

**NET ADVANTAGE**

***Securing our fisheries management***



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## MAIN POINTS

### Introduction

The world's oceans are at risk of collapse, with significant implications for fishing industries, food security and marine biodiversity. Historically, overfishing has been the main threat to global fish stocks. This is now being exacerbated by the risks of climate change, pollution and pests.

Yet with risk comes opportunity. Countries with well-managed fish stocks, supported by healthy marine ecosystems, will be better placed to tap rapidly growing markets for sustainably certified seafood. In the long-term, they should also benefit from stronger commercial fishing industries.

This report finds that Australia can gain a global competitive edge by embracing the benefits of marine reserves. The United Nations and Global Ocean Commission have recommended 10 to 30 per cent of the world's oceans be placed in marine protected areas (MPAs).

Implementation of the Commonwealth Marine Reserves Network (CMRN) of MPAs would establish Australia as a world leader in marine protection. This policy has bipartisan support, but implementation has been suspended pending a review by the current Commonwealth Government.

This report analyses the effects of marine reserves on the economic sustainability of Australia's commercial fishing industry. For the purpose of this report, 'marine reserves' refer to those areas within MPAs such as the Marine National Park Zones within the CMRN (see Figure 1 below). These are 'no-take' zones: highly protected areas where no fishing is allowed at all.

The focus of this report is primarily on the relationship of these marine reserves to commercial fisheries in Commonwealth waters. Examples are also drawn from overseas and State waters. This is not to diminish marine reserves' ecological and biological importance. CPD notes the 1998 policy guidelines specified biodiversity conservation as the primary purpose of MPAs.<sup>1</sup> There are also broader issues of intergenerational equity to consider. However, this report focuses on points where the economic and ecological arguments intersect: fisheries are central to that debate.

### Findings

Marine reserves deliver economic, reputational and ecosystem benefits that can provide a competitive advantage for Australia's commercial fisheries. This includes a potential marketing edge, and insurance against vulnerability to rising fuel costs and unpredictable prices.

**Rapid growth in sustainably certified seafood should provide an opportunity to improve the margins of Australian commercial fisheries.** Given the variety and quality of Australian seafood, sustainably certified products are an increasingly feasible sector of the market for commercial fisheries to target.

- Sustainably certified seafood is a growing global market. Worldwide, the number of fisheries certified by the Marine Stewardship Council (MSC) jumped more than four-fold over the four years to 2012. Last year there was a 35 per cent increase in MSC labelled products globally.
- Leading Australian seafood businesses are supporting sustainable certification. The World Wildlife Fund has partnered with Blackmores, Coles, John West and Tassal to help them shift to responsibly sourced seafood and fish oil products.
- Australian retailers including Woolworths, Coles and Aldi have made the MSC certification central to their sustainable seafood sourcing policy, with Woolworths aiming to have all of their wild-catch seafood MSC certified.

**Marine reserves can make it easier for commercial fisheries to gain and maintain sustainability certification.** MSC performance indicators assess how appropriate fisheries management and its outcomes are for ensuring the long-term sustainability of fisheries and the ecosystems that support them. Benefits generated by MPAs can assist in improving scores, and may make it easier to retain certification even if standards rise over time.



- Marine reserves provide key information to help commercial fisheries get their management strategies right, and demonstrate this to the MSC.
- Marine reserves provide a buffer that may help ecosystems recover from shocks and fisheries to maintain scores against MSC performance indicators. This is important because even the best fisheries management settings can be inadequate in the face of unforeseen risks.

**Marine reserves can increase fish stock populations in surrounding areas, improving the economics of commercial fisheries.** Spill-overs occur when fish leave marine reserves. This increases fish stock populations in surrounding areas. Spill-overs can benefit commercial fishers by increasing the amount caught for the same level of effort, and by enabling harvests of larger and more highly valued fish.

- Global comparison shows that in some cases the catch per unit of effort can increase by up to 66 per cent near ‘no-take’ zones within MPAs, within five years of protection.
- Global examples show fisher income can be as much as 135 per cent higher near ‘no-take’ zones within MPAs in some cases, compared to open access areas.

**Marine reserves provide long-term insurance against population crashes.** The increased diversity and density of marine species improves the overall health and resilience of marine ecosystems. This allows ecosystems to support larger and more stable populations of commercial fish stocks, insuring against risks – such as climate change, pollution and pests – that are hard to address with fisheries management tools.

- Based on cross-country reviews, on average ‘no-take’ zones see an increase in the number of species by 21 per cent, size of organisms by 28 per cent, organism density by 166 per cent and biomass by 446 per cent – when compared to nearby unprotected areas, or the same areas before protection.
- International evidence shows that under proper management, ‘no-take’ zones within MPAs have twice as many large fish species, five times more large fish biomass, and 14 times more shark biomass on average than fished areas.

## ***Recommendations***

This report recommends the current review of the CMRN be used to establish marine reserves that will deliver benefits for the long-term.

- 1. Ensure the design of marine reserves is informed by the latest science.** MPAs are a conservative investment in Australia’s key marine assets. Adequately sized and appropriately located ‘no-take’ zones will enable increasing dividends to flow from MPAs in the future. This review should start by accepting that scientific consensus on the benefits of MPAs dates back to 2001. It should also focus on the latest scientific evidence for designing effective ‘no-take’ zones, and consider the possibility that ecological risks will increase over time.
- 2. Find common ground between stakeholders by focusing on MPA benefits.** Well-planned marine protection generates a range of economic benefits, in addition to ecological benefits. To increase community acceptance of final decisions on zoning, the Bioregional Advisory Panels should seek to find common ground between stakeholders. Attention should be directed to the long-term benefits of well-designed MPAs to all stakeholders, rather than on short-term costs.
- 3. Set aside sufficient funding for structural adjustment and ongoing management.** Australia has learned from previous adjustment packages, and now has a more rational policy and rigorous assessment process for determining and targeting adjustment funding. However, there may be opportunities to achieve a double dividend from adjustment funding by identifying opportunities to buy out excess commercial fishing fleet capacity. To ensure MPAs are effective, 15 years of funding sufficient for ongoing management should be placed in a trust.

Getting this right is an opportunity we do not want to miss. Chopping and changing policy on marine protection will short-change all Australians, and deny future generations the chance to enjoy the same benefits from marine assets as their parents and grandparents.

## ***GLOBAL OCEANS ARE AT RISK***

The developing world and the high seas are facing a crisis that will affect fisheries globally.<sup>2</sup> A study of 20<sup>th</sup> century overfishing estimated that had the world's fisheries been managed sustainably, the additional catch in 2000 could have helped 20 million people cover their food deficit and avert under-nourishment.<sup>3</sup>

The effects of overfishing are compounded by ecological threats including climate change, pollution and pests.<sup>4</sup> A recent report shows that climate change will lead to global marine species redistribution and marine biodiversity reduction that will challenge the sustained provision of fisheries productivity and other ecosystem services.<sup>5</sup> The consequences of these systemic risks to the health of marine ecosystems are hard to predict, and cannot be adequately mitigated exclusively through quota-based fisheries management tools.

In response, the United Nations and Global Ocean Commission have recommended that MPAs be used to preserve biodiversity and the health of marine ecosystems. The 2011-2020 strategic plan of the United Nations Convention on Biological Diversity (which Australia is party to) urges member states to conserve at least 10 per cent of their coastal and marine areas by 2020, and especially areas of importance for biodiversity and ecosystem services.<sup>6</sup> More recently, the Global Ocean Commission has proposed the establishment of a representative network of MPAs covering 20 to 30 per cent of the world's oceans.<sup>7</sup>

## ***THIS PRESENTS NEW OPPORTUNITIES FOR AUSTRALIAN FISHING***

Australian fishing policies have moved commercial fisheries closer to economic sustainability, yet many remain vulnerable to increases in fuel costs, price and exchange rate fluctuations, and long-term ecological risks. The CMRN of MPAs provides Australia with an opportunity to hedge against new risks to the ecosystems our commercial fisheries rely on. The CMRN is a logical next step in ensuring the overall health and resilience of marine ecosystems, and the economic sustainability of the fisheries they support.

## ***Fishing policy has evolved to reflect an increased understanding of science and economics***

Over the past decade, fishing policy has shifted Commonwealth fisheries closer to economic sustainability. Fisheries management has shifted away from protecting fish stocks by restricting fishing effort and towards aligning fishers' economic incentives with long-term, sustainable levels of fish stocks. The following are a few examples:

- Since 2005, individual transferable quotas have reduced competition by allocating a portion of the total allowable catch, or a set number of tonnes, to each fisher.<sup>8</sup>
- The 2005 *Securing Our Fishing Future* package provided \$220 million to reduce excess fleet capacity and assist businesses to leave the industry, thereby improving industry profitability and sustainability.<sup>9</sup>
- The 2007 *Harvest Strategy Policy* sought to rebuild fish stocks and improve the long-term profitability of the industry by setting quota limits at a level that optimises fishing profitability (maximum economic yield), rather than maximising catch (maximum sustainable yield).<sup>10</sup> This results in a higher biomass and therefore a win-win, with larger fish stocks and higher profits.<sup>11</sup>

However, even the best fisheries policies and management have vulnerabilities. For example, the inability to completely control fishing effort or catch, the risk of misreading available stocks, and the risk of setting inappropriate quotas are fundamental challenges to fisheries management.

Given the increasing risk of climate change for marine ecosystem health, it may be timely to review the performance of the 2005 *Securing Our Fishing Future* package. If the industry still has excess capacity, it may be possible to achieve a double dividend from compensation attached to the implementation of new reserves under the CMRN. Directing appropriate levels of compensation toward any needed fleet rationalisation would help shift the commercial fishing industry further toward economic sustainability.

### ***While Commonwealth fisheries are in better condition than the rest of the world, many remain under pressure***

Australia is ahead of many other countries in rebuilding over-fished stocks. Yet the overall situation is still not sustainable. Over 35 per cent of Australian fisheries are classified as subject to overfishing or overfished, or have an uncertain classification.<sup>12</sup> The situation might appear worse still if we had more complete information, for example if current populations were compared to baselines from before industrial fishing began.

Australian commercial fishing is vulnerable to rising fuel costs, and fluctuations in prices and the exchange rate. From 2001-02 to 2011-12, the annual real gross value of Australian fisheries production fell by 28 per cent.<sup>13</sup> This was driven by a decrease in the value of high value wild catch products (the combined value of rock lobster, prawns, tuna and abalone halved over this period), which was partially offset by the rise in aquaculture and specifically the increased value of farmed salmon production.<sup>14</sup> Fuel, labour and other operating costs are a major determinant of where fishing occurs and how profitable any enterprise is.<sup>15</sup> Over the long-term, fuel costs will rise as oil supplies peak.<sup>16</sup>

In the longer-term, Commonwealth fisheries face the same systemic risks from climate change, pollution and pests as the rest of the world. Climate change, in particular, introduces uncertainties that may be beyond the ability of quota-based fisheries management to respond to. An integrated approach to managing Australia's marine estate – one that includes MPAs – could provide insurance against future risks.

### ***The Commonwealth Marine Reserves Network is the logical next step in integrated marine management***

In recent decades, Commonwealth policies have evolved to reflect an increased understanding of the marine environment as a complex system. The 1998 *Oceans Policy* was established to align the overlapping laws that regulate marine management, based on the principle of ecologically sustainable development. This policy gives priority to maintaining ecosystem health and integrity. In a world facing unprecedented threats from climate change, this makes sense for commercial as well as for conservation reasons.

Marine parks are an important part of this evolution of policy. Since 1991, bipartisan support for establishing a representative network of marine parks has been reflected in a series of national and international commitments.<sup>17</sup> At the heart of the *Oceans Policy* is the development of Regional Marine Plans, specifying which areas of Commonwealth waters are protected in marine parks, and which are available for fishing or mining. These plans are meant to be based on the best available scientific and other information.

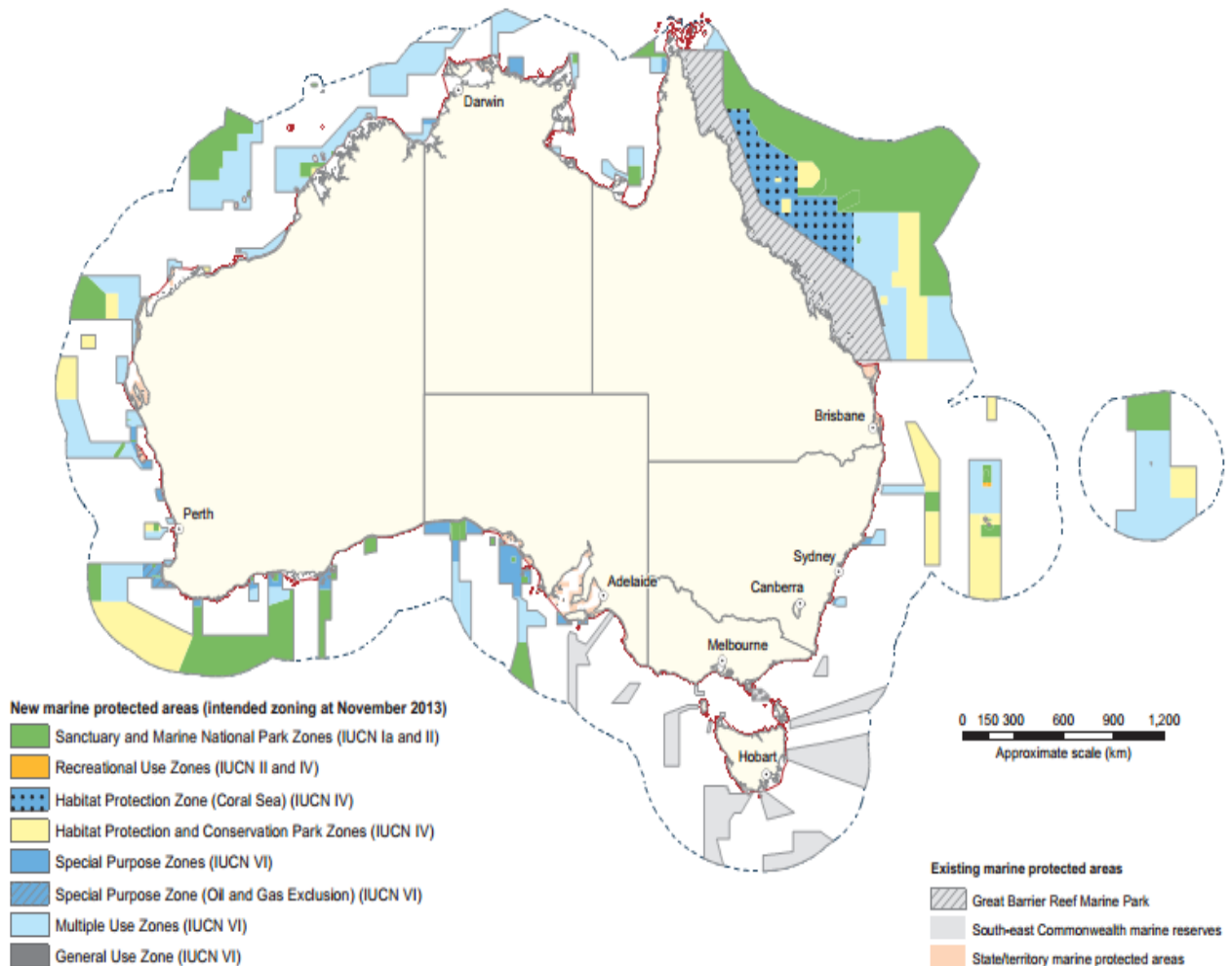
In 1998 the Commonwealth, States and Northern Territory governments committed themselves to establishing a National Representative System of Marine Protected Areas (NRSMPA) by 2012.<sup>18</sup> By 2007, the Commonwealth Government had established the Great Barrier Reef Marine Park, the South-east Marine Reserves Network and a number of smaller areas of protection, which covered 10.1 per cent of Commonwealth waters.<sup>19</sup>



In June 2012 the previous Commonwealth Government announced the creation of the CMRN and declared new MPAs in November of the same year. These new MPAs were designed to complete the Commonwealth part of the NRSMPA.

As previously announced, the MPAs were to extend protection from 10.1 to 35.8 per cent of Commonwealth waters. Under management plans which were due to go into operation in July 2014, 13.3 per cent of Commonwealth waters were to be highly protected zones and the remaining 22.5 per cent would allow some fishing.<sup>20</sup> Figure 1 illustrates the extent of Australia's marine estate, existing protected areas, and the new reserves proclaimed in 2012 with their intended zoning as at November 2013.

**Figure 1: Australia's marine estate and the Commonwealth Marine Reserves Network**



Source: Australian Government Department of the Environment<sup>21</sup>

Zoning determines what activities are allowed in different parts of an MPA. Some areas allow recreational fishing, and some commercial fishing as well, but harmful fishing practices like bottom trawling are generally banned. The marine reserves discussed in the context of the CMRN are the highly protected Marine National Park Zones (in green above) that do not allow any extraction of fish or other resources. They are often referred to as 'no-take' zones, or sanctuary zones.

Management plans set out this zoning, and are critical if MPAs are to be effective in protecting ecosystems and providing flow-on economic benefits. Box 1 shows some of the factors that are important for MPAs to be effective. Once an MPA has been declared, possibly the next most important factor for success is whether the size of highly protected areas is sufficient.

### **Box 1: Factors influencing MPA effectiveness**

MPAs will vary in their effectiveness depending upon a number of factors, including:

- The adequacy of the size of highly protected areas;
- Other environmental damage (e.g. pollution) affecting the MPA;
- How long they have been established, and how this relates to the lifecycle of fish species;
- The mobility of fish species, which will affect both how quickly the species rebuild and the degree of spill-over into the nearest fishing grounds; and
- Fishing management regimes around highly protected areas within MPAs.

It is important that MPAs are sited based on scientific rather than political criteria, so that areas critical for the ecosystem are protected. Baseline studies when MPAs are formed and continuing research are essential to understand the effects of establishing the MPAs. Even more importantly, MPAs will, if properly sited and of sufficient size, provide data about what the natural biomass can be in an undisturbed area. This will help to manage resources for the long-term.

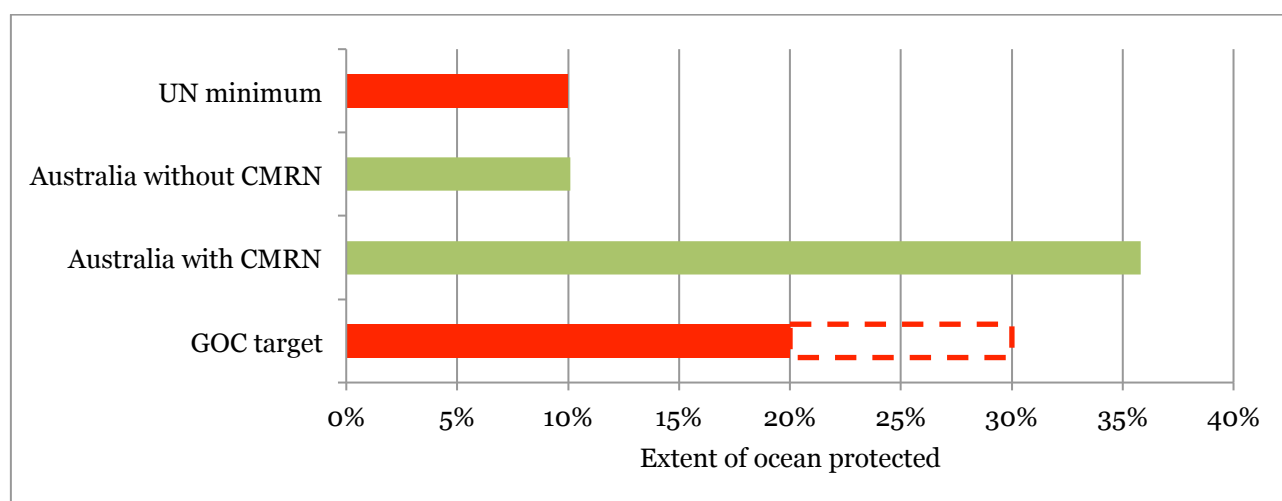
As mentioned previously, the current Commonwealth Government has confirmed its commitment to new MPAs, but has suspended their operation. There have been no changes to the legal status of the new MPAs, which were proclaimed in December 2013.<sup>22</sup> However, the management plans, which were due to take effect in July 2014, have been set aside pending a review of CMRN management arrangements.<sup>23</sup>

On 11 September 2014, the Minister for the Environment, Greg Hunt, formalised the establishment and composition of the Marine Reserves Review. It has two components: the appointment of an Expert Scientific Panel to examine the science supporting the current marine reserves, and the establishment of Bioregional Advisory Panels to improve consultation with stakeholders. The MPAs pre-dating the 2012 CMRN announcement are not part of the Marine Reserves Review.

The Terms of Reference state the process will “reconsider proposed zoning boundaries in consultation with stakeholders” and “restore confidence in the process by bringing genuine consultation”.<sup>24</sup> Two points should be highlighted in light of this development.

First, the Terms of Reference reaffirm findings should be based on the “best available science”. In this respect, we note that the scientific consensus behind MPAs is well established. No doubt this will be borne in mind by the Expert Scientific Panel in any recommendations it makes. Second, as this report argues: MPAs and fisheries should not be constructed as in conflict. They need not be in binary opposition to one other, as the need to find ‘balance’ suggests. The increasing popularity of the MSC label is evidence of industry recognition that a complementary approach on sustainability is in their best interests. Stakeholder industry interests need not conflict with marine protection. Mutual benefit can be harnessed – a win-win scenario for sustainable fisheries and marine protection. Consultation should reflect this. The inclusion of broader economic and social concerns into the Marine Reserves Review process is welcome. Stakeholder views sought should be representative, diverse and grounded in scientific fact.<sup>25</sup> As part of this, the long-term risks to fisheries and ways to mitigate these should be carefully considered.

Full implementation of the new MPAs would surpass recommendations from the United Nations and the Global Ocean Commission, and establish Australia as a world leader in marine protection, as is illustrated in Figure 2. If combined with adequate zoning and funding, the CMRN could position us well to withstand new and compounding threats to oceans, help conserve the population of our fish stocks, and benefit our reputation as a producer of high quality sustainable seafood.

**Figure 2: Australia's marine protection compared to global recommendations**

Source: United Nations Convention on Biological Diversity, Global Oceans Commission, CPD analysis.<sup>26,27,28</sup>

Of course, any government should make decisions based on the latest and best available science. The ecological benefits of MPAs were acknowledged by scientific consensus as early as 2001.<sup>29</sup> Yet as more MPAs are established around the world, evidence for their effectiveness is increasing. This has led Global Ocean Commission Co-Chair Trevor Manuel to emphasise the importance of MPAs in allowing fish stocks to recover.<sup>30</sup>

As recently as February 2014, an Australian led study published in the leading scientific journal *Nature* draws on a study of 87 MPAs across 40 countries. This paper demonstrates that conservation benefits of MPAs increase significantly through the combined presence of five key features: fishing regulations (specifically 'no-take' zones); strong levels of enforcement; longevity of protection (>10 years); size of the protected area; and isolation of reef habitat by deep water or sand.<sup>31</sup> Factoring this information into the scientific component of the current Government's review may mean that the area set aside for high levels of protection under the CMRN is extended.

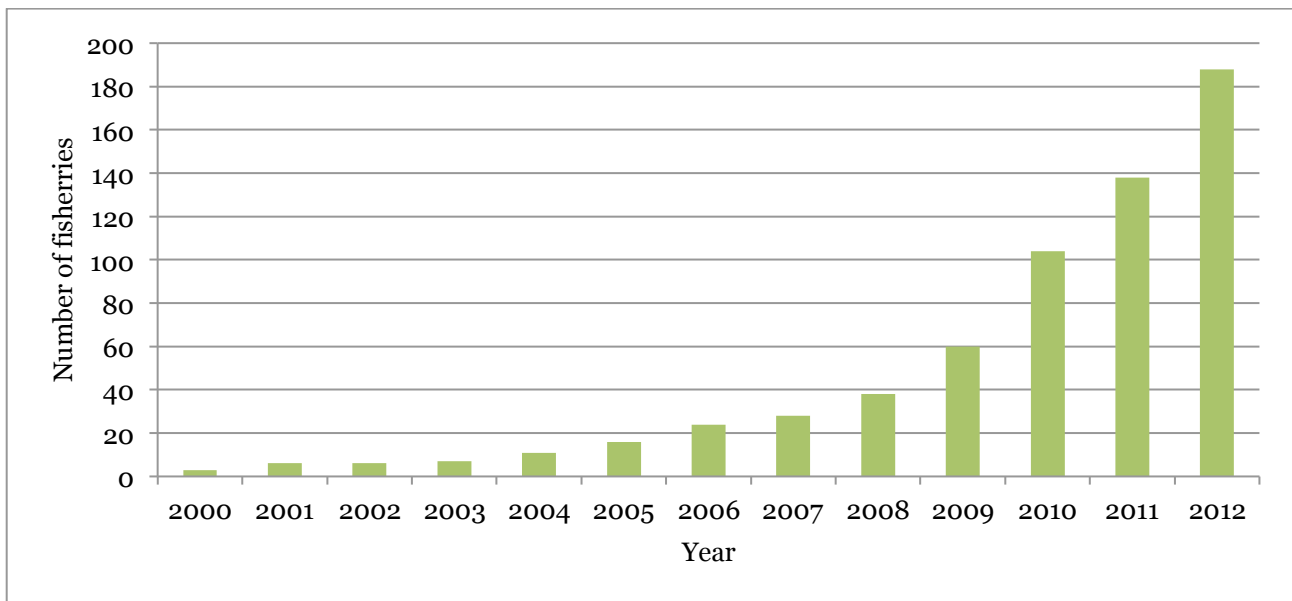
### ***Australia could be a leader in sustainable seafood production***

Commonwealth fisheries have little scope to increase the total quantity of production sustainably, but it should be possible to increase the value of production. Given the variety and quality of Australian seafood, sustainably certified products are an increasingly feasible sector of the market for Australian fisheries to target.

#### ***Demand for sustainably certified seafood continues to grow***

The MSC offers the world's leading certification and eco-labelling program for sustainable seafood. Fisheries that apply for MSC certification and achieve high scores against a range of performance indicators are entitled to label their products with the MSC eco-label, which allows them to be sold at a premium and access select markets. Retailers and restaurants pay royalties to the MSC for the use of their certification. This indicates the value of the MSC brand across the value chain and its recognition amongst consumers.

In 2012-13 there was a 35 per cent increase in the number of MSC labelled products across 106 countries.<sup>32</sup> As illustrated by Figure 3, MSC membership has increased exponentially in recent years, growing four-fold in the four years up to 2012. Membership continues to grow. There are now 237 certified fisheries across 57 countries, 98 fisheries in assessment, and an additional 40 to 50 fisheries in confidential pre-assessment.<sup>33</sup>

**Figure 3: Growth in Marine Stewardship Council certification**

Source: Marine Stewardship Council global impacts summary report 2013<sup>34</sup>

Australian consumers have a very positive perception of the MSC, and the local market is increasingly demanding certified sustainable seafood.<sup>35</sup> The Australian Marine Conservation Society has produced a *Sustainable Seafood Guide* to help Australian consumers make sustainable choices.<sup>36</sup> Major supermarket chains Woolworths, Coles and Aldi have all made the MSC central to their sustainable seafood sourcing policy.<sup>37</sup> Woolworths aims to have all of their wild capture seafood MSC certified in the long-term.<sup>38</sup> The World Wildlife Fund has partnered with Blackmores, Coles, John West and Tassal to help them shift to responsibly sourced seafood and fish oil products, with John West seeking to ensure all of its seafood products in Australia and New Zealand are responsibly sourced by 2015.<sup>39</sup>

Yet there is room to grow: at this stage, the number of MSC labelled products on sale in Australia is still minor compared to leading countries.<sup>40</sup> Beyond our borders, demand for sustainable seafood is likely to grow even faster, as economic growth in Asia develops increasingly affluent and discerning markets. Almost three billion people will join the middle classes by 2050 and these entrants are to be found almost exclusively in today's emerging markets.<sup>41</sup> Some of our trading partners have a much stronger seafood culture – Japan's annual consumption of fish per person is 60kg, compared to only 25kg in Australia.<sup>42</sup>

While the Australian public has a positive view of sustainable seafood, their perceptions toward the sustainability of the local industry are divided, with only 42 per cent of the public believing that Australia's fisheries are sustainable.<sup>43</sup> Now is the time to secure Australia's reputation as a leader in sustainable seafood and marine management, and signal this by growing the proportion of fisheries that are MSC certified. Australia should specialise in high quality sustainable seafood, rather than competing with countries that have low wages and poor marine protection.

### *As sustainable seafood certification becomes widespread, standards may rise*

Sustainability certification may drive a 'race to the top' amongst commercial fisheries. As more fisheries seek certification, higher standards of performance are likely to evolve over time.

Growth in demand for MSC certified seafood has fuelled a corresponding drive for fisheries not yet performing at this level of sustainability to improve their performance. An increasing number of



fisheries around the world have formed ‘fishery improvement partnerships’, benchmarking performance against the MSC standard and developing strategies for achieving MSC certification.<sup>44</sup>

Along with individual fisheries, entire regions can use sustainability certification to obtain a competitive advantage. In September 2012, the Western Australian Government announced that it would provide almost \$15 million in funds to help its fisheries achieve and demonstrate sustainability, selecting the MSC standard and certification program as its method of verification.<sup>45</sup> This makes it the first region in the world to pursue sustainability certification across all its fisheries.

The fund will be used over four years to cover application fees and audit costs. Certification follows a two-stage process: pre-assessment will determine the current status of fisheries and improvements needed towards certification; thereafter MSC-approved bodies will examine fisheries for certification and continue with annual audits to ensure that performance is maintained.<sup>46</sup>

As the influence of the MSC becomes widespread, a virtuous circle may lead to rising standards required for certification. The upfront investment in gaining sustainability certification gives fisheries an incentive to continue to improve their performance to maintain that certification.

Some early movers in MSC now support MPAs as a way to enhance the sustainability of the fishery and the ecosystem it relies upon. As discussed in the case study below, New Zealand’s MSC certified Hoki Fishery helped to initiate protection from harmful fishing practices.

### *Case Study: New Zealand’s Hoki Fishery*

Hoki is New Zealand’s largest fishery. Processed fish exports in 2011 were worth more than NZ\$183.5 million.<sup>47</sup> Hoki are caught by trawling all around New Zealand and are most common in the Cook Strait and off the west coast of the South Island during the winter spawning season.<sup>48</sup> They are fished on the Chatham Rise and in the south on the Campbell Plateau at other times of the year (see Figure 4).<sup>49</sup>

Globally, Hoki was the third fishery to be MSC certified. It was first certified by the MSC in 2001, re-certified in 2007, and again in 2012.<sup>50</sup> In February 2013, a MSC condition to improve management of habitat impacts was satisfied.<sup>51</sup> However, the fishery continues to be audited annually to assess progress on monitoring its ecological impacts.<sup>52</sup>

Since initial certification, management has improved as the fishery has sought to rebuild fish stocks and maintain a reputation as a sustainably managed trawl fishery. The Deepwater Group – a non-profit organisation representing the interests of 95 per cent of all New Zealand’s fisheries quota owners (including Hoki quota owners) – has been instrumental in improving the management and governance of the fishery.

Hoki fish stocks have now been rebuilt from historically over-fished levels. The level of fishing effort was progressively reduced between 2002 and 2008.<sup>53</sup> In 2004, allowable catch was halved in response to extremely low stock levels.<sup>54</sup> Over the 6 years to 2012, Hoki stocks have increased and are now within management target ranges.<sup>55</sup> In response, target catch levels have increased in recent years.

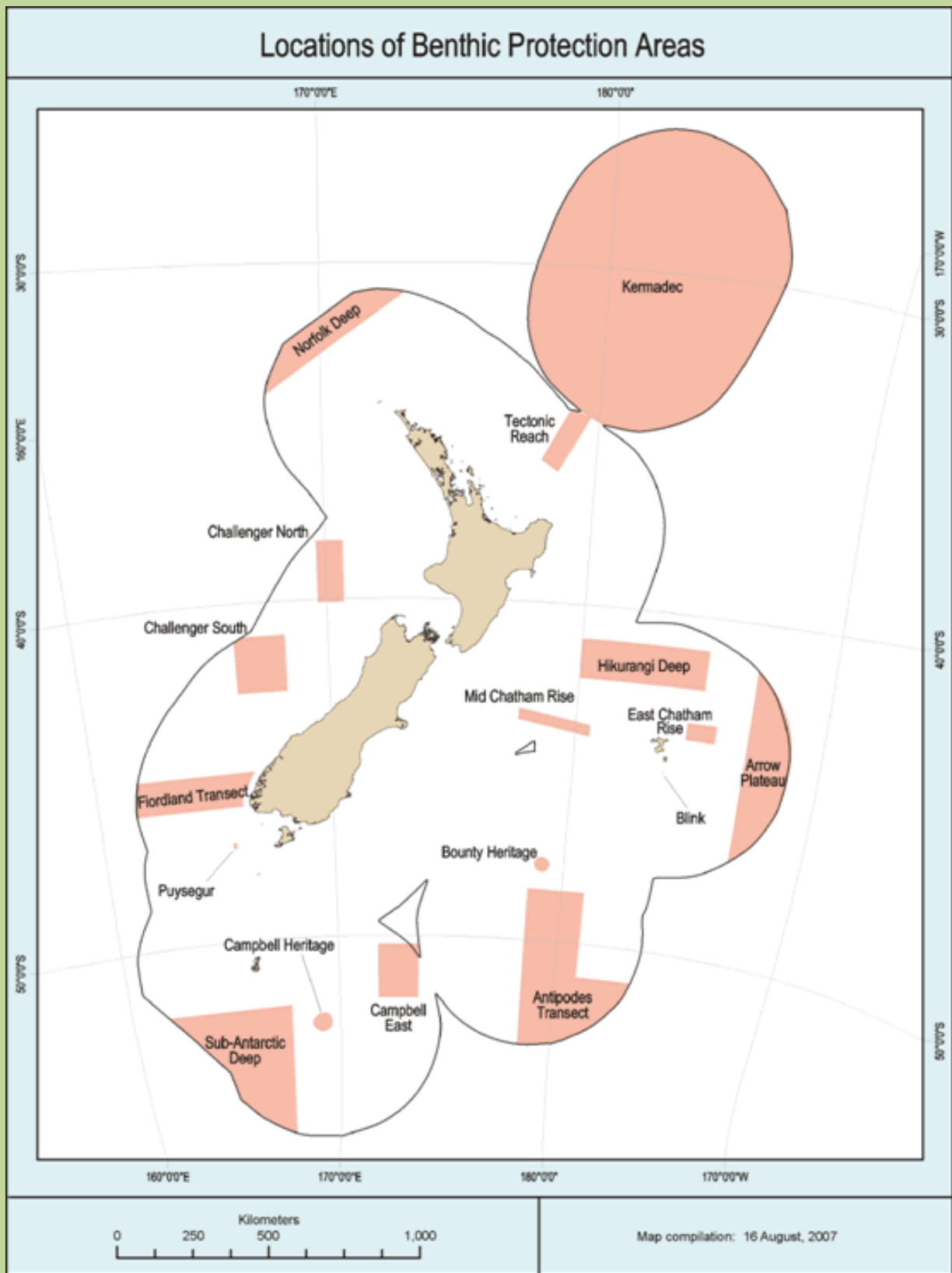
The fishery has also sought to minimise negative ecological impacts. According to the MSC, it has actively sought out and applied methods and strategies to reduce by-catch; minimise its impact on seabirds and fur seals and has established benthic protection areas to protect a broad range of seabed habitats and ecosystems.<sup>56</sup>

Benthic Protection Areas (BPAs) were established as an industry initiative. In 2005, the Deepwater Group proposed that the government should establish a series of Benthic Protection Areas (BPAs) that would prohibit trawling and dredging across a broad range of deep-water benthic habitats.<sup>57</sup> In 2007 seventeen areas were closed to bottom trawling, providing protection to 1.2 million km<sup>2</sup> of seabed habitat.

Protecting 32 per cent of New Zealand's Exclusive Economic Zone, the BPAs represent the single largest national marine protection initiative anywhere in the world.<sup>58</sup> The BPAs are well-distributed geographically and protect at least 10 per cent of each of New Zealand's nine oceanic classes.

The BPAs put New Zealand ahead of growing international and domestic pressure to restrict the adverse effects of bottom trawling on benthic habitat. However, the use of bottom trawling outside the BPAs remains controversial.<sup>59</sup>

Figure 4: New Zealand's Benthic Protection Areas



Source: New Zealand Ministry of Primary Industries<sup>60</sup>

## ***MARINE PROTECTION CAN BENEFIT COMMERCIAL FISHING, IF COMBINED WITH GOOD FISHERIES MANAGEMENT***

MPAs can support the long-term sustainability of commercial fisheries, and may make it easier for them to compete in the growing markets for sustainably certified seafood. While MPAs are first and foremost a conservation tool, if marine reserves (highly protected areas within MPAs) are paired with good fisheries management they can enhance the sustainability of commercial fisheries by helping to build up fish stock and improve fishery economic performance over time.<sup>61</sup>

There are three ways in which marine reserves within MPAs can improve the sustainability of commercial fishing, when combined with good fisheries management:

1. **Marine reserves can make it easier for commercial fisheries to gain and maintain sustainability certification.** MSC performance indicators assess how appropriate fisheries management and its outcomes are for ensuring the long-term sustainability of fisheries and the ecosystems that support them. Benefits generated by MPAs can assist in improving scores and could make it easier to retain certification even if standards rise over time.
2. **Marine reserves can increase fish stock populations in surrounding areas, improving the economics of commercial fisheries.** Spill-overs occur when fish leave marine reserves. This increases fish stock populations in surrounding areas. Spill-overs can benefit commercial fishers by increasing the amount caught for the same level of effort, and by enabling harvests of larger and more highly valued fish.
3. **Marine reserves provide long-term insurance against population crashes.** The increased diversity and density of marine species improves the overall health and resilience of marine ecosystems. This allows ecosystems to support larger and more stable populations of commercial fish stocks, insuring against risks - such as climate change, pollution and pests - that are hard to address with traditional, quota-based fisheries management tools.

If global overfishing continues unabated, causing international fish stocks to collapse, the value of commercial fish from sustainably managed Australian fisheries could increase by more than 40 per cent in 20 years.<sup>62</sup> While this is not the most likely scenario, it indicates the potential benefit to Australia of taking a global leadership position in managing our marine assets for long-term sustainability.

### ***Marine reserves can make it easier for fishers to achieve and maintain sustainability certification, by improving scores against MSC performance criteria***

The MSC sets an outcome-based standard which can be met through effective management, including the implementation of MPAs where relevant. The MSC fisheries standard is used to score fisheries according to their performance on 31 indicators, across the following three principles:

- Fishing is conducted in a manner that does not lead to over-fishing or depletion of exploited populations.
- Fishing operations allow maintenance of the ecosystem.
- The fishery is subject to effective management that respects local, national and international laws and standards.<sup>63</sup>

MSC performance indicators assess how appropriate fisheries management and its outcomes are for ensuring the long-term sustainability of fisheries and the ecosystems that support them. Benefits generated from marine protection can assist in scoring against these performance indicators. Fisheries adjacent to marine reserves may achieve higher scores against the MSC performance indicators, for two reasons:

1. Marine reserves provide key information to help fisheries get their management strategies right and demonstrate this to the MSC – to ascertain whether strategies are appropriate to maintain the long-term sustainability of a fishery. For example, if fisheries managers have information from reserves on undisturbed levels of fish stock – and use it to estimate the biomass that can support maximum sustainable yield – they can develop a better assessment of stock status, better reference points and a more appropriate harvest strategy.
2. Marine reserves provide a buffer that may help maintain scores against MSC performance indicators, even if fisheries managers get their settings slightly wrong. This is important because even the best informed fisheries management settings can be inadequate in the face of unforeseen risks. For example, if management did pose a risk of harm to ecosystem structure and function, reserves could reduce this risk through spill-over effects that allow the ecosystem to re-establish in fished areas.

The benefits of marine reserves and related performance indicators for MSC certification are listed in Table 1.

**Table 1: Marine reserve benefits and related MSC performance indicators**

Marine reserve benefits	Related MSC performance indicators	
Marine reserves provide baseline information on what the ‘virgin’ or undisturbed levels of fish stocks may have been before overfishing occurred. <sup>64</sup> This means that stock status can be assessed against appropriate baselines, and harvest strategy can draw on a comprehensive range of information on stock structure and productivity.	1.1.2	Limit and target <b>reference points</b> are appropriate for the stock.
	1.2.3	Relevant information is collected to support the <b>harvest strategy</b> .
	1.2.4	There is an adequate assessment of the <b>stock status</b> .
Marine reserves protect essential fish habitat, if they are set up to protect critical zones such as spawning areas. <sup>65</sup> They can also provide undisturbed areas of study against which the impacts of fishing can be assessed.	2.4.1	The fishery does not cause serious or irreversible harm to <b>habitat structure</b> , considered on a regional or bioregional basis, and function.
	2.4.2	There is a strategy in place that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to <b>habitat types</b> .
Marine reserves maintain biodiversity. <sup>66</sup> This has been found to increase ecosystem productivity and decrease fish community variability. <sup>67</sup> They can also provide undisturbed areas of study, which can assist in understanding ecosystem component functions and investigating fishery impacts on key ecosystem elements.	2.5.1	There are measures in place to ensure the fishery does not cause serious or irreversible harm to the key elements of <b>ecosystem structure and function</b> .
	2.5.2	There is adequate knowledge of the impacts of the fishery on the <b>ecosystem</b> .

Source: CPD analysis, based on information from Marine Stewardship Council<sup>68</sup>

MPAs also provide an environment – that is an unfished reference area – which can act as a baseline.<sup>69</sup> This is important in the MSC context to enable causation of population shocks and other variations outside the MPA to be better understood. A more accurate assessment of impacts is in everyone’s interests, including fisheries, as better scientific data can improve performance on MSC indicators and ultimately increase market price.

It is difficult to establish what management measures are most appropriate to keep a given fishery sustainable over time. This is due to both the innate variability of fisheries resources, and the complex interactions between external threats and how a fishery is managed. Given information on marine resources is currently inadequate, and threats are increasing, standards could potentially



become more stringent over time. Integrating marine protection into fisheries management can help to insure fisheries against future risk and uncertainty.

### ***Marine reserves increase fish stock populations in surrounding areas, benefiting commercial fishers***

There is growing evidence that marine reserves support larger fish populations and bigger individual fish. These can benefit commercial and recreational fishers if they spill over into areas open for fishing.

MPAs are zoned into different areas and classified according to what activities they allow. Some areas allow recreational fishing. Others also allow commercial fishing but ban harmful fishing practices like bottom trawling. Our interest here is those marine reserves that do not allow any extraction of fish or other resources. These are also known as ‘no-take’ zones, or sanctuary zones.

Well-enforced, long established, large and isolated ‘no-take’ zones generally harbour denser populations, larger individuals, and higher biomass of previously exploited species.<sup>70</sup> These ecological benefits can spill over to harvested areas nearby. This can benefit fishers by increasing the catch achieved for a given investment of effort (fuel, labour and time), and enabling harvests of larger and more highly valued fish.<sup>71</sup> Design of MPAs is important, as the extent of spill-over effects depends on a number of localised environmental variables.

An international review of 14 cases found that at small scales, local fisheries would not be sustainable without reserves in 12 of the cases studied, and spill-overs generated a net benefit in catch in the other two cases.<sup>72</sup> In some cases, the catch per unit of effort increased by as much as 66 per cent within five years of establishing protection, and fisher income was as much as 135 per cent higher compared to open access areas.<sup>73</sup>

The ecological and economic evidence suggests that carefully designed protection should be maintained long enough for full benefits to flow. While economic benefits may be seen early, the full ecological benefits of marine protection only become apparent after 15 years, and continue thereafter.<sup>74</sup>

Whilst the literature is sparse on the effects on adjacent fisheries arising from MPA introduction, this is an area that demands further attention. It is difficult to weigh up biological and economic optimal goals given the number of variables.<sup>75</sup> Under certain conditions a profit-maximising fishery would, in theory, support the creation of a marine reserve.<sup>76</sup> There is some evidence to suggest a win-win outcome can be secured. A recent study of Queensland’s red throat emperor fishery showed that management targets can be both economically and environmentally optimal if combined with a no-take reserve.<sup>77</sup> The study suggests the best target for achieving this “a biomass target which maximises the net present value of the returns to fishing”.<sup>78</sup>

It is possible that fisheries can benefit significantly from high-value catch in adjacent areas. There is some evidence of an improvement in both abundance and spatial distribution in the fisheries adjacent to an MPA off the coast of New England in the United States.<sup>79</sup> This finding was made 10 years after the MPA’s establishment.

Furthermore, a 15-year study into a South African endemic seabream fishery found that the introduction of an MPA benefitted the adjacent fishery.<sup>80</sup> Adult and larval spill-over effects were found to increase catch and profits for the local line fishers when contrasted with areas distant from and unaffected by the MPA.<sup>81</sup>

This suggests further research is warranted into fisheries adjacent to MPAs. Medium and long-term studies would be of particular interest. It is plausible that a win-win scenario can be created; in which sustainable fisheries are beneficiaries of MPAs, due to increased value of catch in spill-over areas and the high price consumers are willing to pay for quality, sustainably sourced product. The Marine Reserves Review should examine relevant scientific evidence on this question. Economic and conservation outcomes need not be in conflict. Complementary approaches have been

identified in a number of fisheries, including rights-based catch shares to increase economic returns alongside no-take areas.<sup>82</sup>

### ***Marine reserves provide long-term insurance against population crashes***

Marine reserves can insure against the risk of collapse of marine ecosystems, and the commercial fisheries they support. Within a well-managed marine estate, well-designed ‘no take’ zones act as reserves of natural capital. These reserves have a higher resilience to external stresses than fished areas, and can support faster recovery of commercial fish stocks from population shocks.

Marine reserves insure against commercial fish population crashes in two ways:

- Increased numbers of large, fertile fish act as a buffer that stabilise commercially targeted fish populations against year-to-year fluctuations and can repopulate fish stocks after shocks.
- Higher biodiversity within marine reserves can buffer entire ecosystems against crashes – increasing resistance to pollution, pests and climate impacts.

Restoring biodiversity within marine reserves is essential for both these insurance effects to work. Based on a meta-analysis across 32 controlled experiments, restoration of biodiversity was found to increase ecosystem productivity four-fold and decrease variability by 21 per cent on average.<sup>83</sup> There appears to be no upper limit on the benefits, with improvements continuing as biodiversity increases.

Higher biodiversity within marine reserves leads to more productive ecosystems, where commercial fish can multiply and grow older, larger and reproduce more. A review of ‘no-take’ zones in 124 marine reserves across 29 countries showed 21 per cent more species, 28 per cent larger fish, 166 per cent more fish density, and 446 per cent more biomass on average, compared to nearby unprotected areas or the same areas before protection.<sup>84</sup> More recently, an Australian led study of 87 MPAs across 40 countries showed that ‘no-take’ zones which are well-enforced, long established, large and isolated have twice as many large fish species, five times more large fish biomass, and 14 times more shark biomass on average than fished areas.<sup>85</sup>

At the same time, MPAs are more effective when good fisheries management is taking place around them. Australian Commonwealth fisheries have a policy that targets maximum economic yield (maximum profit) rather than chasing maximum sustainable yield (maximum revenue). Properly practiced, this approach ensures that stocks are maintained at a stable level to optimise long-term ecological and economic benefits, rather than catching as many fish as possible today to chase short-term profits.<sup>86</sup>

However, unpredictable shocks to fish populations can expose vulnerabilities in even the best managed fisheries. In light of the increased systemic risks to our oceans, investing in MPAs as insurance against unknown events is a smart move. Sustainable fisheries may increasingly view such an approach as good risk management.

Counterfactual analysis suggests there would have been significant economic benefits (estimated to be \$162 million under optimal harvesting conditions) to introducing a reserve alongside Northern Cod fisheries in Canada.<sup>87</sup> The value would have been derived from the ability to better manage risk and guard against population shock.

The recent and unexpected shock to the Western Australian Rock Lobster population, explored below, is an example of where the existence of MPAs might have avoided millions of dollars of economic impact. The Western Australian Rock Lobster Fishery is an iconic example of sustainable fisheries management. Nevertheless, in recent years it has come under threat. The case study below suggests that increased marine protection might be the best solution for the longevity and profitability of the industry.

### *Case Study: Western Australia's Rock Lobster Fishery*

Western Australia's Rock Lobster Fishery was the first MSC certified fishery in the world. It was certified in 2001, has been recertified twice, and remains a model of sustainable fishery management. However, in recent years population shocks have halved allowable catch, resulting in annual losses of around \$56 million.<sup>i</sup> While the rapid reaction by fisheries managers to reduce harvesting prevented a more rapid population crash, the reasons for the shocks remain unknown. Increasing systemic risks to our oceans and natural variability in population sizes has ensured the need to allow for a buffer to safeguard stocks is becoming evident. Such an approach would act as a natural insurance for fisheries against population shocks. This would mark a shift from a crisis management to a risk management approach.

A representative system of MPAs across the fished area would be the best defence against unknown future threats. In principle, the economic benefits of a natural buffer accrue as shocks increase in regularity.<sup>88</sup> Establishing more marine protection in the area would secure stocks for the long-term. The cost of displaced fishing effort will likely be a relatively small price to insure Australia's largest single-species fishery, worth \$200 million on average annually, and which directly supports 780 jobs, while indirectly supporting a number of other industries and an important Australian export.<sup>89,90</sup>

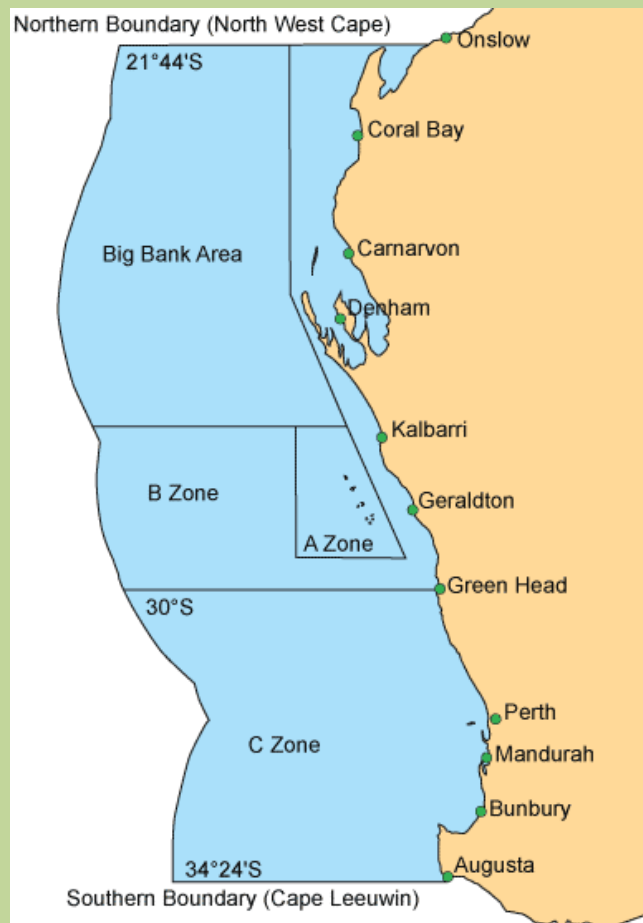
The area in which commercial fishing is allowed falls within both State and Commonwealth waters and is divided into three zones, as illustrated in Figure 6:

- A Zone (Abrolhos Islands)
- B Zone (North of latitude 30S)
- C Zone (South of latitude 30S)

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<sup>i</sup> \$56 million is the difference between the average annual value of industry catch of \$250 million (Allen Consulting Group) and the catch for the 2010/11 season of \$194 million (WA Fisheries Management). The historical range of annual catch is \$200 to \$400 million (WA Fisheries Management).

**Figure 5: Western Australia's commercial rock lobster fishing zones**



Source: Western Australia Department of Fisheries<sup>91</sup>

This is intended to prevent concentrated fishing in some areas and to allow management that addresses zone-specific issues. Most fishing occurs in C Zone, with part of A Zone protected and temporary closure measures in part of B Zone. However, stock problems persist and are not well understood.

Since the 1960s, Rock Lobster stock has been forecast up to four years in advance by monitoring puerulus, a late larval form.<sup>92</sup> Lobsters spawn in late spring and early summer and their pueruli spend up to 11 months drifting in the ocean, before being swept by currents to settle on inshore coral reefs. While usually accurate, the system is not perfect and is susceptible to unexpected threats. In 2007-08 and 2008-09, puerulus counts were poor despite conditions that should favour good settlement. This was in contrast to observed patterns that had prevailed since records first began.<sup>93</sup>

This poor settlement was used to predict a very low recruitment to fishing stock, which allowed fishery management to be adjusted before the low larval count translated to a decline in fishable stock. But managing catch actually meant reducing it significantly: Big Bank Area in B Zone has been closed to fishing, and Total Allowable Commercial Catch (TACC) in 2010/11 was kept at 5,500 tonnes (half the long-term average).

These management measures were able to facilitate recovery, and the WA Rock Lobster Fishery was recertified in March 2012. However, such a setback might not be so easily overcome in the future. The historical correlation between puerulus settlement and harvest may cease as new and compounding threats increase. The recovery was also slow and the stability of stocks is by no means guaranteed. Importantly, the reason for the stock collapse is still not fully understood.

MPAs offer the best way to manage threats, and do so at relatively little cost. An economic study suggests that a reduction in catch of 10 to 25 per cent would result in a loss of annual economic rent of only \$5 to \$14 million<sup>ii</sup>.<sup>94</sup> By comparison, the introduction of marine protection to a lobster fishery in Spain generated spill-over sufficient to offset lost yield from reduced fishing grounds and increase catch weight by 10 per cent.<sup>95</sup>

In 2010-11, the fishery employed 780 people across 279 boats.<sup>96</sup> Boats have, however, been leaving the industry for a number of years: as recently as the mid-1990s there were close to 2,000 people employed.<sup>97</sup> Thus, even if increased marine protection does require a rationalisation of fishing fleet, this is unlikely to hinder long-term employment prospects. Protection is in this case vital to stabilising stock levels and industry viability.

The cost of protection is minor compared to the 50 per cent stock collapse that recently caused annual losses of \$56 million, or the risk of complete collapse.

## ***ADEQUATE FUNDING FOR MPAS IS ESSENTIAL TO REALISE THEIR BENEFITS***

The economic benefits of MPAs may offset the costs in as little as 5 years.<sup>98</sup> A meta-analysis of marine protection around the world suggests that the value of effective MPAs may often exceed pre-reserve value, because of the benefits of enhanced adjacent fishing and tourism.<sup>99</sup> This report only considers commercial fishing stakeholders, who may fear short-term income loss. Yet the benefits of more stable commercial fish catch and enhanced tourism opportunities can be relevant for the broader community, particularly in regional areas.

However, adequate funding is essential to ensure marine parks provide an attractive payback period. This means funding for buying out excess fishing fleet, compensating those who suffer genuine short-term losses, and providing for the long-term management of marine parks needs to be considered when parks are first established. Funding for both adjustment and management must not only be sufficient, but well targeted.

Australia has a mixed record in targeting funding, but is learning from past experience. The 2003 Great Barrier Reef Structural adjustment package has been widely criticised as one of the most politically manipulated and misallocated in history.<sup>100</sup> However, the 2011 *Fisheries Adjustment Policy* provides a clear basis for more rational decision making on buyouts and compensation.<sup>101</sup>

Australia now has an improved process for targeting adjustment funding to: a) enhance economic sustainability by reducing fishing effort where there is too much fleet capacity; b) compensate those that suffer genuine losses; and c) assist those who can't easily adapt. To make this work in practice, the 2011 *Fisheries Adjustment Policy* must be administered well and based on accurate information.

For the CMRN so far, these learnings appear to have been applied. Rigorous economic consultation and modelling was undertaken for the Commonwealth Government's Regulatory Impact Statement (RIS) in 2012.

Estimated impacts on industry are less than variability caused by natural fluctuations in fish stocks from year to year, and factors such as fuel prices and market conditions. The RIS notes that these are conservative estimates, as displacement of income does not necessarily equal loss of income. Many of the fisheries displaced by the new reserves have access to alternative fishing grounds, or could continue fishing within open areas of the reserve if they switch to less damaging methods of catch.

Table 2 illustrates the estimated economic impact of the CMRN on the commercial fishing industry according to the RIS, and the relative impact that this would have on the industry.

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<sup>ii</sup> Economic rent is a profit figure, calculated by subtracting costs from net return.



**Table 2: Industry impact of the Commonwealth Marine Reserves Network**

Short-term impact	RIS estimations	Relative industry impact
Fishing income displaced	\$11.1 million	1.1 per cent of industry revenue For 50 of the 62 fisheries, less than three per cent of the value of annual catch would be affected
Jobs lost (full-time equivalent)	103 jobs	2.2 per cent of estimated direct employment in wild catch fisheries

Source: Department of Sustainability Environment Water Population and Communities, Australian Bureau of Agricultural and Resource Economics and Sciences, CPD analysis<sup>102,103</sup>

The RIS notes that the impacts of the CMRN are not large enough to have a clear impact on total national fisheries production, even if the total estimated displaced catch was lost to the economy.<sup>104</sup> However, individual businesses could be significantly impacted. Where there are significant losses for commercial fishers, these should be shared by the Australian community. Where there are also short-term economic impacts on businesses or communities related to commercial fishing, assistance may be warranted if there is genuine loss and a lack of capacity to adapt.

Where Australia needs to improve is to fund management and monitoring of MPAs over time. In the longer-term, this cost is a small 'insurance premium' for protecting marine assets when compared to the benefits. For example, the annual cost of running the Great Barrier Reef Marine Park is less than 2 per cent of what it contributes to the economy.<sup>105</sup> Adequately funding the management and monitoring of the CMRN will be essential to ensure its full economic and ecological benefits flow over time.

## **RECOMMENDATIONS**

The recently announced Marine Reserves Review is the second comprehensive planning process for the Commonwealth Marine Reserves Network. It should be used to establish a network that will deliver benefits for the long-term.

To maximise future dividends, MPAs must be well designed and zoning should be kept in place for 15 years before their effectiveness is judged. This will only be possible if the review of management arrangements is based on sound science, balanced community consultation, and is not unduly swayed by political influence.

### ***Ensure the design of marine reserves is informed by the latest science***

- Marine reserves are a conservative investment in the future of Australia's key marine assets. Their primary benefit is to insure ecosystems against threats such as overfishing, climate change, pollution and pests, which have unforeseen and compounding effects. However, they can also provide economic benefits where they complement commercial fishing areas, as part of a risk management strategy.
- The starting point for the Marine Reserves Review should be an acceptance of the scientific case for establishing a network of MPAs, given the ecological benefits of MPAs were acknowledged by scientific consensus as early as 2001.
- New scientific research shows the size of 'no-take' zones is one of the key criteria for effective MPAs. 'No-take' zones generally harbour denser populations, larger individuals, and higher biomass of previously exploited species, but only if they are well-enforced, long established, large and isolated.
- The Expert Scientific Panel should consider the latest evidence for designing effective 'no-take' zones, and the possibility that ecological risks will increase over time.

### ***Find common ground between stakeholders by focusing on MPA benefits***

- MPAs have economic and reputational as well as environmental benefits. These include competitive advantages for commercial fishers through a potential marketing edge, and insurance against the threat of rising fuel costs and market price fluctuations.
- Australia cannot afford to be complacent about current fisheries management policies, even for relatively well managed Commonwealth fish stocks. Even the best scientific fisheries management relies on limited information, given the unexpected interactions between threats and variability of stocks. A risk management approach suggests a buffer is needed to guard against population shocks, and MPAs are an effective way to provide that buffer.
- While final decisions on zoning should be informed by local stakeholder knowledge as well as by science, they must not be swayed by the short-term concerns of one particular view.
- To increase community acceptance of final decisions on zoning the Bioregional Advisory Panels should be designed to find common ground between stakeholders. This is important to ensure the CMRN zoning remains in place long enough to be effective.
- Fisheries and marine protection interests should not be constructed as two sides of a debate. There is a growing list of shared interests, as evidenced from eco-labelling and sustainable fisheries. A policy outcome based on the best science can be mutually beneficial.

### ***Set aside sufficient funding for structural adjustment and ongoing management***

- Australia has learned from previous adjustment packages, and now has a more rational policy and rigorous assessment process for determining and targeting adjustment funding.

- However, it may be timely to review the performance of the 2005 *Securing Our Fishing Future* package, given the increasing risk of climate change for marine ecosystem health. If the commercial fishing industry still has excess capacity, further fleet rationalisation may enhance industry sustainability over the long-term.
- The Commonwealth Government should seek a double dividend from adjustment funding attached to the implementation of the CMRN by actively identifying opportunities to buy out excess fleet capacity.
- Australia has room to improve its strategic approach to funding ongoing management of the CMRN. Planning ahead requires a realistic assessment of the annual cost of management, enforcement and monitoring of MPAs. To ensure MPAs are effective, ideally 15 years of funding should be provided upfront.
- The Commonwealth Government should ensure 15 years funding for managing the CMRN is placed in a trust, or similar arrangement, with independent governance.

Marine protection should be complemented by a sustainable, productive, commercial fishing industry. The two concepts can co-exist in a well-designed, carefully managed CMRN. This outcome encourages industry eco-certification and long-term, co-ordinated planning.

The scientific consensus behind MPAs is well established. The economic arguments against them have withered with the passage of time. In an increasingly complex economy, sustainable fisheries may benefit from MPAs as part of a comprehensive risk management strategy.

Getting this right is an opportunity we do not want to miss. Chopping and changing policy on marine protection will short-change all Australians, and deny future generations the chance to enjoy similar benefits from marine assets as their parents and grandparents.

## NOTES

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- <sup>1</sup> Australian and New Zealand Environmental and Conservation Council Taskforce, “Guidelines for Establishing the National Representative System of Marine Protected Areas”, Environment Australia, Canberra, December 1998, available at <http://www.scew.gov.au/system/files/resources/378b7018-8f2a-8174-3928-2056b44bf9b0/files/anzec-gl-guidelines-establishing-national-representative-system-marine-protected-areas-199812.pdf>
- <sup>2</sup> California Environmental Associates, *Charting a Course to Sustainable Fisheries*, 2012, 4.
- <sup>3</sup> U. Thara Srinivasan et al., “Food Security Implications of Global Marine Catch Losses due to Overfishing,” *Journal of Bioeconomics* 12, no. 3 (August 2010): 183-200 at 195, doi:10.1007/s10818-010-9090-9.
- <sup>4</sup> Hugh Possingham and Jon Nevill, *Open Letter to Prime Minister and Leader of the Opposition: Science Behind the Marine Protected Areas*, 2010.
- <sup>5</sup> Intergovernmental Panel on Climate Change, *Climate Change 2014: Impacts, Adaptation, and Vulnerability*, March 2014, 16.
- <sup>6</sup> United Nations Convention on Biological Diversity, “Aichi Biodiversity Targets” (n.d.), Target 11, <http://www.cbd.int/sp/targets/>.
- <sup>7</sup> Global Ocean Commission, *A Sustainable Development Goal for the Global Ocean*, November 2013, 3, <http://www.globaloceancommission.org/policies/a-sustainable-development-goal-for-the-global-ocean/>.
- <sup>8</sup> Paul Newton et al., *Fishery Economic Status Report*, 2007, 15-17.
- <sup>9</sup> *Ibid*, 29-30.
- <sup>10</sup> *Ibid*, 21.
- <sup>11</sup> R Q Grafton, T Kompas, and R W Hilborn, “Economics of Overexploitation Revisited,” *Science* 318, no. 5856 (December 2007): 1, doi:10.1126/science.1146017.
- <sup>12</sup> Australian Bureau of Agricultural and Resource Economics and Sciences, *Fishery Status Reports 2012, 2013*, 4.
- <sup>13</sup> Australian Bureau of Agricultural and Resource Economics and Sciences, *Australian Fisheries Statistics 2012, 2013*, 21.
- <sup>14</sup> *Ibid*.
- <sup>15</sup> Department of Sustainability Environment Water Population and Communities, *Completing the Commonwealth Marine Reserves Network: Regulatory Impact Statement*, 2012, 38.
- <sup>16</sup> Richard G Miller and Steven R Sorell, “The Future of Oil Supply”, *Philosophical Transactions of the Royal Society A* 372, no. 2006 (December 2013): 1, 24.
- <sup>17</sup> Department of Sustainability Environment Water Population and Communities, *Completing the Commonwealth Marine Reserves Network: Regulatory Impact Statement*, 2012.
- <sup>18</sup> Australian Government Department of the Environment, “Commonwealth Marine Reserves Review,” accessed Jun 5, 2014, <http://www.environment.gov.au/topics/marine/marine-reserves/marine-reserves-review>.
- <sup>19</sup> Caroline Hoisington and Laura Eadie, “Preserving Our Marine Wealth: An Economic Evaluation of the Proposed Commonwealth Marine Reserves Network”, *Centre for Policy Development Occasional Paper* no. 19, (June 2012): 1, 19.
- <sup>20</sup> *Ibid*.
- <sup>21</sup> Australian Government Department of the Environment, “Commonwealth Marine Reserves,” n.d, <http://www.environment.gov.au/topics/marine/marine-reserves/marine-reserves-review>.
- <sup>22</sup> Australian Government Department of the Environment, “Commonwealth Marine Reserves Review,” n.d, <http://www.environment.gov.au/topics/marine/marine-reserves/marine-reserves-review..>
- <sup>23</sup> Greg Hunt and Richard Colbeck, “Joint Media Release: Supporting Recreational Fishing While Protecting Our Marine Parks” (2013).
- <sup>24</sup> Australian Government Department of the Environment, “Commonwealth Marine Reserves Review - Terms of Reference”, 1, available at

<http://www.environment.gov.au/system/files/pages/931ca952-fdd2-4e14-a512-0a5278d22c71/files/commonwealth-marine-reserves-review-terms-reference.pdf>

<sup>25</sup> We note here a 2013 open letter to the NSW Government from the Dive Industry Association, an example of an economic interest in marine protection. See [http://www.diveindustry.com.au/default2.asp?active\\_page\\_id=132](http://www.diveindustry.com.au/default2.asp?active_page_id=132)

<sup>26</sup> United Nations Convention on Biological Diversity, “Aichi Biodiversity Targets” <http://www.cbd.int/sp/targets/>.

<sup>27</sup> Global Ocean Commission, *A Sustainable Development Goal for the Global Ocean*, November 2013, 3, <http://www.globaloceancommission.org/policies/a-sustainable-development-goal-for-the-global-ocean/>.

<sup>28</sup> Hoisington and Eadie, “Preserving Our Marine Wealth: An Economic Evaluation of the Proposed Commonwealth Marine Reserves Network.”

<sup>29</sup> University of California National Centre for Ecological Analysis and Synthesis, *Scientific Consensus Statement on Marine Reserves and Marine Protected Areas*, 2001, 3.

<sup>30</sup> “Large no fishing zones must be declared in high seas, says Manuel”, BDLive, 28/08/2014, <http://www.bdlive.co.za/business/agriculture/2014/08/28/large-no-fishing-zones-must-be-declared-in-high-seas-says-manuel>.

<sup>31</sup> Graham J Edgar et al., “Global Conservation Outcomes Depend on Marine Protected Areas with Five Key Features,” 506 *Nature* (13 February 2014): 216-220.

<sup>32</sup> Marine Stewardship Council, *Annual Report 2012/13*, 2013, 10.

<sup>33</sup> Marine Stewardship Council, *MSC in Numbers*, n.d, <http://www.msc.org/business-support/key-facts-about-msc>.

<sup>34</sup> Marine Stewardship Council, *Global Impacts Summary Report 2013*, 2013, 3.

<sup>35</sup> AMR Marketing Research, *Research to Gauge Consumer Attitudes and Behaviour towards Ecolabels, Sustainable Seafood, and MSC Certification*, July 2012, 21.

<sup>36</sup> Australian Marine Conservation Society, “Australia’s Sustainable Seafood Guide,” [http://www.sustainableseafood.org.au/Sustainable-Seafood-Guide.asp?active\\_page\\_id=702](http://www.sustainableseafood.org.au/Sustainable-Seafood-Guide.asp?active_page_id=702).

<sup>37</sup> Marine Stewardship Council, *Annual Report 2012/13*, 11.

<sup>38</sup> Woolworths Limited, “Sustainable Fish and Seafood,” n.d, [http://www.woolworthslimited.com.au/page/A\\_Trusted\\_Company/Responsible\\_Sourcing/Sustainable\\_Fish\\_and\\_Seafood/](http://www.woolworthslimited.com.au/page/A_Trusted_Company/Responsible_Sourcing/Sustainable_Fish_and_Seafood/).

<sup>39</sup> World Wildlife Fund, “Sustainable Seafood,” 2014, [http://www.wwf.org.au/our\\_work/saving\\_the\\_natural\\_world/oceans\\_and\\_marine/marine\\_solutions/sustainable\\_seafood/](http://www.wwf.org.au/our_work/saving_the_natural_world/oceans_and_marine/marine_solutions/sustainable_seafood/).

<sup>40</sup> Marine Stewardship Council, *Annual Report 2012/13* 2013 , 11.

<sup>41</sup> Karen Ward and Frederic Neumann, “Consumer in 2050: The Rise of the EM Middle Class,” *HSBC Global Research* (October 2012): 1.

<sup>42</sup> Food and Agriculture Organization of the United Nations, *The State of World Fisheries and Aquaculture*, 2012, 83.

<sup>43</sup> Michael Sparks, *Community Perceptions of the Sustainability of the Fishing Industry in Australia*, October 2013, 2.

<sup>44</sup> Marine Stewardship Council, “Annual Report 2012/13.”

<sup>45</sup> Western Australia Department of Fisheries, *Western Australian Commercial Fisheries Third Party Certification Program with the Marine Stewardship Council*, 2013, 3.

<sup>46</sup> Ibid.

<sup>47</sup> Deepwater Group, “Hoki Gets MSC Certification for Record Third Time,” September 28, 2012, <http://deepwater.co.nz/dwg-release-hoki-gets-msc-certification-for-a-record-third-time>. For broader 2014 industry figures from Seafood New Zealand see [http://www.seafoodnewzealand.org.nz/fileadmin/documents/Economic\\_review/Economic\\_Review\\_edition\\_8\\_FINAL.pdf](http://www.seafoodnewzealand.org.nz/fileadmin/documents/Economic_review/Economic_Review_edition_8_FINAL.pdf).

<sup>48</sup> J M Akroyd, J Pierre, and A Punt, *NZ Hoki Fishery: 2nd Reassessment - Final Report v4*, 2012, 10.



- <sup>49</sup> Ibid.
- <sup>50</sup> Deepwater Group, “Hoki Gets MSC Certification for Record Third Time,” September 28, 2012, <http://deepwater.co.nz/dwg-release-hoki-gets-msc-certification-for-a-record-third-time/>.
- <sup>51</sup> J M Akroyd and J P Pierre, *Surveillance Report New Zealand Hoki Fishery*, February 2013, 11.
- <sup>52</sup> Ibid.
- <sup>53</sup> Deepwater Group, “Hoki,” *Our Species*, accessed June 17, 2014, <http://www.deepwater.co.nz/our-species/hoki/>.
- <sup>54</sup> Deepwater Group, “Hoki Gets MSC Certification for Record Third Time.”, 2012, <http://deepwater.co.nz/dwg-release-hoki-gets-msc-certification-for-a-record-third-time/>
- <sup>55</sup> J M Akroyd and J P Pierre, *Surveillance Report New Zealand Hoki Fishery*, February 2013, 8.
- <sup>56</sup> Deep Sea Conservation Coalition, “New Zealand Hoki Fishery Enters Re-Assessment for MSC Certification,” *Save The High Seas*, 2011, <http://www.savethehighseas.org/news/view.cfm?ID=262>.
- <sup>57</sup> Braddock Spear and Jim Cannon, *Benthic Protection Areas : Best Practices and Recommendations (Sustainable Fisheries Partnership Report)*, April 2012, 23.
- <sup>58</sup> New Zealand Ministry for Primary Industries, “Benthic Protection Areas,” 2007, <http://www.fish.govt.nz/en-nz/Environmental/Seabed+Protection+and+Research/Benthic+Protection+Areas.htm>.
- <sup>59</sup> Forest & Bird, “Best Fish Guide: Hoki,” *The Best Fish Guide*, 2011, <http://www.forestandbird.org.nz/what-we-do/publications/-best-fish-guide-/hoki>.
- <sup>60</sup> Ibid.
- <sup>61</sup> L.R. Little et al., “Complementarity of No-Take Marine Reserves and Individual Transferable Catch Quotas for Managing the Line Fishery of the Great Barrier Reef,” *Conservation Biology* 25, no. 2 (2010): 333–340.
- <sup>62</sup> Data sourced from International Food Policy Research Institute, *Fish to 2020*, Washington D.C. 2003, as cited in Laura Eadie and Caroline Hoisington, *Stocking up: Securing Our Marine Economy*, 2011, 49.
- <sup>63</sup> Marine Stewardship Council, *MSC Fishery Standard: Principles and Criteria for Sustainable Fishing*, May 2010, 1–8.
- <sup>64</sup> Caitlyn Toropova et al., *Global Ocean Protection: Present Status and Future Possibilities*, 2010, 17.
- <sup>65</sup> Andrew Rosenberg et al., “Ecosystem Approaches to Fishery Management through Essential Fish Habitat,” *Bulletin of Marine Science* 66, no. 3 (2000): 535–542.
- <sup>66</sup> Sarah Lester et al., “Biological Effects within No-Take Marine Reserves: A Global Synthesis,” *Marine Ecology Progress Series* 384 (May 2009): 37, doi:10.3354/meps08029.
- <sup>67</sup> Boris Worm et al., “Impacts of Biodiversity Loss on Ocean Ecosystem Services,” *Science* 314, no. 5800 (November 2006): 787–90, doi:10.1126/science.1132294.
- <sup>68</sup> Marine Stewardship Council, *MSC Certification Requirements*, January 2013: C145.
- <sup>69</sup> B Ballantine, “Fifty years on: Lessons from Marine Reserves in New Zealand and principles for a worldwide network”, *Biological Conservation*, No. 176, 2014, 304.
- <sup>70</sup> Australian Marine Sciences Association, *Position Statement on Marine Protected Areas*, June 2012, 2.
- <sup>71</sup> The Allen Consulting Group, *The Economics of Marine Protected Areas: Application of Principles to Australia’s South West Marine*, November 2009, 14.
- <sup>72</sup> Benjamin S. Halpern, Sarah E. Lester, and Julie B. Kellner, “Spillover from Marine Reserves and the Replenishment of Fished Stocks,” *Environmental Conservation* 36, no. 04 (February 2010): 272, doi:10.1017/S0376892910000032.
- <sup>73</sup> E Sala et al., “A General Business Model for Marine Reserves,” *PloS One* 8, no. 4 (April 2013): 2, doi:10.1371/journal.pone.0058799.
- <sup>74</sup> P P Molloy, I B McLean and I M Côté, “Effects of marine reserve age on fish populations: a global meta-analysis”, *Journal of Applied Ecology*, 46, 2009, 743–751, as cited in Caroline Hoisington, “The Marine Protection Dividend: NSW Marine Parks Deliver More over Time,” *Centre for Policy Development Occasional Paper* no. 34 (November 2013): 4.



- <sup>75</sup> J Sanchirico et al., “When are no take zones an economically optimal fishery management strategy?”, *Ecological Applications* 16, no. 5, 2006, 1643-1659.
- <sup>76</sup> Ibid.
- <sup>77</sup> S Yamazaki, R Q Grafton, T Kompas and S Jennings, “Biomass management Targets and the Conservation and Economic Benefits of Marine Reserves,” *Fish and Fisheries*, 2012, 208.
- <sup>78</sup> S Yamazaki, R Q Grafton, T Kompas and S Jennings, “Biomass management Targets and the Conservation and Economic Benefits of Marine Reserves,” *Fish and Fisheries*, 2012, 197.
- <sup>79</sup> S Murawski et al., “Effort distribution and catch patterns adjacent to temperate MPAs”, *ICES Journal of Marine Science*, 62, 2005, 1150–1167.
- <sup>80</sup> S E Kerwath, C G Atwood et al., “Marine protected area improves yield without disadvantaging fishers”, *Nature Communications*, No. 4, 2347, doi: 10.1038/ncomms3347, August 2013, 5.
- <sup>81</sup> S E Kerwath, C G Atwood et al., “Marine protected area improves yield without disadvantaging fishers”, *Nature Communications*, No. 4, 2347, doi: 10.1038/ncomms3347, August 2013, 4.
- <sup>82</sup> L Little, R Q Grafton, T Kompas, A D M. Smith, A Punt and B Mapstone, “Complementarity of No-Take Marine Reserves and Individual Transferable Catch Quotas for Managing the Line Fishery of the Great Barrier Reef,” *Conservation Biology*, 25, 2010, pp. 333-340.
- <sup>83</sup> Worm et al., “Impacts of Biodiversity Loss on Ocean Ecosystem Services”
- <sup>84</sup> Lester et al., “Biological Effects within No-Take Marine Reserves: A Global Synthesis”, *Marine Ecology Progress Series* 384 (May 2009): 37, doi:10.3354/meps08029.
- <sup>85</sup> Edgar et al., “Global Conservation Outcomes Depend on Marine Protected Areas with Five Key Features”
- <sup>86</sup> R Q Grafton, T Kompas, and R Hilborn, “Economics of Overexploitation Revisited.”, *Science*, 318, December 2007, 1601
- <sup>87</sup> R Q Grafton, T Kompas, and V H Pham, “Cod Today and None Tomorrow: The Economic Value of a Marine Reserve”, *Land Economics*, 85, 3, 2009, 467
- <sup>88</sup> R Q Grafton, T Kompas, and V H Pham, “The Economic Payoffs from Marine Reserves: Resource Rents in a Stochastic Environment”, *Economic Record*, 82, 2006, 478
- <sup>89</sup> S De Lestang et al., *Stock Assessment for the West Coast Rock Lobster Fishery*, 2012, 1.
- <sup>90</sup> Western Australia Department of Fisheries, “Lobster Commercial Fishing,” n.d, <http://www.fish.wa.gov.au/Species/Rock-Lobster/Pages/Lobster-Commercial-Fishing.aspx>.
- <sup>91</sup> Western Australia Department of Fisheries, “Lobster Management,” n.d, <http://www.fish.wa.gov.au/Species/Rock-Lobster/Lobster-Management/Pages/default.aspx>.
- <sup>92</sup> Western Australia Department of Fisheries, “Puerulus Settlement Index,” n.d, <http://www.fish.wa.gov.au/Species/Rock-Lobster/Lobster-Management/Pages/Puerulus-Settlement-Index.aspx>.
- <sup>93</sup> The Allen Consulting Group, *The Economics of Marine Protected Areas: Application of Principles to Australia’s South West Marine*.
- <sup>94</sup> Ibid, 29-30.
- <sup>95</sup> R Goñi et al., “Net Contribution of Spillover from a Marine Reserve to Fishery Catches,” *Marine Ecology Progress Series* 400 (February 2010): 233–243, doi:10.3354/meps08419.
- <sup>96</sup> Western Australia Department of Fisheries, “Lobster Commercial Fishing.”
- <sup>97</sup> Western Australia Department of Fisheries, *Assessment of Western Australian Rock Lobster Strategic Management Options: An Overview of Bio-Economic, Sociological and Comparative Analyses (Fisheries Management Paper No. 209)*, vol. 1, 2006, 82.
- <sup>98</sup> Sala et al., “A General Business Model for Marine Reserves.”
- <sup>99</sup> Ibid.
- <sup>100</sup> Andrew Macintosh, “Does Burke’s Marine Protection Zone Get the Balance Right?,” *Crikey*, June 14, 2012, <http://www.crikey.com.au/2012/06/14/does-burkes-marine-protection-zone-get-the-balance-right>.
- <sup>101</sup> Department of Sustainability Environment Water Population and Communities, *Fisheries Adjustment Assistance Package for New Commonwealth Marine Reserves: Discussion Paper*, 2012, 4.

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<sup>102</sup> Department of Sustainability Environment Water Population and Communities, *Completing the Commonwealth Marine Reserves Network: Regulatory Impact Statement*.

<sup>103</sup> Australian Bureau of Agricultural and Resource Economics and Sciences, *Australian Fisheries Statistics 2012*.

<sup>104</sup> Department of Sustainability Environment Water Population and Communities, *Completing the Commonwealth Marine Reserves Network: Regulatory Impact Statement*, 42.

<sup>105</sup> Laurence J McCook et al., “Adaptive Management of the Great Barrier Reef: A Globally Significant Demonstration of the Benefits of Networks of Marine Reserves,” *Proceedings of the National Academy of Sciences of the United States of America* 107, no. 43 (October 26, 2010): 18278–85, doi:10.1073/pnas.0909335107. Figures adjusted to compare costs to the direct contribution of the GBRMP to Australia’s GDP.