural resource management. This is intended to be used for a ‘first pass’ assessment of these impacts (see Box 3). Benefits

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<sup>14</sup> See ABARES (2012c) p.5.

<sup>15</sup> Robert Gillespie and Jeff Bennett (2011) *Non Use Economic Values of Marine Protected Areas in the South-West Marine Area*, Environmental Economics Research Hub Research Reports.

<sup>16</sup> National Land and Water Resources Audit (2002) *Australians and Natural Resource Management*, Commonwealth of Australia.

<sup>17</sup> These studies are expensive as they involve large scale surveys.

transfer involves the use of results of previous studies to derive estimates of the value of a site or resource being studied. It is used in situations where valuation using primary research is too expensive or time consuming.

**Box 3: National Land and Water Resources Audit Benefit Transfer Guidelines 2002**

Implicit prices can be used to make 'first pass' assessments of the size of non-market values associated with policies that have particular environmental and social impacts.

Caution should be applied in relying on the estimates from other studies as they can be general and may be inappropriate for assessing changes that have very narrow and specific outcomes. They are not suitable for determining the impact of policies that affect environmental assets that are considered to be national or regional 'icons', such as the protection of the Great Barrier Reef, Ayers Rock or koalas.

The key steps of a benefit transfer approach is summarised below.

Step 1: Define policy context

Determine whether the project is a national project versus a regional project. Consider implicit prices (values) associated with changes in environmental outcomes/attributes. For instance, based on existing choice modelling studies, some existing values to households are:

- ▶ \$1.36 per household for per species protected
- ▶ \$1.40 and \$1.75 per household per 10,000 ha of landscape protected
- ▶ \$1.60 and \$2.00 per household per 10 kms of waterway restored/protected.

Step 2: Defining the attribute changes

This step involves determining which attributes are impacted by the policy under investigation, and identifying the expected change in the attribute levels over a given time period relative to a 'business as usual' policy. Examples include:

- ▶ Quantity of species protected from extinction
- ▶ Areas protected
- ▶ Length of waterways restored for fishing or swimming.

Step 3: Aggregating the attribute values

Each attribute change caused by a particular policy (defined in Step 2) is then multiplied by its implicit price (defined in Step 1). These attribute values are then summed to yield an approximation of the average annual benefit per household from the implementation of the proposed policy.

Step 4: Defining the target population

The number of houses impacted is determined. The impacts of changes implemented in particular regions should be restricted to the rural and city populations adjacent to the region in question.

Step 5: Aggregation

It is recommended that the annual household values be aggregated to 45% of the target population (as not everyone in the target population is interested). This calibration assumption is based on a study which found that a proportion of people surveyed were not willing to pay for environmental improvements.

If the analysis calls for an estimate of the full impact of a resource use change over a number of years, the annual values will need to be consolidated to a lump sum present value. A real discount rate of 3% to 5% is recommended.

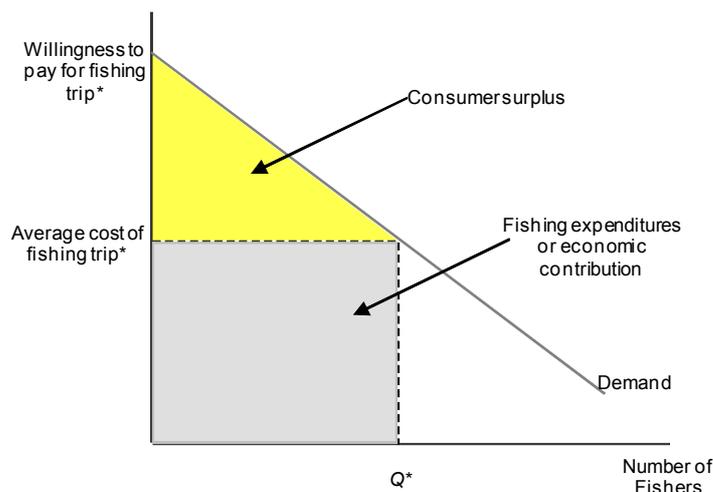
Source: Appendix 5 of National Land and Water Resources Audit (2002)

**Use values (recreation)**

In addition to non-market non-use benefits, non-market costs associated with reduced recreational activities in marine areas may arise from the proposal.

Recreational activities can generate value referred to as 'consumer surplus' - this is the value that people place on recreation that is over and above the cost of engaging in that activity (this concept is depicted diagrammatically in the figure below).

Figure 3: Consumer surplus of recreational fishing



Note: Consumer surplus is the difference between what recreational fishers are willing to pay to engage in fishing activities and the cost of undertaking the fishing activity. This value is represented by the triangle shape below the demand curve and above the price of fishing.

Examples of fishing recreational values estimated in previous studies are presented in Table 4.

Table 4: Some estimates of Value of recreational fishing trips

Impact	Source	Unit	Value
Fishing trips in South West Western Australia	van Bueren, Linder & McLeod (1999)	Consumer surplus per fishing trip	AUD \$40
Motorized boating	Rosenberger & Loomis (2000)	Average consumer surplus values per activity day per person	US \$34.75 - US \$18.15
Fishing	Rosenberger & Loomis (2000)	Average consumer surplus values per activity day per person	US \$35.89 - US \$20.19
Boat fishing	As cited in ABARE(2004)	Willingness to pay per day of private recreational game fishing.	AUD \$151
Recreational fishing along the coast of Central Queensland	Prayaga, Rolfe and Stoekle (2009)	Consumer surplus per trip per fishing group	AUD \$385.34

Source: van Bueren, M., Linder, R. and McLeod, P(1999) *Economic Values for Recreational Fishing in South Western Australia*, Department of Agricultural and Resource Economics, Rosenberger and Loomis (2000) *Benefits Transfer of Outdoor Recreation Use Values; A technical Document Supporting Forest Service Strategic Plan (2000 revision)* prepared for US Department of Agriculture. ABARE (2004) *Economic value of Charter and Recreational Fishing in Australia's eastern tuna and billfish fishery*. Prayaga, Rolfe and Stoekle (2010) *The value of recreational fishing along the Capricorn Coast: A pooled revealed preference and contingent behaviour model*, *Marine Policy* 34:244-251.

The ABARES study is limiting as it does not value the social impact on recreational fishers. In particular:

- ▶ Whether there would be changes in the number of fishing trips
- ▶ Whether there would be changes in the quality of fishing trips (impacting on average consumer surplus values).

However, ABARES expects only minor impacts on recreational charter fishing activities as the proposed reserves will be located away from key population centres where charter boats operate.<sup>18</sup> Notwithstanding, these impacts were not valued.

## 4.5 Tourism impacts

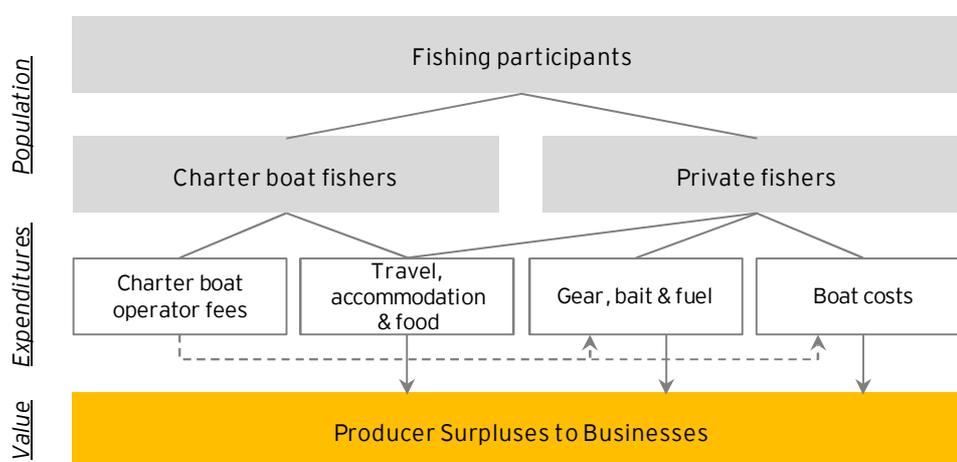
With reduced recreation, there may also be reduced profits (producer surplus) to regional businesses that rely on tourists who visit regional centres to engage in fishing activities.

Figure 4 summarises some of the potential expenditures of recreational fishers that benefit regional businesses. Expenditures include:

- ▶ Charter boat fees
- ▶ Expenditures on travel, accommodation and food
- ▶ Expenditures on gear, bait and fuel
- ▶ Other boating costs.

The changes in expenditure and producer surpluses to businesses arising from reduced fishing tourism were not quantified.

Figure 4: Tourism value chain



## 4.6 Implementation and enforcement costs not considered

The ABARES study does not consider the potential implementation costs associated with the policy change. These costs relate to the cost of creating the Marine Parks and the costs associated with providing structural assistance to industry.

ABARES does not consider the additional enforcement costs associated with expanding the marine reserve network. These costs include additional operating and capital costs (such as boats and aircraft) associated with area patrols and surveillance. It is difficult to estimate what these costs might be, but they are unlikely to be immaterial. These could also be costs to

<sup>18</sup>ABARES (2012c, p.32)

industry if they are passed on through higher management levies. Also, as Box 4 indicates, fisheries management costs (which included enforcement costs) are likely to continue to escalate over time.

**Box 4: General increasing trend in fisheries management costs**

Research undertaken by EconSearch of the South Australian Northern Rock Lobster Fishery found that licence fees (which is used to recover the cost of fisheries management) as a percentage of GVP have generally followed an increasing trend. The overall increase in licence fees as a proportion of GVP between 1997/98 (4.4 per cent) and 2010/11 (8.2 per cent) was attributable to an increase in the cost of management and a decline in fishery GVP.

These management costs, when paid for by industry, also impacts on the profitability of the industry (i.e. producer surplus) and their ability to participate.

Source: *Econsearch (2012) Economic Indicators for the South Australian Northern Zone Rock Lobster Fishery, 2010/11*

From a cost benefit perspective, the expected compensation (industry assistance) impacts will be largely distributional. That is, industry would benefit from any structural assistance paid by government, but this will come at a cost to the community and tax payers. The net effect of the structural assistance may be negligible from a cost benefit perspective. However, there are other administrative and implementation costs associated with any industry assistance package that would need to be taken into account:

- ▶ *Administrative costs of raising public funds* - A structural assistance package would require government to increase taxes (or reduce spending on other government services). Any additional tax increase to fund this package will impose costs on the community that is over and above the size of the tax. These additional costs include compliance costs and administration costs (e.g., borne by the ATO). The Productivity Commission for instance cites a cost of 27.5 cents per dollar of subsidy (and a range of 15 to 40 cents per dollar) as the cost of raising public funds associated with the R&D tax concession<sup>19</sup>
- ▶ *Cost of administering structural assistance* - There would be costs associated with designing and implementing a compensation/assistance mechanism for industry. These costs can include red tape costs to businesses (e.g. costs associated with applying for compensation and providing proof of entitlement) and associated costs to government in administering and reviewing the program
- ▶ *Deadweight cost of taxation* - Deadweight costs arise when people change their behaviour in response to higher taxes, substituting one optimal kind of behaviour for a sub-optimal behaviour. For instance, if taxes were levied on purchases of seafood to fund the compensation payments, this may result in households substituting away from seafood and towards inefficient patterns of consumption due to the higher taxes on seafood. This creates economic costs as it promotes the development of inefficient industries.
- ▶ *Other management costs* - these include other implementation and operating costs such as ongoing administrative functions (such as community and industry education) and marine research to monitor the effectiveness of the policy. By way of example, the 2012-13 Budget has provided \$58.2 million over six years to complete marine planning activities and implement management of declared marine reserves networks and marine bioregional plans.<sup>20</sup> This would likely include the preparation of management plans for the new marine reserves over this period.

<sup>19</sup> Productivity Commission (2003) *Evaluation of the Pharmaceutical Industry Investment Program*.

<sup>20</sup> Australian Government (2012) *Budget 2012-13*.

The exclusion of these implementation costs represents a major limitation of the ABARES study. Reasonable estimates of the full cost of implementation is required along with the impacts to industry, should be conducted to enable judgements to be made on the likely effectiveness and efficiency of the proposed Commonwealth Marine Network Proposal.

# Appendix A Summary of ABARES analysis

This Appendix summarises ABARES' approach to analysis which comprises three elements (i) Direct displacement of commercial and charter fishing, (ii) Social impact assessment, and (iii) Subregional economic modelling. Case studies were also presented.

## A.1 Direct displacement of commercial and charter fishing

The volume and value of catch displaced was based on:

- ▶ Estimating the total volume of catch for each fishery (based on historical catches between 2000 and 2010)
- ▶ Estimating the value of catch (based on 2008-10 landed prices) and inflating them to reflect 2011 dollars)
- ▶ Deriving the GVP that would be displaced under the Marine Network proposal by examining spatial data from commercial fisheries logbooks over a 10 year period.

The key (revised) GVP results reported by ABARES for each of the regions are presented below.

The GVP indicator effectively represents the turnover forgone by commercial fishers at "beach prices". Processing costs are not included in the beach price, as processing operations are assumed to occur further along the value chain. The use of beach prices also removes the effect of transfer pricing by the firm if it is vertically integrated into the value chain.

Table 5: Gross Value of Production Displaced (Commercial Fishing)

	Value
Coral Sea	\$4,154,300
Temperate East	\$559,000
South-west	\$2,855,000
North-west	\$546,200 to \$615,400
North	\$2,033,000 to \$2,938,000

ABARES also identified the potential impacts on charter boat operators based on consultations with charter vessel operators and other stakeholders. The impacts reported were largely around expected reduction in client numbers and reduced catch (although the Coral Sea analysis reported impacts in terms of boats and weight of catch).

ABARES noted that the overall displacement of charter fishing would be low (in comparison to total charter fishing) as charter vessel activity is currently concentrated around major population areas and away from the proposed Marine Reserves.

**Table 6: Displacement of charter fishing boats**

Region	Potential Client Displacement	Potential Catch Displacement
Coral Sea	9 boats	6,472 kg
Temperate East*	n.a.	n.a.
South-west	0.04% of total charter boat clients in WA 0.38% of total charter boat clients in SA	n.a.
North-west	0.07% of total charter boat clients in WA	17 individual fish
North	0.2% of total charter boat clients in NT 0.1% of total charter boat clients in I QLD	236 indiv. fish in NT 41 indiv. fish in QLD

*Note: \*Charter boat displacement was not considered in the Temperate East analysis*

## A.2 Social impact assessment

ABARES' social impact assessment looked at two areas:

- ▶ Fishing business impacts
- ▶ Personal and community impacts.

The social impact analysis was largely based on responses to surveys of fishing businesses and the community. The types of questions asked during the surveys and the key indicators used are summarised in Figure 5 and Figure 6.

ABARES' social impact analysis largely generates ordinal information (i.e. either "Yes"/"No" responses to statements or subjective assessment of impacts on a likert scale) and no monetary values were assigned to the results.

Figure 5: Summary of methodology, issues and indicators of potential impacts on fishing businesses

Potential impacts on fishing businesses						
"Your marine areas matter: a survey of commercial fishers' values and preferences for Commonwealth marine reserves"						
Topic	Values held by fishers	Potential displacement	Business Impacts	Business Plans and Investments	Other Factors	Ability to Adapt
Description	Analysis of the values that fishers place on specific areas	Whether fishers would be excluded under draft marine reserves	Whether fishers' activity would change and how	Whether business plans would be disrupted by draft marine reserves	Other overlying issues arising from draft marine reserves	Ability of fishing businesses to adapt to potential changes
Method	Survey approach	Survey, qualitative data, focus groups	Survey approach	Survey, focus groups, interviews	Survey, focus groups, interviews	Survey approach
Issues considered	<ul style="list-style-type: none"> <li>▶ Value mapping criterion:               <ul style="list-style-type: none"> <li>▶ Catch reliability</li> <li>▶ Catch diversity</li> <li>▶ Easy to access</li> <li>▶ Safe area</li> <li>▶ Less competition</li> <li>▶ Future use value</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>▶ Displacement from fisheries response:               <ul style="list-style-type: none"> <li>▶ Excluded</li> <li>▶ Unsure</li> </ul> </li> <li>▶ Percentage of catch removed if excluded from draft marine reserves</li> </ul>	<ul style="list-style-type: none"> <li>▶ Business impact response:               <ul style="list-style-type: none"> <li>▶ Stay in same fishery</li> <li>▶ Move to alternate fishery</li> <li>▶ Continue with reduced catch</li> <li>▶ Leave industry</li> <li>▶ Unsure</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>▶ Fishers who had made business or investment plans</li> <li>▶ Considerations when making investments</li> <li>▶ Discussion of concerns:               <ul style="list-style-type: none"> <li>▶ Depreciation/ no return on assets</li> <li>▶ Financial and investment uncertainty</li> <li>▶ Decline in boat sales and licence trading</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>▶ Major issues raised:               <ul style="list-style-type: none"> <li>▶ Cheaper imported fish</li> <li>▶ Increased costs</li> <li>▶ Changes to management and access</li> <li>▶ Prices received</li> <li>▶ Exchange rates</li> <li>▶ Access to labour</li> <li>▶ Region-specific issues</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>▶ Ability to adapt to change criterion:               <ul style="list-style-type: none"> <li>▶ Business skills</li> <li>▶ Previous change management</li> <li>▶ Financial situation</li> <li>▶ Ability to afford to make changes to adapt</li> </ul> </li> </ul>
Indicators	<ul style="list-style-type: none"> <li>▶ Proportion of valuable fishing waters within marine reserves</li> </ul>	<ul style="list-style-type: none"> <li>▶ Number of excluded fishers</li> <li>▶ Percentage of potential catch removed</li> </ul>	<ul style="list-style-type: none"> <li>▶ Proportion whose activities would change</li> <li>▶ Key changes</li> </ul>	<ul style="list-style-type: none"> <li>▶ Number of individual plans or business investments within marine reserves</li> </ul>	<ul style="list-style-type: none"> <li>▶ Most common issues raised and their relative importance, from 'major problem' to 'no problem'</li> </ul>	<ul style="list-style-type: none"> <li>▶ Proportion within each category, from 'strongly agree' to 'strongly disagree'</li> </ul>

Note: All topics were covered in each region, except for Potential Displacement, which was not included in the Coral Sea and Temperate East analyses.

**Figure 6: Summary of methodology, issues and indicators of potential personal and community impacts**

	Personal impacts	Community impacts
Description	Understanding how the introduction of draft marine reserves will affect fishers and their families including their ability to adapt	Understanding how the introduction of draft marine reserves will affect communities which rely upon fishing including their ability to adapt
Method	Surveys of fishers	Surveys of fishers, focus groups and interviews with fishers, fishing industry representatives and community members
Issues considered	Groups and corresponding issues considered:	
	<p>Group 1: <i>Stay in the same fishery and make up the shortfall fishing in other areas, or move into an alternative fishery</i></p> <ul style="list-style-type: none"> <li>Stress levels</li> <li>Family quality of life</li> <li>Working hours</li> <li>Need to move away</li> </ul>	<p>Group 2: <i>Continue operating with reduced catch in the same fishery or downsize the operation</i></p> <ul style="list-style-type: none"> <li>Stress levels</li> <li>Family quality of life</li> <li>Working hours</li> <li>Need to move away</li> </ul>
	<p>Group 3: <i>Leave the fishing industry</i></p> <ul style="list-style-type: none"> <li>Stress</li> <li>Family quality of life</li> <li>Spouse's ability to earn income</li> <li>Other skills for alternative work</li> <li>Ability to make a living</li> <li>Need to move away</li> </ul>	<p>Issues considered:</p> <ul style="list-style-type: none"> <li>Reduction in fishing-related business activity</li> <li>Limited alternate employment</li> <li>Importance to community culture</li> <li>Importance to family traditions</li> <li>Importance to tourism</li> <li>International reputation</li> <li>Loss of youth-mentoring opportunities</li> <li>Transportation of equipment, goods and people on boats</li> <li>Decreased surveillance capacity of illegal foreign boats</li> <li>Loss of sea-rescuing ability</li> <li>Loss of economies of scale in relation to fuel and electricity costs</li> <li>Loss of food source</li> <li>Decline in quality of seafood opportunities</li> </ul>
	Ability to adapt to change criterion:	
	<ul style="list-style-type: none"> <li>Health</li> <li>Openness to change</li> <li>Ability to cope with and manage change</li> </ul>	<ul style="list-style-type: none"> <li>Other skills and income opportunities</li> <li>Community connectedness</li> <li>Ability to seek help</li> <li>Impact on other fishing businesses</li> <li>Impact of previous changes</li> <li>Community reliance on fishing</li> <li>Community members' willingness to help others</li> <li>Presence and involvement in community groups</li> </ul>
Indicators	<ul style="list-style-type: none"> <li>Proportion of responses to each on a 5-tier scale:                             <ul style="list-style-type: none"> <li>Strongly agree</li> <li>Agree</li> <li>Neither disagree nor agree</li> <li>Disagree</li> <li>Strongly disagree</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Proportion of responses to each on a 5-tier scale:                             <ul style="list-style-type: none"> <li>Strongly agree</li> <li>Agree</li> <li>Neither disagree nor agree</li> <li>Disagree</li> <li>Strongly disagree</li> </ul> </li> </ul>

### **Fishing businesses impact analysis**

The report synthesized results which were obtained from three sources:

- ▶ Survey of commercial fishers and their businesses<sup>21</sup>. A separate survey was conducted for each region
- ▶ Focus groups
- ▶ Interviews with potentially affected fishers, supply chain businesses and community representatives.

ABARES conducted its fishing business impact analysis based upon six topics. The response rates to the surveys are presented below.

<sup>21</sup> *Your marine areas matter: a survey of commercial fishers' values and preferences for Commonwealth marine reserves in the (North and North-west) Marine Regions of Australia Survey* as cited by ABARES,

**Table 7: Summary of number of responses by region and topic**

	Values held by fishers*	Potential Displacement <sup>^</sup>	Business Impacts	Business Plans and Investments <sup>#</sup>	Other Factors	Ability to Adapt	Total <sup>+</sup>
Coral Sea	386	n.a.	80	90	n.a.	75-80	377
Temperate East	714	n.a.	87	195	n.a.	133-135	526
South-west	600	89	81	81	n.a.	76-80	281
North-west	206	42	39	60	n.a.	24-28	104
North	260	180	53	165	n.a.	~34	227
Total	2,166	311	340	561	n.a.	342-357	1,515

Notes: \* Total number of markers placed in total. Each fisher was given 18 markers; 3 for each criteria

<sup>^</sup> Respondents could choose multiple marine reserves from which they were sure or unsure that they would be displaced, Values do not include those that said that they would not be displaced

<sup>#</sup> Total number of plans and investments. Respondents could choose multiple marine reserves. Values do not include those that do not have any plans or investments

<sup>+</sup> Total number of fishing businesses within the final survey frame.

The implied response rates are presented below (ranging between 21% and 38% of the survey population. ABARES notes that their survey population covers 90 per cent of all licence holders.

Region	Survey Frame Population	Survey Respondents	Implied Response Rate	ABARES Comments
Coral Sea	377	80	21%	The use of Commonwealth and state log data and expert knowledge of the industry provides a high level of confidence that the survey frame covers more than 90 per cent of all licence holders in the target population
Temperate East	526	142	27%	
South-west	281	81	29%	
North-west	104	39	38%	
North	227	53	23%	
Total	1,515	395	26%	

The key highlights from the analysis are presented below.

#### **Values held by fishers**

- ▶ Value mapping across the five regions indicated that a significant number of valuable fishing grounds lie within draft marine reserves, ranging from 36% (Temperate East) to 67% (Coral Sea and South-west)

#### **Potential displacement**

- ▶ The number of fishers who indicated that they would be displaced in some way ranged from 35 (North-west) up to 144 (North)
- ▶ Of those that indicated some exclusion, most respondents indicated that the potential catch removed would be less than 40 per cent; however some indicated up to a 100 per cent loss (South-west and North).

#### **Business impacts**

- ▶ In all regions, the majority of respondents stated that their fishing activities would change due to the marine reserves, from 56% (Temperate East) up to 78% (South-west)
- ▶ Commonly-indicated changes included increased conflict with other fishers, the time and money needed to move to new fishing areas, associated increased fuel costs and the need to upgrade equipment.

### ***Business Plans and Investments***

- ▶ The number of individual plans ranged from 60 (North-west) to 195 (Temperate East)
- ▶ Respondents mostly agreed that the ability to access both historic and new fishing grounds was an important factor to consider when making investment decisions.

### ***Other Factors***

- ▶ In all regions, survey responses suggested that 'cheaper imported fish', 'changes in fisheries management', 'input costs' and the 'prices received for fish' were the most significant major problems, with more than 50% of respondents indicating so
- ▶ Issues that were deemed not to be significant problems included individuals' 'health', 'fish stocks', 'climate change' and 'food safety regulations'.

### ***Ability to Adapt***

- ▶ Overall, around half of the respondents stated that they strongly agreed or agreed that they had good business skills
- ▶ A smaller proportion agreed that they were in a good financial position
- ▶ The majority disagreed that they could afford to adapt to changes.

## **Personal and community impacts**

ABARES analysed the potential personal and community impacts of the draft marine reserves via surveys. The response rates are summarised below. Respondent numbers are provided as they were available in the ABARES reports. These are shown below.

**Table 8: Number of respondents to survey on personal impacts**

Region	Group 1	Group 2	Group 3	Total
Coral Sea	25	4	8	37
Temperate East	35	3	21	59
South-west	35	11	13	59
North west	9	9	3	21
North	18	11	5	34
Total	122	38	50	210

**Table 9: Number of respondents to survey on community ability to adapt**

Region	Total respondents
Coral Sea	73-77
Temperate East	135-138
South-west	n.a.
North west	26
North	41
Total	275-282

The key highlights from the personal and community analysis are presented below.

### ***Personal impacts***

- ▶ For Group 1 and Group 2, most respondents agreed or strongly agreed that their stress levels and working hours would increase and that their family life would suffer

- ▶ For Group 3, most respondents agreed or strongly agreed that leaving the industry would cause considerable personal and family stress whilst most strongly disagreed that they could continue to make a living
- ▶ For the ability to adapt, most respondents strongly agreed or agreed that they did not want to give up fishing, were too young to retire and had good health. Conversely, the majority disagreed that they had the skills or confidence necessary to seek alternate employment.

**Community impacts**

- ▶ Key issues from discussions included reductions in fishing-related businesses, loss of employment and flow-on effects to the region
- ▶ For the ability to adapt, most respondents strongly agreed or agreed that fishing was an important part of the community and that businesses would be impacted.

**A.3 Subregional economic modelling**

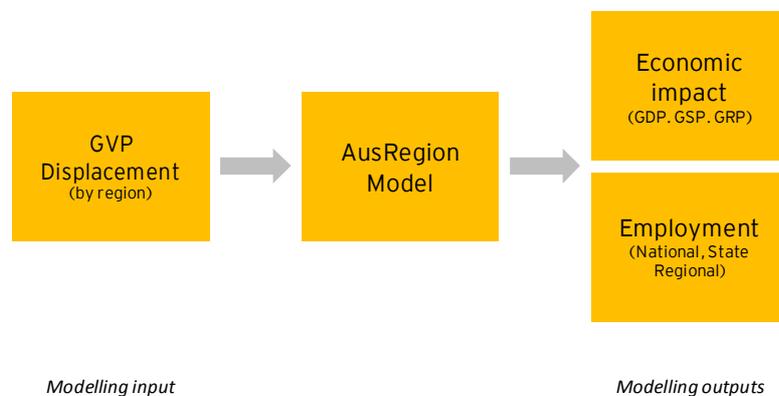
The ABARES AusRegion model was used to estimate the economic impact on subregional, state and national economies. The AusRegion model is a dynamic computable general equilibrium (CGE) model of the Australian economy (with regional and industry dimensions).

As summarised in Figure 7, the economic impact modelling was based on inputting estimates of GVP displacement (by region) into the AusRegion model. The inbuilt assumptions in the AusRegion model then determine the flow on (or multiplier) impacts on Gross Domestic Product, Gross Regional Product and employment.

ABARES presents results in both the short term (2012-13) and in the longer term (2019-20). These reflect the different closure assumptions in the model (that is, around labour and capital mobility).

Ernst & Young are not in a position to review the workings of the AusRegion model as we understand that it is an in-house model used by ABARES. However we note that GVP displacement is the only input (or economic shock) used in this modelling. Other inputs are not considered in their modelling.

**Figure 7: Economic impact modelling framework**



The final AusRegion modelling results for the regions are summarised in Table 10. ABARES did not report state or national impacts as these were considered negligible.

**Table 10: AusRegion economic impact modelling results**

	Short term impact (final estimate)	
	Gross Regional Product	Regional Employment
Coral Sea Marine Reserve	-\$7.5m	17 jobs lost
Temperate East	-\$0.9m	2 jobs lost
South-west Marine Region	-5.1m	12 jobs lost
North-west	-1.1m	3 jobs lost
North	-\$3.3m to -\$4.8m	9 to 14 jobs lost

*Note: We understand that ABARES did not undertake new CGE modelling to derive the final estimate. The final estimate was based on scaling the draft CGE estimate using their latest GVP information.*

## A.4 Case studies

In addition to the analysis above, case studies were chosen by State Governments and the Department of Sustainability, Environment, Water, Population and Communities (SEWPaC) with the aim of providing an understanding of how the impacts of the draft marine reserves would emerge at different levels and from different perspectives.

Case studies considered a combination of all three facets (GVP displaced, social impact and economic impact using the ABARES model) - although not all case studies used each approach - as well as a narrative of the impacts at a more micro level. A full list of the case studies is summarised below.

**Table 11: Summary of case studies**

Region	Case study name	ABARES AusRegion Model	GVP Estimates	Social Impact Assessment
Coral Sea	Pelagic longliners in the Eastern Tuna and Billfish Fishery		✓	✓
	A vertically integrated fishing business in the Eastern Tuna and Billfish Fishery: the Lamason Group		✓	✓
	Onshore processing facilities			✓
	Queensland East Coast Otter Trawl Fishery-T1 sector		✓	✓
	Charter fishing in the Coral Sea			✓
	Economic modelling of Cairns, Hervey Bay-Bundaberg and Mooloolaba	✓		
Temperate East	Cumulative issues impacting fishing businesses in the Temperate East Marine Region		✓	✓
	Prospective fishing in the Deepwater Prawn Sector of the New South Wales Ocean Trawl Fishery			✓
	Potential impacts on fishermen's cooperatives in the Temperate East Marine Region		✓	✓
	Impact of the draft Jervis marine reserve on an individual operator in the Southern and Eastern Scalefish and Shark Fishery Commonwealth Trawl Sector: the importance of Jervis			✓
	Sydney Fish Market		✓	✓

Region	Case study name	ABARES AusRegion Model	GVP Estimates	Social Impact Assessment
	Economic modelling of Shoalhaven and Mooloolaba.	✓		
South-west	Port Lincoln		✓	✓
	New and prospective fisheries			✓
	Esperance		✓	✓
	Windy Harbour			✓
	Vertically Integrated Business			✓
	Charter vessel impacts- South Australia			✓
	Northern Zone Rock Lobster Fishery background			✓
	Economic effects for two key subregions.	✓		
North-west	Carnarvon–supply chain and flow of impacts to the community		✓	✓
	Western Tuna and Billfish Fishery– displacement and prospective fishing		✓	✓
	Shark Bay, Kimberley and Nickol Bay prawn fisheries–variability in prawn production		✓	✓
	West Coast Demersal Gillnet and Longline Fishery–individual fisher.			✓
North	Impact on a vertically integrated fishing business–Wren Fishing.		✓	✓
	Impact on a community/town– Karumba.			✓
	Impact on a large fishery–Northern Prawn Fishery.		✓	✓
	Fishery development/prospectivity.		✓	✓
	North Marine Region supply chain impacts.			✓
	Economic modelling of Darwin and Karumba	✓		

## Appendix B A note on social discount rates

Typically, government projects and initiatives involve an upfront investment from which benefits are captured over time. As people are not indifferent with respect to the timing of costs and benefits – that is typically, people prefer to receive benefits as early as possible and pay for costs as late as possible – it is best practice to adjust future costs and benefits into “present values” when evaluating projects. This adjustment/conversion process is known as discounting and enables a comparison of costs and benefits on a like-with-like basis (i.e., in “today’s dollars”).

Given that the benefits of some projects will not occur until the medium to long term, the choice of discount rate is crucial. However, the choice of discount rate is not straight forward. There is much literature on the ‘correct’ discount rate to use when weighing up the costs and benefits of projects and policy initiatives that accrue over time. As noted by Harrison (2010):

*Academics, cost benefit guides and textbooks give widely conflicting advice on discount rate selection, with recommended rates varying from 1 to 15 per cent, with the rates recommended in most developed economies trending down over recent decades.*

A relatively high discount rate will attach less weight to benefit and cost streams that occur in the distant future and favours projects with benefits occurring at earlier dates, while a relatively low discount rate favours projects with benefits occurring at later dates.

For commercial project evaluation, the choice of discount rate is relatively straightforward. It is typically the opportunity cost of capital – that is, the discount rate would reflect the returns that an investor could otherwise obtain if he/she were to invest in an alternative asset with the same risk profile. For instance, if an investor was to invest in a risk free project, then he/she would expect at least the same returns as investment into government bonds (which is often used as a proxy for risk free asset). If not, the project would be undesirable relative to these other opportunities (i.e., investing in government bonds).

However, for social projects with wider community impacts, the choice of discount rate (that is, the social discount rate) is not as straightforward. As Harrison notes, there are two approaches to establishing a social discount rate:

- ▶ A ‘descriptive’ approach – as per commercial example above, this approach would set rates based on the opportunity cost of capital used in the project. Arguably, this approach satisfies the efficiency criterion and would measure the benefits/returns to society if the funds were left in the private sector. This approach is used by the Victorian Department of Treasury and Finance when assessing projects as part of the *Partnerships Victoria* process.
- ▶ A ‘prescriptive’ approach – this is more subjective and usually adopts a discount rate that is lower than market discount rates.

The arguments for adopting a prescriptive (or non-market based) approach that yields a lower discount rate include the *social rate of time preference* and *intergenerational equity*.

The social rate of time preference refers to the rate at which *society* is willing to substitute present for future consumption. The Commonwealth Bond rate or GDP growth rates are commonly used as proxies for this. It is argued that this rate is society’s opportunity cost associated with funding public projects, as in the absence of a public project; the government could put the funds to productive uses such as reducing the national debt.

Alternatively, it could be argued that for a public project to be net beneficial to society, its returns should be at least as fast as the productive capacity of the economy. Social discount rates of around 3% to 4% are therefore consistent with this approach.<sup>22</sup>

Others have argued that the social discount rate should consider more than just economic efficiency, but also the distributional impacts on different generations. That is, in case of very long-term projects with impacts lasting for more than one generation or even hundreds of years into the future, many have advocated for an even lower discount rate.

Garnaut's (2009) view is that a near-zero pure rate of time preference is appropriate as there should not be a discount on the utility of people in the future. A zero time discount rate effectively means that future generations are treated the same as present generations. That is, the view is that the welfare of future generations should not be discounted. Notwithstanding, Garnaut proposed a discount rate of between 1.35% and 2.65% to take account of declining levels of utility with respect to consumption over time as people become richer. That is, providing future generations with greater welfare is worth less than providing people in our generation with the same welfare. Thus, it is argued that future benefits should be discounted at a rate that reflects this declining marginal utility.

In summary, the choice of discount rates is still a contentious issue - there is no one single accepted rate used by economists. From a market efficiency perspective, the use of a lower social discount rate effectively involves trading off the welfare of one group against another's (for example, the present generation against future generations). Some have argued that this approach actually leads to intergenerational inequity (i.e., the current generation effectively paying for the benefits of future generations, and/or vice versa).

Notwithstanding, for public projects/initiatives where benefits accrue over a long time horizon (such as climate change initiatives), there is a trend towards the use of lower social discount rates. This implicitly involves ethical judgements that the benefits/costs to future generations should be valued higher than the benefits/costs of the current generation relative to market based approaches to discounting.

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<sup>22</sup> Real GDP growth rates in Australia has averaged around 2.9% per annum over the last five years, while the 10 Commonwealth Bond nominal rates have averaged around 5.5% over the last 5 years, or around 3 per cent real.

**Table 12: Selected social discount rates used in Australia and the US**

Source	Real rate	Projects/initiatives on which it is applied to...
Garnaut Report (2009)	1.35% and 2.65%	Climate change initiatives out to the year 2050 and 2100.
Stern Report (US) (as cited by Harrison (2010))	1.4%	Climate change initiatives out to the year 2050 and 2100.
Victorian Competition and Efficiency Commission (2007)	3.5%	Regulatory proposals (e.g., safety, consumer protection, environmental protection)
Queensland Treasury (2006)	Reference points suggested include <ul style="list-style-type: none"> <li>▶ the interest rate for government borrowings for a term relevant to the expected duration of the project</li> <li>▶ the long-term average real economic growth rate, with an additional allowance for major risks and time preference for current consumption.</li> <li>▶ the rate of return on debt and equity for comparable private sector projects (as a public sector project would be competing with other activities for debt and equity capital).</li> </ul>	Public capital projects
Tasmanian Department of Treasury and Finance (1996)	Long term Commonwealth Bond Rate plus a margin of 1.0%	Public capital projects
Department of Health and Ageing and enHealth Council (2003)	5% (with sensitivity testing at 3% and 7%)	Environmental health policies
Office of Best Practice Regulation (as cited by Harrison (2010))	7% (with sensitivity testing at 3% and 11%)	Regulatory proposals
NSW Treasury (1997)	7% (with sensitivity testing at 4% and 10%)	Economic appraisal of public capital projects
Infrastructure Australia (2008)	7% (with sensitivity testing at 4% and 10%)	Appraisals of infrastructure projects over a thirty (30) year timeframe
Harrison (2010)	8% (with sensitivity testing at 3% and 10%)	All projects
Victorian Department of Treasury and Finance (2010)	<ul style="list-style-type: none"> <li>▶ Projects without quantifiable benefits - Treasury Corporation bond rate</li> <li>▶ Non-commercial investments with significant financially quantifiable benefits- Treasury Corporation rate plus a margin of 2.0%</li> <li>▶ Commercial investments - market rates prevailing for the particular investment under consideration.</li> </ul>	Public sector business cases for investment over \$5 million

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