

Chapter 1

Overview

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The Australian Government's approach to fisheries management aims to maintain fish stocks at ecologically sustainable levels and, within this context, maximise the net economic returns (NER) to the Australian community (DAFF 2007). It also considers the impact of fishing activities on non-target species and the long-term sustainability of the marine environment, as required by the *Fisheries Management Act 1991*. This requires an understanding of the biological status of stocks, the economic status of fisheries and the state of marine environments that support fisheries.

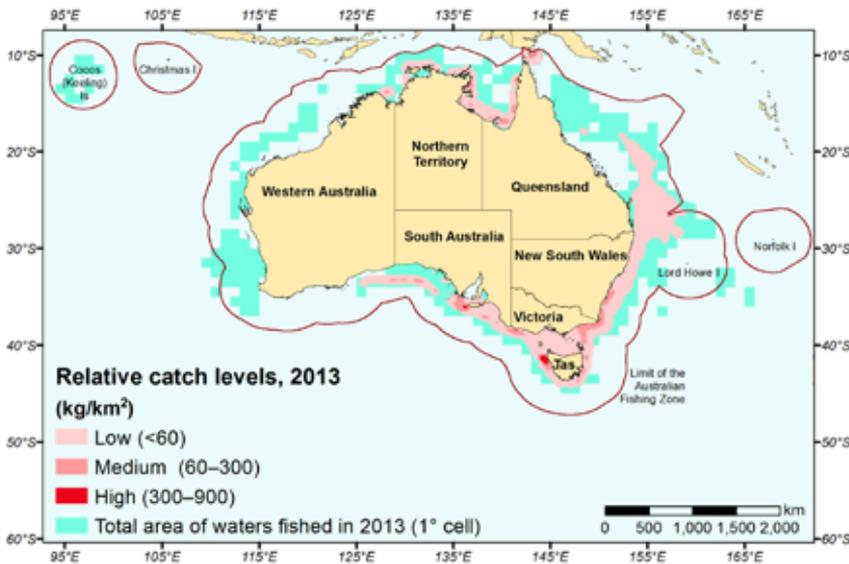
Fishery status reports 2013–14 provides an independent assessment of the biological status of fish stocks and the economic status of fisheries managed, or jointly managed, by the Australian Government (Commonwealth fisheries). It summarises the performance of these fisheries in 2013, and over time, against the requirements of fisheries legislation and policy. The reports aim to be comprehensive and, in doing so, assess all key commercial species from Australian Government-managed fisheries and examine the broader impact of fisheries on the environment, including on non-target species.

The main fisheries (by catch weight) include the Northern Prawn Fishery (NPF) in the north, the Eastern Tuna and Billfish Fishery (ETBF) in the east, and the Southern and Eastern Scalefish and Shark Fishery (SESSF) in the south-east (Figure 1.1). The 2013 reports assess 93 fish stocks across 21 fisheries. Total gross value of production (GVP) of Commonwealth fisheries in 2012–13 was \$319.7 million—about 13 per cent of Australia's total fisheries and aquaculture GVP (\$2.4 billion).

To complete these reports, ABARES use a range of information and data sourced from agencies such as the Australian Fisheries Management Authority (AFMA) and regional fisheries management organisations. The reports use catch, fishing effort and other information for the most recent full season that is available, along with the most recent stock assessment. Commonwealth fisheries operate with different season dates, and so the currency of catch and effort data in the reports varies. The most recent catch and effort data used are for the SESSF 2013–14 season, which had an end date of 30 June 2014. To compare status from year to year, biological and environmental status is presented retrospectively for '2013', noting the aforementioned caveats on the currency of the different data that are used. Where possible, economic status is presented for the 2012–13 financial year.

To better align with the year in which the reports are published, and to make this more consistent with other ABARES publications, the title of this year's *Fishery status reports* has been changed.

FIGURE 1.1 Relative catch levels of all Australian Government–managed fisheries, 2013



1.1 Assessing biological status

Assessments of stock status provide an indication of whether the current size of a fish stock is adequate to sustain the stock above the level at which the stock is considered to be overfished (biomass status), and whether current levels of catch will allow the stock to remain in that state (fishing mortality status). Stock status is expressed in relation to the reference points prescribed by the Commonwealth Fisheries Harvest Strategy Policy (HSP; DAFF 2007).

Biomass status indicates how many fish there are—specifically, whether the biomass in the year being assessed is above or below the level at which the risk to the stock is considered to be unacceptable. The HSP defines this level as the limit reference point, below which the stock is considered to be overfished.

Fishing mortality status reflects the level of fishing mortality of a stock in the year being assessed and whether that mortality level is likely to result in the stock becoming overfished, or prevent the stock from rebuilding from an overfished state. If fishing mortality exceeds either of these thresholds, a stock is considered to be subject to overfishing.

Stocks are included in the *Fishery status reports* if they meet one or more of the criteria below. Conversely, stocks may be removed from the report if they do not meet at least one of these criteria:

- a target or key commercial species in a fishery managed solely or jointly by the Australian Government
- a species managed under a total allowable catch (TAC)
- a species previously classified as ‘overfished’ that has not yet recovered to above the limit reference point
- a species previously included in the *Fishery status reports* as a single stock that has been reclassified as multiple stocks to align with species biology or management
- a byproduct species of ecological and/or economic importance if it meets one or more of the following criteria:
 - for several consecutive years or fishing seasons, the total catch (landings and discards) of the byproduct species is approximately equal to, or greater than, that of any other stock currently targeted and/or assessed in that fishery or sector
 - the value of the total catch landed of the byproduct species is considered to be an important economic component of the fishery or sector
 - the byproduct species or stock is listed as being at high risk from fishing activity in the ecological risk assessment process for the fishery or sector.

1.2 Biological status in 2013

Fishery status reports 2013–14 assesses 93 fish stocks across 21 fisheries (Figure 1.2): 66 stocks were assessed across 9 fisheries that are managed solely by AFMA on behalf of the Australian Government, and 27 stocks were assessed across 12 fisheries that are managed jointly with other Australian jurisdictions or other countries. Summary statistics are provided separately for solely domestically managed and jointly managed stocks. This allows an evaluation of performance of fisheries management against relevant legislation and policy.

The status of fish stocks managed solely and jointly by the Australian Government improved overall in 2013, compared with previous years (Figures 1.3 and 1.4). The number of stocks classified as not overfished and not subject to overfishing has increased. The number of stocks classified as subject to overfishing has decreased slightly, and the number of stocks classified as overfished has increased slightly. The number of stocks classified as uncertain with regard to fishing mortality remained the same as in 2012, while the number of stocks classified as uncertain with regard to biomass decreased.

Of the 93 stocks assessed in 2013:

- 78 stocks were classified as not subject to overfishing (77 in 2012), and 65 stocks were classified as not overfished (63 in 2012). Of these, 61 stocks were both not subject to overfishing and not overfished (60 in 2012)
- 3 stocks were classified as subject to overfishing (4 in 2012), and 11 stocks were classified as overfished (9 in 2012). Of these, 2 stocks (bigeye tuna [*Thunnus obesus*] in the ETBF and striped marlin [*Tetrapturus audax*] in the Western Tuna and Billfish Fishery—WTBF) were both subject to overfishing and overfished (2 in 2012)
- 12 stocks were classified as uncertain with respect to their fishing mortality status (12 in 2012), and 17 stocks were classified as uncertain with respect to their biomass status (21 in 2012). Of these, 4 stocks were uncertain with respect to both fishing mortality and biomass.

FIGURE 1.2 Biological status of fish stocks in 2013, by fishery or sector

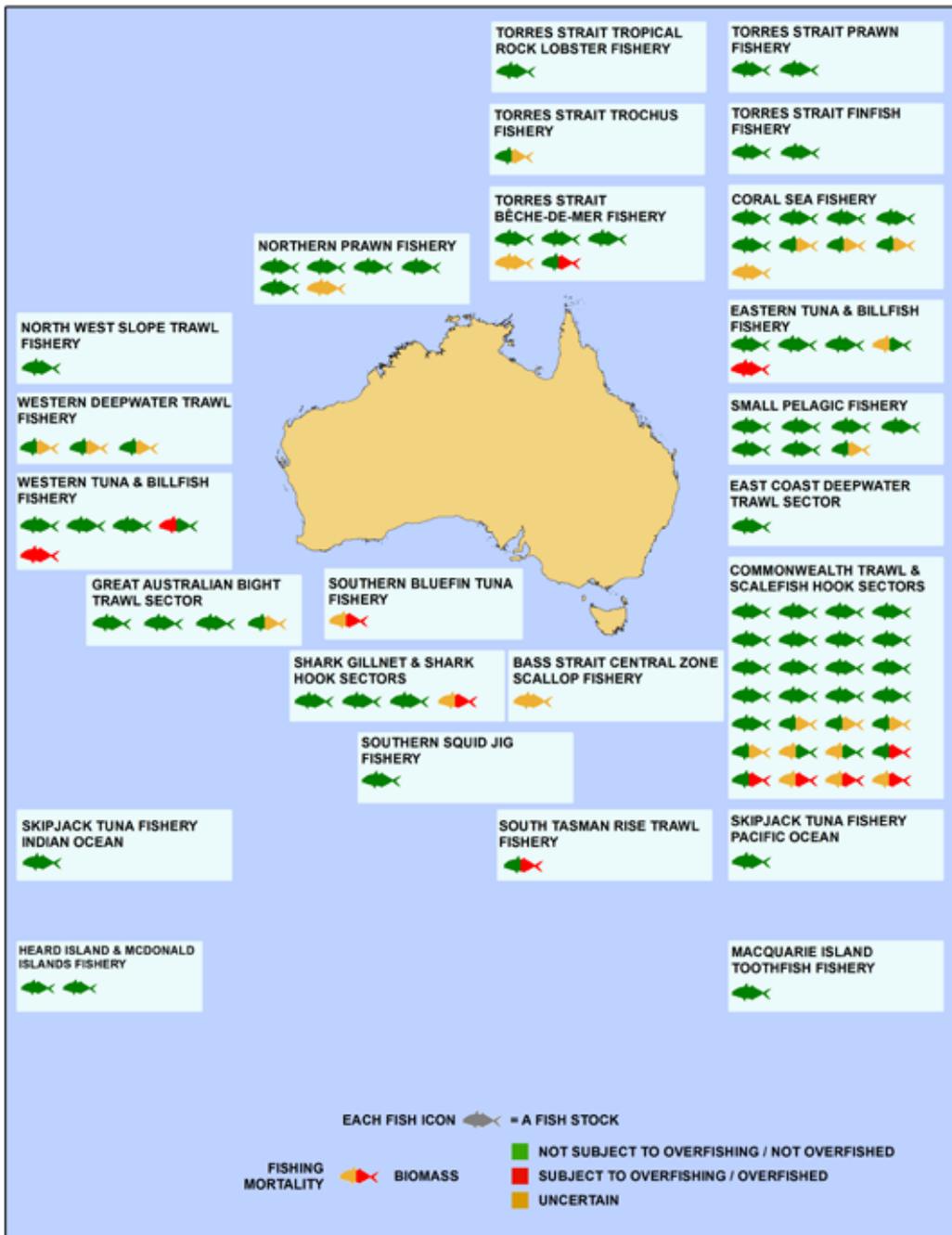
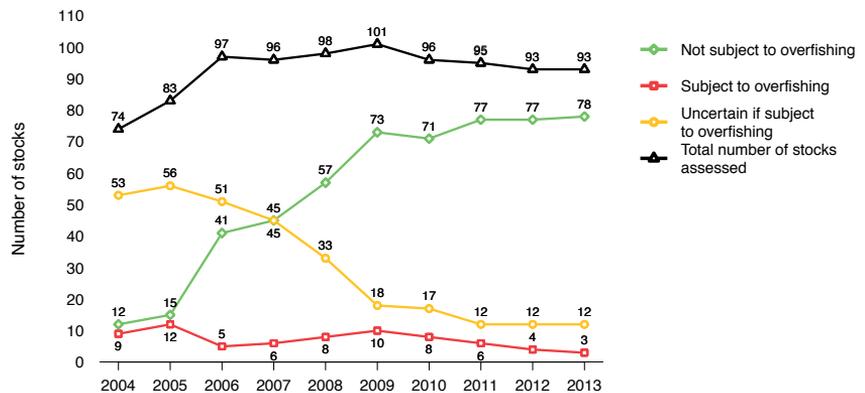
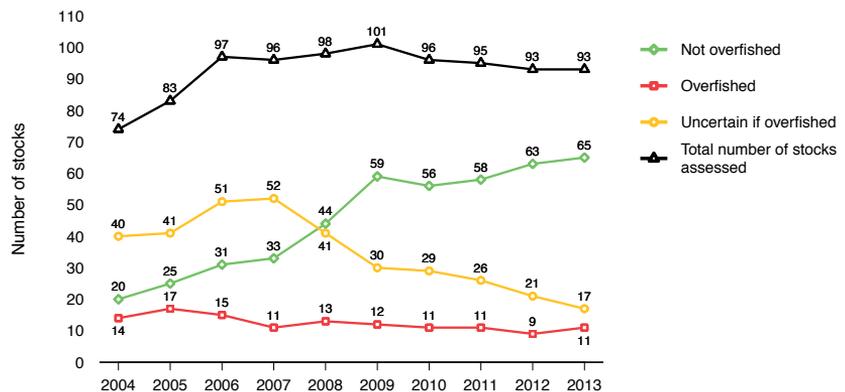


FIGURE 1.3 Fishing mortality status (number of stocks), 2004 to 2013**FIGURE 1.4** Biomass status (number of stocks), 2004 to 2013

Stocks managed solely by the Australian Government

All stocks

In 2013, 66 stocks were assessed across the 9 fisheries managed by AFMA on behalf of the Australian Government. Of these:

- 57 stocks (86 per cent) were classified as not subject to overfishing, and 45 stocks (68 per cent) were classified as not overfished. Of these, 43 stocks were both not subject to overfishing and not overfished
- no stocks were classified as subject to overfishing, and 6 stocks (9 per cent) were classified as overfished; this is the first time that no solely Australian Government-managed stocks have been subject to overfishing since 2006
- 9 stocks (14 per cent) were classified as uncertain with regard to the level of fishing mortality, and 15 stocks (23 per cent) were classified as uncertain with regard to the level of biomass; of these, 3 stocks were uncertain with respect to both fishing mortality and biomass.

Stocks that have changed status

The status of six solely Australian Government–managed fish stocks changed in 2013 (Tables 1.1 and 1.3). Three of these changes reflect increased uncertainty around fishing mortality status, while the other three changes represent increased certainty around both fishing mortality and biomass status. Although 2013 was the first year that no solely Australian Government–managed stocks were subject to overfishing since 2006, the increased uncertainty around the fishing mortality status of blue-eye trevalla (*Hyperoglyphe antarctica*), eastern gemfish (*Rexea solandri*) and school shark (*Galeorhinus galeus*) is of some concern.

The level of uncertainty around the fishing mortality of blue-eye trevalla in the SESSF Commonwealth Trawl and Scalefish Hook sectors (CTSHS) increased following a decrease in the combined dropline and auto-longline standardised catch-per-unit-effort (CPUE) to 2010 levels, which was the lowest in the history of the fishery. However, the average over the past four years has remained above the limit reference point (proxy for 20 per cent of unfished biomass; $0.2B_0$), but below the target reference point (Haddon 2013). The 2013 assessment found average standardised CPUE over the past four years to be near the limit in the east, but only slightly below target in the west. Although the stock remains classified as not overfished with regard to biomass, it is classified as uncertain with respect to the level of fishing mortality because the landed catch in 2013–14 exceeded the updated 2014–15 recommended biological catch (RBC) estimate based on CPUE to 2012, and CPUE indices for the eastern component of the stock continue to decline.

The level of uncertainty around the fishing mortality of eastern gemfish in the SESSF CTSHS has also increased (the stock was classified as subject to overfishing in 2012). Recent analysis (Little 2011) indicates high fishing mortality rates for eastern gemfish until the late 1990s, but much lower rates since 2002. Because fishing mortality rates have substantially decreased, assessment model projections indicate that, with average recruitment, the stock should reach the limit reference point (20 per cent of unfished biomass) in 2025, which is less than the one generation time plus 10 years required under the HSP. However, this rebuilding projection assumes average levels of recruitment, and it appears that recruitment has been low in recent years (Little 2011). Total removals were close to the 100 t limit in 2012 but landed catches have fallen substantially to 52 t in the 2013–14 fishing season. While commercial catches have been declining, there is increasing uncertainty that the current levels of recruitment and removals will allow the stock to rebuild.

Ocean perch (bigeye ocean perch—*Helicolenus barathri* and reef ocean perch—*H. percoides*) in the SESSF CTSHS, which were classified as uncertain with respect to fishing mortality and biomass in 2012, have been classified as not subject to overfishing and not overfished in 2013. The 2013 CPUE-based assessment for bigeye ocean perch indicates that the stock biomass is above the limit reference point, and the 2013–14 catch was less than the RBC. Previous CPUE-based assessments for reef ocean perch, excluding discard estimates, estimated reef ocean perch to have declined to the limit reference point by 2003 and to have started to rebuild back towards the target after 2006. The 2013 CPUE-based assessment, including discards, found reef ocean perch to have rebuilt to above the target by 2010, with recent four-year average standardised CPUE above the target. Although discards of this species are high and highly variable, and have substantial influence on CPUE values, recent discards are well estimated. Given that reef ocean perch is assessed to be above the target and to have rebuilt to above the target from near the limit in 2006, this stock is assessed as not overfished and not subject to overfishing. Based on the evidence given, the combined stock of bigeye and reef ocean perch is classified as not overfished and not subject to overfishing.

Similarly, elephantfish (*Callorhinchus milii*) and sawshark (*Pristiophorus cirratus*, *P. nudipinnis*) in the Shark Gillnet and Shark Hook sectors (SGSHS), which were classified as uncertain with respect to fishing mortality and biomass in 2012, have been assessed as not subject to overfishing and not overfished in 2013. Two alternative CPUE-based assessments were conducted for elephantfish in 2013, one with discard estimates and one without (Haddon 2013). The model that did not use discard estimates, which was accepted by the Shark Resource Assessment Group, indicated that recent average CPUE for elephantfish was estimated to be above the target and well above the limit reference point. On this basis, the stock was assessed as not overfished. Because catch was below the TAC and the RBC, the stock is assessed as not subject to overfishing in 2013.

In 2012, sawshark was assessed as uncertain with respect to biomass and fishing mortality because of uncertainties in mortality and the absence of a reliable index of abundance. Updated assessments show that recent average CPUE was above the target and well above the limit reference point (Haddon 2013). On this basis, the stock is assessed as not overfished in 2013. Because catch was below the TAC and the RBC, the stock is assessed as not subject to overfishing in 2013.

The status of school shark in the SGSHS changed from subject to overfishing in 2012 to uncertain if subject to overfishing in 2013, although the stock remained classified as overfished because biomass is estimated to be below the limit reference point. Because school shark is assessed to be overfished and is under a rebuilding strategy, targeted fishing is prohibited, with an RBC of zero. However, unavoidable catches of school shark are made while fishing for gummy shark, and these have been provided for by means of incidental catch allowances. Given these unavoidable catches, determination of fishing mortality status needs to consider the rebuilding target (initially B_{lim}) and the timeframe predicted for the stock to reach that target. If current incidental catch is predicted to allow a stock to recover to a target (B_{lim}) within the timeframe specified in a rebuilding strategy, the stock could be classified as not subject to overfishing. In contrast, if catch is above the level predicted to allow recovery to the target (B_{lim}) within the rebuilding timeframe, the stock could be classified as subject to overfishing.

Provided that total mortality is limited to within the incidental catch limit (estimated to be 215 t) projected to allow for rebuilding within three generation times (66 years; Thomson 2012), school shark could be assessed as not subject to overfishing. However, there is uncertainty around the rebuilding projections, resulting from uncertainty around the assumptions about gear selectivity, and spatial and temporal distribution of catches in the Thompson (2012) assessment. As well, it is uncertain whether the total school shark mortality in 2013–14 (state and Commonwealth catches plus discards) was below the incidental catch allowance. The school shark stock is therefore classified as uncertain if subject to overfishing.

Stocks classified as subject to overfishing and/or overfished

Six stocks managed solely by the Australian Government were classified as overfished in 2013 (Table 1.2). For the first time since 2006, no Australian Government–managed stocks were classified as subject to overfishing. All stocks classified as overfished are subject to stock rebuilding strategies. The stocks classified as overfished in 2013 were blue warehou (*Seriola lalandi*), eastern gemfish, orange roughy (*Hoplostethus atlanticus*—southern and western zone stocks), gulper sharks (*Centrophorus harrissoni*, *C. moluccensis*, *C. zeehaani*) and school shark. Eastern gemfish and school shark are discussed above, as they were subject to changes in fishing mortality.

Although the catch of blue warehou in recent years has been declining, it is unclear whether total mortality has been reduced enough to allow the stock to rebuild to the limit reference point within the timeframe specified in the rebuilding strategy. As a result, the stock is classified as uncertain with regard to the level of fishing mortality. The stock remains classified as overfished because the average CPUE over the past four years is below the CPUE limit reference points for both eastern and western stocks.

The biomass of southern and western stocks of orange roughy was substantially reduced in the late 1980s and early 1990s. However, recent catches have been relatively low, and most areas deeper than 700 m have been closed to trawling. As a result, these stocks remain classified as overfished but not subject to overfishing.

In the absence of any evidence of recovery to above the limit reference level, gulper sharks remain classified as overfished in 2013 because of the substantial depletion of Harrison's and southern dogfish in areas of southern and eastern Australia.

The level of reported catch (including discards) of gulper sharks has declined over the past decade and continued to decline in 2013–14, but no evidence has been obtained showing rebuilding of the stock. As a result, gulper sharks remain classified as uncertain with respect to the level of fishing mortality in 2013.

Jointly managed stocks

All stocks

In 2013, 27 stocks were assessed in 12 fisheries that are jointly managed by the Australian Government and other Australian jurisdictions, or with other countries through international arrangements. Of these:

- 21 stocks (78 per cent) were classified as not subject to overfishing, and 20 stocks (74 per cent) were classified as not overfished; 19 of these were classified as both not subject to overfishing and not overfished
- 3 stocks (11 per cent) were classified as subject to overfishing, and 5 stocks (19 per cent) were classified as overfished; of these, 2 stocks were classified as both subject to overfishing and overfished
- 3 stocks (11 per cent) were classified as uncertain with regard to the level of fishing mortality, and 2 stocks (7 per cent) were classified as uncertain with regard to the level of biomass; of these, 2 stocks were uncertain with respect to both fishing mortality and biomass.

Stocks that have changed status

The status of three stocks jointly managed by the Australian Government changed in 2013. Status considers the impacts of all countries' fleets on the stocks. The level of uncertainty around the fishing mortality of swordfish (*Xiphias gladius*) in the ETBF has increased. The main uncertainty in the 2013 assessment pertains to swordfish growth, maturity and mortality at age schedules, with two schedules used in the assessment: one derived from Hawaiian estimates and the other from Australian estimates. Although these two schedules affected the stock status of swordfish, the Western and Central Pacific Fisheries Commission (WCPFC) Scientific Committee was unable to decide which schedule was more reliable (WCPFC 2013). The Australian schedule indicated that overfishing was occurring, and the stock is therefore assessed as uncertain with regard to the level of fishing mortality in 2013.

The biomass status of bigeye tuna in the ETBF has changed from not overfished in 2012 to overfished in 2013. A new stock assessment (Harley et al. 2014) indicates that bigeye tuna spawning biomass is below the 20 per cent depletion reference point adopted by the WCPFC. This reference point corresponds with the limit reference point in the HSP. The current fishing mortality across the western and central Pacific Ocean is well in excess of levels needed to maintain maximum sustainable yield (MSY), and so the stock remains classified as subject to overfishing in 2013. The WCPFC Scientific Committee has recommended a reduction of at least 36 per cent in fishing mortality from the average levels between 2008 and 2011, to reduce the fishing mortality to a rate that would support MSY.

The status of striped marlin in the WTBF has changed from uncertain with respect to biomass and fishing mortality to overfished and subject to overfishing. The 2013 assessment, which is the first assessment for this stock, indicates that the current biomass is below the default limit reference point of 20 per cent of initial unfished levels. As a result, the Indian Ocean striped marlin stock is classified as overfished. Since the current biomass is below the level that would produce MSY and fishing mortality is above the level required to produce MSY, the stock is classified as subject to overfishing. The Australian catch of striped marlin in the WTBF is low, and the fishing mortality status is a result of fishing across the Indian Ocean.

Stocks classified as subject to overfishing and/or overfished

Six jointly managed stocks were classified as either overfished or subject to overfishing in 2013. With the exception of swordfish in the ETBF and striped marlin in the WTBF (discussed above), classification of these stocks remained the same as in 2012 (Table 1.2).



Southern Champion
Gavin Kewan, AFMA

TABLE 1.1 Stocks with a changed status in 2013 and their status in 2012

Fishery	Common name (scientific name)	2012		2013	
		Fishing mortality	Biomass	Fishing mortality	Biomass
Stocks managed solely by the Australian Government					
SESSF: Commonwealth Trawl and Scalefish Hook sectors	Blue-eye trevalla (<i>Hyperoglyphe antarctica</i>)				
SESSF: Commonwealth Trawl and Scalefish Hook sectors	Gemfish, eastern zone (<i>Rexea solandri</i>)				
SESSF: Commonwealth Trawl and Scalefish Hook sectors	Ocean perch (<i>Helicolenus barathri</i> , <i>H. percoides</i>)				
SESSF: Shark Gillnet and Shark Hook sectors	Elephantfish (<i>Callorhynchus milii</i>)				
SESSF: Shark Gillnet and Shark Hook sectors	Sawshark (<i>Pristiophorus cirratus</i> , <i>P. nudipinnis</i>)				
SESSF: Shark Gillnet and Shark Hook sectors	School shark (<i>Galeorhinus galeus</i>)				
Stocks managed jointly by the Australian Government					
Eastern Tuna and Billfish Fishery	Swordfish (<i>Xiphias gladius</i>)				
Eastern Tuna and Billfish Fishery	Bigeye tuna (<i>Thunnus obesus</i>)				
Western Tuna and Billfish Fishery	Striped marlin (<i>Tetrapturus audax</i>)				

Notes: SESSF Southern and Eastern Scalefish and Shark Fishery.

Fishing mortality Not subject to overfishing Subject to overfishing Uncertain

Biomass Not overfished Overfished Uncertain

TABLE 1.2 Stocks classified as subject to overfishing and/or overfished in 2013, and their status in 2012

Fishery	Common name (scientific name)	2012		2013	
		Fishing mortality	Biomass	Fishing mortality	Biomass
Stocks managed solely by the Australian Government					
SESSF: Commonwealth Trawl and Scalefish Hook sectors	Blue warehou (<i>Seriolella brama</i>)	Yellow	Red	Yellow	Red
SESSF: Commonwealth Trawl and Scalefish Hook sectors	Gemfish, eastern zone (<i>Rexea solandri</i>)	Red	Red	Yellow	Red
SESSF: Commonwealth Trawl and Scalefish Hook sectors	Gulper sharks (<i>Centrophorus harrissoni</i> , <i>C. moluccensis</i> , <i>C. zeehaani</i>)	Yellow	Red	Yellow	Red
SESSF: Commonwealth Trawl Sector	Orange roughy, southern zone (<i>Hoplostethus atlanticus</i>)	Green	Red	Green	Red
SESSF: Commonwealth Trawl Sector	Orange roughy, western zone (<i>Hoplostethus atlanticus</i>)	Green	Red	Green	Red
SESSF: Shark Gillnet and Shark Hook sectors	School shark (<i>Galeorhinus galeus</i>)	Red	Red	Yellow	Red
Stocks managed jointly by the Australian Government					
South Tasman Rise Trawl Fishery	Orange roughy (<i>Hoplostethus atlanticus</i>)	Green	Red	Green	Red
Torres Strait Bêche-de-mer Fishery	Sandfish (<i>Holothuria scabra</i>)	Green	Red	Green	Red
Eastern Tuna and Billfish Fishery	Bigeye tuna (<i>Thunnus obesus</i>)	Red	Green	Red	Red
Southern Bluefin Tuna Fishery	Southern bluefin tuna (<i>Thunnus maccoyii</i>)	Yellow	Red	Yellow	Red
Western Tuna and Billfish Fishery	Albacore (<i>Thunnus alalunga</i>)	Red	Green	Red	Green
Western Tuna and Billfish Fishery	Striped marlin (<i>Tetrapturus audax</i>)	Yellow	Yellow	Red	Red

Notes: SESSF Southern and Eastern Scalefish and Shark Fishery.

Fishing mortality Green Not subject to overfishing Red Subject to overfishing Yellow Uncertain
Biomass Green Not overfished Red Overfished Yellow Uncertain

TABLE 1.3 Biological stock status of all stocks assessed in 2013, and their status since 1992 continued

Fishery	Common name (scientific name)	Status																			
		1992	1993	1994	1996	1997	1998	1999	2001–02	2002–03	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	
		Fishing mortality	Biomass																		
Australian Government–managed stocks																					
Northern Prawn Fishery	Grooved tiger prawn (<i>Penaeus semisulcatus</i>)	Green	Green	Green																	
Northern Prawn Fishery	Blue endeavour prawn (<i>Metapenaeus endeavouri</i>)	Grey	Yellow	Yellow	Green	Green	Green	Green	Green	Green											
Northern Prawn Fishery	Red endeavour prawn (<i>Metapenaeus ensis</i>)	Grey	Yellow	Yellow																	
North West Slope Trawl Fishery	Scampi (<i>Metanephrops australiensis</i> , <i>M. boschmai</i> , <i>M. velutinus</i>)	Green	Green	Green																	
Small Pelagic Fishery	Australian sardine (<i>Sardinops sagax</i>)	Grey	Grey	Green	Green	Green	Green	Green	Green	Green											
Small Pelagic Fishery	Blue mackerel, east (<i>Scomber australasicus</i>)	Grey	Grey	Grey	Grey	Grey	Grey	Yellow	Yellow	Green	Green	Green									
Small Pelagic Fishery	Blue mackerel, west (<i>Scomber australasicus</i>)	Grey	Grey	Grey	Grey	Grey	Grey	Yellow	Yellow	Green	Green	Green									
Small Pelagic Fishery	Jack mackerel, east (<i>Trachurus declivis</i>)	Grey	Yellow	Yellow	Green	Green	Green	Green	Green	Green											
Small Pelagic Fishery	Jack mackerel, west (<i>Trachurus declivis</i>)	Grey	Yellow	Yellow	Green	Green	Green	Green	Green	Green											
Small Pelagic Fishery	Redbait, east (<i>Emmelichthys nitidus</i>)	Grey	Grey	Grey	Grey	Grey	Grey	Yellow	Yellow	Green	Green	Green									
Small Pelagic Fishery	Redbait, west (<i>Emmelichthys nitidus</i>)	Grey	Grey	Grey	Grey	Grey	Grey	Yellow	Yellow	Green	Green	Green	Green	Green	Yellow	Green	Yellow	Yellow	Yellow	Yellow	
SESSF: Commonwealth Trawl and Scalefish Hook sectors	Blue-eye trevalla (<i>Hyperoglyphe antarctica</i>)	Yellow	Green	Green																	

continued ...

TABLE 1.3 Biological stock status of all stocks assessed in 2013, and their status since 1992 continued

Fishery	Common name (scientific name)	Status																			
		1992	1993	1994	1996	1997	1998	1999	2001-02	2002-03	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	
		Fishing mortality	Biomass																		
Australian Government-managed stocks																					
SESSF: Commonwealth Trawl and Scalefish Hook sectors	Blue grenadier (<i>Macruronus novaezelandiae</i>)	Green	Green	Green																	
SESSF: Commonwealth Trawl and Scalefish Hook sectors	Blue warehou (<i>Seriolella brama</i>)	Yellow	Green	Green	Yellow	Green	Green	Red	Red	Red	Yellow	Red									
SESSF: Commonwealth Trawl Sector	Deepwater sharks, eastern zone (18 spp.)	Grey	Grey	Grey	Grey	Grey	Grey	Grey	Grey	Grey	Green	Green									
SESSF: Commonwealth Trawl Sector	Deepwater sharks, western zone (18 spp.)	Grey	Grey	Grey	Grey	Grey	Grey	Grey	Grey	Grey	Green	Green									
SESSF: Commonwealth Trawl Sector	Eastern school whiting (<i>Sillago flindersi</i>)	Green	Green	Green																	
SESSF: Commonwealth Trawl Sector	Flathead (<i>Neoplatycephalus richardsoni</i> and 4 other spp.)	Green	Green	Green																	
SESSF: Commonwealth Trawl and Scalefish Hook sectors	Gemfish, eastern zone (<i>Rexea solandri</i>)	Red	Red	Yellow	Red	Green	Red	Yellow	Red	Red	Red	Red									
SESSF: Commonwealth Trawl and Scalefish Hook sectors	Gemfish, western zone (<i>Rexea solandri</i>)	Green	Green	Green																	
SESSF: Commonwealth Trawl and Scalefish Hook sectors	Gulper sharks (<i>Centrophorus harrissoni</i> , <i>C. moluccensis</i> , <i>C. zeehaani</i>)	Grey	Grey	Grey	Grey	Grey	Grey	Grey	Grey	Grey	Green	Red	Yellow	Red	Red	Red	Red	Red	Red	Red	
SESSF: Commonwealth Trawl and Scalefish Hook sectors	Jackass morwong (<i>Nemadactylus macropterus</i>)	Green	Green	Green																	

continued ...

TABLE 1.3 Biological stock status of all stocks assessed in 2013, and their status since 1992 continued

Fishery	Common name (scientific name)	Status																			
		1992	1993	1994	1996	1997	1998	1999	2001-02	2002-03	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	
		Fishing mortality	Biomass																		
Australian Government–managed stocks																					
SESSF: Commonwealth Trawl Sector	John dory (<i>Zeus faber</i>)																				
SESSF: Commonwealth Trawl Sector	Mirror dory (<i>Zenopsis nebulosa</i>)																				
SESSF: Commonwealth Trawl Sector	Ocean jacket, eastern zone (<i>Nelusetta ayraud</i>)																				
SESSF: Commonwealth Trawl and Scalefish Hook sectors	Ocean perch (<i>Helicolenus barathri</i> , <i>H. percoides</i>)																				
SESSF: Commonwealth Trawl Sector	Orange roughy, Cascade Plateau (<i>Hoplostethus atlanticus</i>)																				
SESSF: Commonwealth Trawl Sector	Orange roughy, eastern zone (<i>Hoplostethus atlanticus</i>)																				
SESSF: Commonwealth Trawl Sector	Orange roughy, southern zone (<i>Hoplostethus atlanticus</i>)																				
SESSF: Commonwealth Trawl Sector	Orange roughy, western zone (<i>Hoplostethus atlanticus</i>)																				
SESSF: Commonwealth Trawl Sector	Oreodory: smooth, Cascade Plateau (<i>Pseudocyttus maculatus</i>)																				
SESSF: Commonwealth Trawl Sector	Oreodory: smooth, non-Cascade Plateau (<i>Pseudocyttus maculatus</i>)																				

continued ...

TABLE 1.3 Biological stock status of all stocks assessed in 2013, and their status since 1992 continued

Fishery	Common name (scientific name)	Status																			
		1992	1993	1994	1996	1997	1998	1999	2001–02	2002–03	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	
		Fishing mortality	Biomass																		
Australian Government-managed stocks																					
SESSF: Commonwealth Trawl Sector	Oreodory: other (<i>Neocyttus rhomboidalis</i> , <i>Allocyttus niger</i> , <i>A. verrucosus</i>)																				
SESSF: Commonwealth Trawl and Scalefish Hook sectors	Pink ling (<i>Genypterus blacodes</i>)																				
SESSF: Commonwealth Trawl Sector	Redfish, eastern (<i>Centroberyx affinis</i>)																				
SESSF: Commonwealth Trawl and Scalefish Hook sectors	Ribaldo (<i>Mora moro</i>)																				
SESSF: Commonwealth Trawl Sector	Royal red prawn (<i>Haliporoides sibogae</i>)																				
SESSF: Commonwealth Trawl and Scalefish Hook sectors	Silver trevally (<i>Pseudocaranx georgianus</i>)																				
SESSF: Commonwealth Trawl Sector	Silver warehou (<i>Seriola punctata</i>)																				
SESSF: East Coast Deepwater Trawl Sector	Alfonsino (<i>Beryx splendens</i>)																				
SESSF: Great Australian Bight Trawl Sector	Bight redfish (<i>Centroberyx gerrardi</i>)																				
SESSF: Great Australian Bight Trawl Sector	Deepwater flathead (<i>Platycephalus conatus</i>)																				
SESSF: Great Australian Bight Trawl Sector	Ocean jacket, west (<i>Nelussetta ayraud</i>)																				

continued ...

TABLE 1.3 Biological stock status of all stocks assessed in 2013, and their status since 1992 continued

Fishery	Common name (scientific name)	Status																		
		1992	1993	1994	1996	1997	1998	1999	2001–02	2002–03	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
		Fishing mortality	Biomass	Fishing mortality																
Australian Government–managed stocks																				
SESSF: Great Australian Bight Trawl Sector	Orange roughy (<i>Hoplostethus atlanticus</i>)																			
SESSF: Shark Gillnet and Shark Hook sectors	Elephantfish (<i>Callorhynchus milii</i>)																			
SESSF: Shark Gillnet and Shark Hook sectors	Gummy shark (<i>Mustelus antarcticus</i>)																			
SESSF: Shark Gillnet and Shark Hook sectors	Sawshark (<i>Pristiophorus cirratus</i> , <i>P. nudipinnis</i>)																			
SESSF: Shark Gillnet and Shark Hook sectors	School shark (<i>Galeorhinus galeus</i>)																			
Southern Squid Jig Fishery	Gould's squid (<i>Nototodarus gouldi</i>)																			
Western Deepwater Trawl Fishery	Bugs (<i>Ibacus</i> spp.)																			
Western Deepwater Trawl Fishery	Orange roughy (<i>Hoplostethus atlanticus</i>)																			
Western Deepwater Trawl Fishery	Ruby snapper (<i>Etelis carbunculus</i>)																			
Macquarie Island Toothfish Fishery	Patagonian toothfish (<i>Dissostichus eleginoides</i>)																			
Stocks managed jointly by the Australian Government																				
South Tasman Rise Trawl Fishery	Orange roughy (<i>Hoplostethus atlanticus</i>)																			
Torres Strait Finfish Fishery	Coral trout (<i>Plectropomus</i> and <i>Variola</i> spp.)																			

continued ...

TABLE 1.3 Biological stock status of all stocks assessed in 2013, and their status since 1992 continued

Fishery	Common name (scientific name)	Status																			
		1992	1993	1994	1996	1997	1998	1999	2001–02	2002–03	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	
		Fishing mortality	Biomass																		
Stocks managed jointly by the Australian Government																					
Torres Strait Finfish Fishery	Spanish mackerel (<i>Scomberomorus commerson</i>)																				
Torres Strait Tropical Rock Lobster Fishery	Tropical rock lobster (<i>Panulirus ornatus</i>)																				
Torres Strait Prawn Fishery	Brown tiger prawn (<i>Penaeus esculentus</i>)																				
Torres Strait Prawn Fishery	Blue endeavour prawn (<i>Metapenaeus endeavouri</i>)																				
Torres Strait Bêche-de-mer Fishery	Black teatfish (<i>Holothuria whitmaei</i>)																				
Torres Strait Bêche-de-mer Fishery	Prickly redfish (<i>Thelenota ananas</i>)																				
Torres Strait Bêche-de-mer Fishery	Sandfish (<i>Holothuria scabra</i>)																				
Torres Strait Bêche-de-mer Fishery	White teatfish (<i>Holothuria fuscogilva</i>)																				
Torres Strait Bêche-de-mer Fishery	Other sea cucumbers (up to 18 species)																				
Torres Strait Trochus Fishery	Trochus (<i>Trochus niloticus</i>)																				
Eastern Tuna and Billfish Fishery	Striped marlin (<i>Tetrapturus audax</i>)																				
Eastern Tuna and Billfish Fishery	Swordfish (<i>Xiphias gladius</i>)																				
Eastern Tuna and Billfish Fishery	Albacore (<i>Thunnus alalunga</i>)																				
Eastern Tuna and Billfish Fishery	Bigeye tuna (<i>Thunnus obesus</i>)																				
Eastern Tuna and Billfish Fishery	Yellowfin tuna (<i>Thunnus albacares</i>)																				

continued ...

TABLE 1.3 Biological stock status of all stocks assessed in 2013, and their status since 1992 continued

Fishery	Common name (scientific name)	Status																			
		1992	1993	1994	1996	1997	1998	1999	2001–02	2002–03	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	
		Fishing mortality	Biomass																		
Stocks managed jointly by the Australian Government																					
Skipjack Tuna Fishery: Pacific Ocean	Skipjack tuna (<i>Katsuwonus pelamis</i>)																				
Skipjack Tuna Fishery: Indian Ocean	Skipjack tuna (<i>Katsuwonus pelamis</i>)																				
Southern Bluefin Tuna Fishery	Southern bluefin tuna (<i>Thunnus maccoyii</i>)																				
Western Tuna and Billfish Fishery	Striped marlin (<i>Tetrapturus audax</i>)																				
Western Tuna and Billfish Fishery	Swordfish (<i>Xiphias gladius</i>)																				
Western Tuna and Billfish Fishery	Albacore (<i>Thunnus alalunga</i>)																				
Western Tuna and Billfish Fishery	Bigeye tuna (<i>Thunnus obesus</i>)																				
Western Tuna and Billfish Fishery	Yellowfin tuna (<i>Thunnus albacares</i>)																				
Heard Island and McDonald Islands Fishery	Mackerel icefish (<i>Champscephalus gunnari</i>)																				
Heard Island and McDonald Islands Fishery	Patagonian toothfish (<i>Dissostichus eleginoides</i>)																				

Notes: **SESSF** Southern and Eastern Scalefish and Shark Fishery. Individual stocks may have been classified as multispecies stocks in earlier years. The status determination process changed in 2004—refer to Chapter 30 for more information.

Fishing mortality ■ Not subject to overfishing ■ Subject to overfishing ■ Uncertain
Biomass ■ Not overfished ■ Overfished ■ Uncertain

Status of key Australian fish stocks reports

In December 2014, the Fisheries Research and Development Corporation will release *Status of key Australian fish stocks reports 2014*, the second in the series. The reports provide a national assessment of the status of key wild-capture fish stocks. The reports were initiated in 2012 by the Fisheries Research and Development Corporation and ABARES. They are developed collaboratively by ABARES and government fishery research agencies in all states and the Northern Territory, and CSIRO.

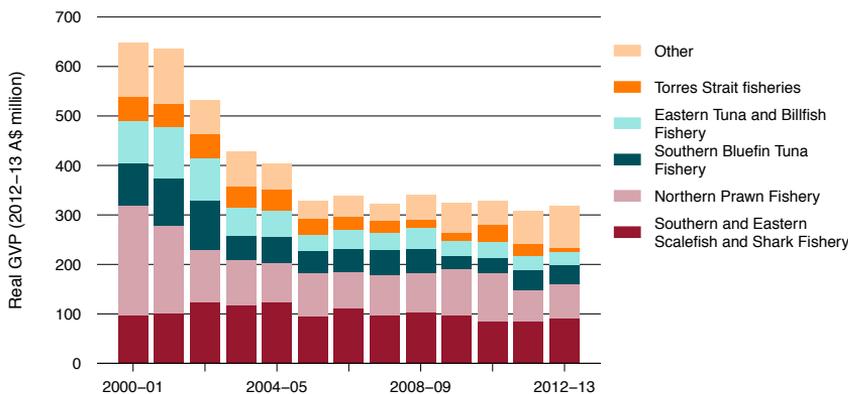
The 2014 reports are expected to provide stock assessments for 68 key species (or species complexes), 19 more than in the 2012 inaugural edition. The 49 species included in the inaugural edition represented more than 80 per cent of the value and 70 per cent of the catch volume from all Australian wild-capture fisheries. These reports consider the same biological information as the *Fishery status reports 2013–14*, but interpret that information within a nationally agreed classification system (Appendix A). This national reporting framework is designed to improve the ability to compare the status of fish stocks across Australia.

1.3 Economic status in 2013

Fishery status reports 2013–14 assesses the economic status of all fisheries managed solely and jointly by the Australian Government. These fisheries generated an estimated GVP of \$319.7 million in 2012–13—this is about 13 per cent of Australia’s total fisheries and aquaculture GVP.

Fishery GVP is dominated by the production of a few major fisheries. In 2012–13, the multisector SESSF was the most valuable Australian Government–managed fishery, with a GVP of \$91.8 million (Figure 1.5). The NPF was the next most valuable, with a GVP of \$71 million, making it the most valuable single-method fishery. The wild-catch sector of the Southern Bluefin Tuna Fishery (SBTF) and the ETBF also made substantial contributions to fisheries GVP in 2012–13, with values of \$38.4 million and \$24.8 million, respectively. Together, these four fisheries accounted for 71 per cent of total fishery GVP.

FIGURE 1.5 Gross value of production of fisheries managed solely or jointly by the Australian Government, 2000–01 to 2012–13



The evaluation of economic status in the *Fishery status reports* assesses each fishery’s performance against the economic objective of the *Fisheries Management Act 1991* to maximise NER to the Australian community, within the constraints of ecologically sustainable development. Each fishery’s economic performance is assessed using indicators of trends in NER, effects of management arrangements, and performance against the HSP’s objective of maximum economic yield (MEY). For jointly managed fisheries (to which the HSP does not apply), performance is evaluated against relevant management objectives. Table 1.4 presents a summary of indicators of economic performance.

Fisheries managed solely by the Australian Government

The ABARES financial and economic surveys are important in assessing the economic performance of fisheries managed solely or jointly by the Australian Government. Each fishery's NER can be estimated from the economic survey data. ABARES undertakes regular economic surveys of the most valuable fisheries managed solely by the Australian Government: the Commonwealth Trawl Sector (CTS), and Gillnet, Hook and Trap Sector (GHaTS) of the SESSF, and the NPF. These fisheries are managed under MEY objectives. Together, they accounted for 91 per cent of the GVP of fisheries managed solely by AFMA and 47 per cent of the GVP of all Australian Government-managed fisheries in 2012–13.

Estimates of NER for the CTS have been positive for the past seven financial years and have risen substantially, increasing from \$1.7 million in 2005–06 to \$5.6 million in 2011–12. In comparison, the average NER for the previous five years (2000–01 to 2004–05) was –\$2.5 million; NER were as low as –\$5.8 million in 2002–03. For the NPF, real NER remained positive but decreased by more than \$11 million to \$3.7 million in 2011–12, as a result of lower landings of banana prawn (*Penaeus indicus*, *P. merguensis*). The NER are estimated to have increased in 2012–13 to \$5.4 million, driven by higher projected fishing income from an increase in the average price received for banana prawn (Skirtun et al. 2014). The NPF is explicitly managed to an MEY target for the tiger prawn (*Penaeus esculentus*) component of the fishery, using a bioeconomic model to set effort levels that are estimated to produce MEY.

The CTS and GHaTS are also managed to MEY targets for key commercial species. However, unlike in the NPF, fishery-specific B_{MEY} targets (biomass targets consistent with achieving MEY) have not been quantitatively estimated. Instead, MEY is targeted through the application of proxies for B_{MEY} (generally 1.2 times B_{MSY} —the biomass that should produce MSY), equivalent to 0.48 of the unfished biomass (B_0 ; see Glossary for definition of these terms). For the most valuable species targeted in these two sectors, biomass levels are generally estimated to be close to, or above, their respective B_{MEY} targets, meaning that stock levels are not constraining profits. An exception may be the eastern component of the pink ling (*Genypterus blacodes*) stock (the entire stock accounted for 11 per cent of GVP in the CTS and 10 per cent in the GHaTS in 2012–13). Estimates of fishing mortality for the eastern and western components of this stock differ, making fishing mortality status for the combined stock uncertain (Table 1.3). Both sectors also have stocks that previously generated significant economic returns but are now overfished and require rebuilding. For example, orange roughy catches in the CTS previously accounted for more than half the sector's GVP, but two of the three orange roughy stocks previously fished in the CTS are assessed as overfished (the third has an uncertain biomass status), and all are subject to substantial spatial closures to facilitate rebuilding.

In the GHaTS, positive NER were maintained in the decade leading up to, and including, 2008–09. However, NER turned negative in 2009–10, declining to –\$0.4 million (George & New 2013). The NER are estimated to have remained at similar levels in 2010–11 (–\$0.14 million) and 2011–12 (–\$0.18 million—preliminary estimate). The recent reduction in economic performance in the GHaTS occurred despite biomass levels of gummy shark (*Mustelus antarcticus*; the sector's main target species) being close to or above the stock's target reference point. Recent spatial closures aimed at reducing marine mammal interactions and efforts to avoid school shark are likely to have contributed to the decline in the sector's recent economic performance.

In the Great Australian Bight Trawl Sector (GABTS), the development of a bioeconomic model for the two key target species (deepwater flathead—*Platycephalus conatus*, and bight redfish—*Centroberyx gerrardi*) has improved the ability to target B_{MEY} (Kompas et al. 2012). The most recent stock assessment for bight redfish projected that biomass levels at the start of 2013–14 will be above the stock's B_{MEY} target (Klaer 2011), potentially allowing increased profits to be generated as the stock is fished down to its target. The most recent stock assessment for deepwater flathead suggests that biomass levels are below the B_{MEY} target (Klaer 2012). Nonetheless, fishery profitability is unlikely to be constrained by stock status, with biomass forecast to increase to $0.39B_0$ in 2013–14, just below the MEY target reference point of $0.43B_0$.

The Bass Strait Central Zone Scallop Fishery (BSCZSF) produced negative NER in both 2009–10 (–\$1.1 million) and 2010–11 (–\$1.0 million) (George et al. 2012). These negative NER are likely to reflect the poor biological status of the stock and recently reported scallop die-offs, which have resulted in reduced catches. The development of an appropriate economic target for the BSCZSF harvest strategy, consistent with the intent of the HSP, is a challenge for this fishery. Since the fishery's reopening, higher GVPs of \$1.3 million and \$4.0 million were achieved in 2008–09 and 2009–10, respectively. However, real GVP has continued to decrease since 2009–10; GVP was \$0.5 million in 2012–13. Most of the fall in real GVP in 2010–11 was a result of poor-quality scallops and low beach prices. Large declines in landed catch meant that real GVP continued to fall in 2011–12 and 2012–13, despite considerably higher beach prices.

Catch rates in the Southern Squid Jig Fishery increased substantially in the 2011 and 2012 seasons, and beach prices reached their highest levels in more than a decade. The fishery's GVP increased from \$0.10 million in 2009–10 to \$1.69 million in 2010–11. Profitability in the 2012 season is likely to have increased, despite a small decrease in effort, with a further increase in GVP to \$2.1 million in 2011–12. However, in 2012–13, real average beach price fell by 41 per cent to \$1.50 per kilogram as global supply returned to more normal levels. The low catch, coupled with low squid prices, significantly reduced the fishery's GVP in 2012–13, to \$0.24 million. The degree to which these changes have generated positive NER in the fishery is uncertain.

The economic performance of smaller fisheries managed solely by the Australian Government was mixed in 2012–13. For the Coral Sea Fishery, catches in the Aquarium Sector increased in 2012–13, indicating a possible improvement in NER. The impact on NER of changes in gear used in other sectors of the fishery is uncertain. The TAC for the Macquarie Island Toothfish Fishery was almost fully caught (98 per cent of the TAC) in the 2013–14 fishing season, mainly as a result of improved sea conditions. This suggests that profitability is likely to be positive for the fishery. Low catch and effort levels in the other active fisheries (East Coast Deepwater Trawl Sector, North West Slope Trawl Fishery, Small Pelagic Fishery and Western Deepwater Trawl Fishery) indicate low NER in these fisheries in 2012–13.

Jointly managed fisheries

Of the fisheries jointly managed by the Australian Government and other Australian or international jurisdictions, major fisheries in value terms include the SBTF, the ETBF and the Torres Strait Tropical Rock Lobster Fishery (TSTRLF). In 2012–13, these fisheries generated GVP of \$38.4 million, \$24.8 million and \$20.1 million, respectively. Combined, these three fisheries accounted for 54 per cent of the GVP of all jointly managed fisheries and 26 per cent of the GVP of all Australian Government-managed fisheries in 2012–13.

Estimates of NER are not available for the SBTF. However, the fishery produces a high-value product and is potentially highly profitable, despite the overfished state of its stock. The SBTF primarily provides fish to South Australia's southern bluefin tuna aquaculture industry. The GVP of the South Australian southern bluefin tuna aquaculture sector was \$153.5 million in 2012–13. The overfished status of southern bluefin tuna means that a proportion of the historical NER was generated while the total catch levels on the global stock were unsustainable. The stock's current low biomass level may pose a risk to the future flow of NER from the fishery. If the international management arrangements allow the stock to rebuild, economic status would be expected to improve.

Economic status in the ETBF has improved. In 2010–11, NER were positive for the first time since 2000–01 (George & New 2013). In 2011–12, NER are estimated to have increased to \$3.0 million (preliminary estimate), with a decrease in operating costs outweighing a decline in revenue. The NER estimates for 2012–13 are not available and are uncertain. Improved economic performance in the fishery is consistent with an increasing trend in economic productivity since the early 2000s (Stephan & Vieira 2013). This has occurred at the same time as the reduction in fleet size, driven primarily by market forces in the early 2000s and later in the same decade by the Securing our Fishing Future structural adjustment package. These changes are likely to have left the more efficient vessels continuing to operate in the fishery. The fishery's move to individual transferable quotas in 2011 and a new harvest strategy may result in further improvement in economic performance.

Torres Strait fisheries are managed in accordance with the *Torres Strait Fisheries Act 1984*. This Act details a range of management priorities, including acknowledging and protecting the traditional way of life and livelihood of Traditional Inhabitants, including their rights in relation to traditional fishing; managing commercial fisheries for optimum use; and having regard, in developing and implementing licensing policy, to the desirability of promoting economic development and employment opportunities for Traditional Inhabitants in the Torres Strait area. As a result, although the Protected Zone Joint Authority has asked management forums to provide advice on applying the HSP to Torres Strait fisheries, these fisheries are not evaluated against the MEY objective of the HSP in these reports.

The TSTRLF was the most valuable commercial fishery in Torres Strait in 2012–13. Despite the decrease in production in 2012–13, a significant increase in beach prices (whole weight equivalent) contributed to an overall increase in GVP for the fishery of 25 per cent between 2011–12 and 2012–13, to \$20.1 million. The increase in GVP is an indication that the NER for the fishery are likely to have improved.

Management objectives for the Torres Strait Prawn Fishery (TSPF) Management Plan 2008 include promoting economic efficiency and ensuring the optimal use of fishery resources. Despite these objectives, negative NER persisted in this fishery for the five years leading up to 2008–09 (the last year for which NER estimates are available). NER for the fishery increased from -\$2.4 million in 2010–11 to -\$1.8 million in 2011–12. The improvement in NER in 2011–12 is mainly attributed to an increase in catch and in the prices of major species caught by the TSPF. Despite an increase in NER, the fishery still experiences high levels of latent effort that have prevailed for some time. Moreover, despite an increase in NER, achieving the fishery's economic potential needs to be considered alongside the other social and cultural objectives of Torres Strait Islander and Aboriginal people.

TABLE 1.4 Indicators and summary of economic status of Commonwealth fisheries for 2012–13

Fishery	Performance relative to MEY target	NER trend	Fishing right latency
Bass Strait Central Zone Scallop Fishery	MEY target not specified	Negative in 2009–10 and 2010–11 (–\$1.1 million)	High
Coral Sea Fishery	MEY target not specified	Not estimated	Low in Aquarium Sector; higher in other sectors
Norfolk Island Fishery	MEY target not specified	Not estimated	Unknown
Northern Prawn Fishery	Tiger prawn stocks approaching B_{MEY} target. MEY targets not specified for banana prawn	Positive and increasing	Low
North West Slope Trawl Fishery	MEY target not specified	Not estimated	High
Small Pelagic Fishery	MEY target not specified	Not estimated	High
SESSF: Commonwealth Trawl and Scalefish Hook sectors a	Of the five key species, most are close to B_{MEY} targets. Overfished stocks require rebuilding for improvement in economic status	Positive	Low for key species
SESSF: East Coast Deepwater Trawl Sector	Fishing mortality below economic target reference point	Not estimated	High
SESSF: Great Australian Bight Trawl Sector	Bight redfish above B_{MEY} target. Deepwater flathead just below B_{MEY} target	Not estimated but likely to be positive and have increased	High
SESSF: Shark Hook and Shark Gillnet sectors b	Gummy shark stock close to, or above, target. Biomass of school shark requires rebuilding	Turned slightly negative in 2010–11 and 2011–12 for GHaTS	Low
Southern Squid Jig Fishery	MEY target not specified	Not estimated	High
Western Deepwater Trawl Fishery	MEY target not specified	Not estimated	High

2012–13 fishery GVP (% change from 2011–12)	2012–13 management costs (% share of GVP)	Primary management instrument	Comments
\$0.5 million (-52%)	0.2 million (40%)	ITQs and spatial management	NER in 2012–13 are likely to be negative given large declines in effort, catch and GVP in the years following the surveyed years, when real NER were estimated to be -\$1.1 million
Confidential	\$0.1 million (confidential)	Catch triggers and TACs	Estimates of NER are not available. Aquarium Sector catch increased substantially in 2012–13, indicating an improvement in NER. For the remainder of the fishery, it is unclear how changes in gear used and reduced catch have affected NER
Not available	Not available	Input controls	The offshore fishery is closed to commercial fishing. Only non-commercial fishing occurs in the inshore fishery. Economic status is unknown
\$71 million (+10%)	\$2.2 million (3%)	Individual transferable gear units (headrope length)	NER were \$3.6 million in 2011–12 and are estimated to have increased in 2012–13 owing to increased landings of tiger prawns and higher prices received for banana prawns. Overall, economic status of the fishery has improved since adoption of an MEY target for tiger prawn in 2004
Confidential	\$0.07 million (confidential)	Limited entry and catch triggers	Estimates of NER are not available for the fishery, although the high degree of latent effort indicates that NER are likely to be low
Confidential	\$0.3 million (confidential)	ITQs	Estimates of NER are not available but are likely to be low given the low levels of effort and high latency in the fishery
\$61.0 million (+5%)	\$2.5 million for CTS (4% of CTS GVP)	ITQs	NER were positive in 2010–11 (\$7.0 million) and 2011–12 (\$5.6 million; preliminary estimate). A positive trend in NER since 2002–03, partly driven by increased economic productivity, suggests a move towards MEY. Most key species are close to their B_{MEY} targets, but economic status can still be improved with rebuilding of some overfished stocks
Confidential	\$0.08 million (confidential)	ITQs	A high level of latency indicates low NER
\$12 million (+3%)	\$0.3 million (3%)	ITQs	NER are likely to have increased slightly in 2012–13, as positive impacts on fishery profitability from lower effort and fuel costs reinforce the positive impacts of higher GVP on profitability. Key species are close to the B_{MEY} target
\$15.7 million (+13%)	\$2.3 million for GHaTS (13% of GHaTS GVP)	ITQs	NER were -\$0.14 million in 2010–11 and -\$0.18 million in 2011–12 (preliminary estimate). Although gummy shark biomass is not constraining NER, management of non-target species and marine mammal interactions is likely to have contributed to a fall in NER in the fishery
\$0.24 million (-89%)	\$0.08 million (33%)	Individual transferable gear units (jig machines)	NER are likely to have declined in the 2013 season, as indicated by a decrease in GVP and a large decrease in effort
Confidential	\$0.06 million (confidential)	Limited entry	Estimates of NER are not available, but decline in unit effort and a low number of active fishing permits in recent years indicate that NER have been low

continued ...

TABLE 1.4 Indicators and summary of economic status of Commonwealth fisheries for 2012–13 continued

Fishery	Performance relative to MEY target	NER trend	Fishing right latency
Torres Strait Finfish Fishery	Not applicable ^c	Not estimated	Not applicable
Torres Strait Tropical Rock Lobster Fishery	Not applicable ^c	Not estimated but likely to be positive	Low
Torres Strait Prawn Fishery	Not applicable ^c	Improved from 2011–12 to 2012–13 but still negative	High
Torres Strait Bêche-de-mer and Trochus fisheries	Not applicable ^c	Not estimated	Low for white teatfish; high for all other stocks
Eastern Tuna and Billfish Fishery	MEY target not adequately specified or applied	Increasing trend; turned positive in 2010–11	Low for striped marlin and swordfish; high for albacore, bigeye tuna and yellowfin tuna
Skipjack Tuna Fishery	MEY target not specified	No fishing	High
Southern Bluefin Tuna Fishery	MEY target not specified	Not estimated but likely to be positive	Low
Western Tuna and Billfish Fishery	MEY target not specified	Not estimated	High
Heard and McDonald Islands Fishery	Not applicable ^c	Not estimated but likely to be positive	Low
Macquarie Island Toothfish Fishery	Not applicable ^c	Not estimated	Low

2012–13 fishery GVP (% change from 2011–12)	2012–13 management costs (% share of GVP)	Primary management instrument	Comments
\$0.78 million (-33%)	Not available	Non-tradeable quota	Estimates of NER are not available. Leasing arrangements are likely to generate some positive economic returns to the Torres Strait community
\$20.1 million (+25%)	Not available	Limited entry, size limits, gear limits and bag limits	NER are likely to have increased with higher beach prices in 2012–13. The fishery is meeting its objective to provide commercial opportunities for Traditional Inhabitants, but it is uncertain whether the fishery is meeting its full economic potential
\$6 million (-12%)	\$0.2 million (3%, AFMA costs only)	Tradeable effort units (nights)	NER for the fishery increased from -\$2.4 million in 2010–11 to -\$1.8 million in 2011–12. Improvement in NER in 2011–12 is mainly attributed to an increase in catch and prices of major species caught
Not available	Not available	TACS	Estimates of NER are not available.
\$24.8 million (-11%)	\$1.6 million (7%)	ITQs	NER were \$3.0 million in 2011–12 (preliminary estimate). NER estimates for 2012–13 are not available and are uncertain. The move to ITQs and a new harvest strategy may support improvement
No fishing	\$0.06 million (no fishing)	Limited entry	No Australian vessels fished in 2012 or 2013. Fishing is opportunistic, and highly dependent on availability and the domestic cannery market. Currently, no domestic cannery has active contracts for skipjack tuna
\$38.4 million (-6%)	\$1.3 million (3%)	ITQs	NER are expected to have remained positive. The overfished status of the stock poses a risk to future NER. Economic status will improve if the stock can be rebuilt under the management procedure
Confidential	\$0.3 million (confidential)	ITQs	Latency remained high in 2013, with only a small proportion of the total allowable commercial catch caught, suggesting low NER
Confidential	\$1.4 million (confidential)	ITQs	Estimates of NER are not available but were most likely positive in 2011–12 and 2012–13 because the TAC for Patagonian toothfish was mostly caught
Confidential	\$0.4 million (confidential)	ITQs	Estimates of NER are not available but were most likely positive in 2013–14 because the TAC for Patagonian toothfish was mostly caught

a NER estimates and management costs are only available for the Commonwealth Trawl Sector and exclude the Scalefish Hook Sector.

b NER estimates and management costs are only available for the GHaTS, which includes Scalefish Hook Sector catches and gillnet scalefish catches. c These fisheries are jointly managed fisheries that are not managed under MEY objectives. Statistics are provided by financial year.

Notes: AFMA Australian Fisheries Management Authority. B_{MEY} Biomass at maximum economic yield. CTS Commonwealth Trawl Sector.

GHaTS Gillnet, Hook and Trap Sector. GVP Gross value of production. ITQ Individual transferable quota. MEY Maximum economic yield.

NER Net economic returns. SESSF Southern and Eastern Scalefish and Shark Fishery. TAC Total allowable catch. South Tasman Rise Trawl Fishery is not shown because it has been closed since 2007.

1.4 Environmental status in 2013

The *Fishery status reports* examine the broader impact of fisheries on the environment, in response to the requirements of the *Fisheries Management Act 1991* and the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The Australian Government aims to implement an ecosystem-based approach to fisheries management as part of meeting the requirements of ecologically sustainable development. This requires a holistic approach to management that considers fisheries' interactions with, and impacts on, bycatch species (including threatened, endangered and protected [TEP] species), marine habitats, communities and ecosystems.

As part of the review of the Commonwealth Policy on Fisheries Bycatch, CSIRO assessed trends in bycatch for several Commonwealth fisheries (Tuck et al. 2013). It found that data limitations precluded the accurate assessment of trends in bycatch. For example, variations between years in observer coverage, fishing gear types, seasons, areas and sampling protocols could lead to misleading estimates of bycatch trends. Furthermore, bycatch rates need to be interpreted with caution, as a decrease in this indicator may be due to the success of mitigation measures, a decrease in susceptibility to the gear or a decrease in the abundance of the bycatch population. Tuck et al. (2013) also found it difficult to accurately measure the effectiveness of bycatch mitigation measures. However, anecdotal evidence and incomplete data suggested that fisheries that introduced mitigation measures had generally experienced successful outcomes. A more detailed review of this research is presented in the SESSF overview chapter (Chapter 8).

Ecological risk assessment

A key component of AFMA's ecosystem-based approach to fisheries management has been the application of an ecological risk management (ERM) framework that is designed to respond to the outcomes of the ecological risk assessment (ERA) process (Hobday et al. 2007). Fishery-specific ERM reports integrate the information from the ERAs and other management requirements, such as recovery plans and threat abatement plans (TAPs), and detail AFMA's management response. Fishery-specific actions with respect to bycatch and discarding are identified in fishery-specific bycatch and discarding workplans.



Hauling room in the Macquarie Island Toothfish Fishery
AFMA

Protected species interactions

During the normal course of fishing operations, fishers can interact with TEP species listed under the EPBC Act. There is a legislative requirement to take all reasonable steps to minimise interactions and report any interactions that do occur. The species involved and the level of interactions vary between fisheries and sectors, as well as with gear, area and season. Although interactions with TEP species are usually rare, they can still be a significant source of mortality for the affected populations.

Some fisheries have made considerable progress in implementing measures to reduce interactions with TEP species. The use of turtle excluder devices became compulsory in the NPF in 2001 and is reported to have reduced the bycatch of turtles from approximately 5700 turtles per year before 2001 to approximately 30 per year after 2001 (Griffiths et al. 2007). In 2013 in the NPF, 72 turtles were reported as being entangled in gear, 67 of which were reported as being released alive. Coupled with industry education programs, these devices are also understood to have been effective in reducing the bycatch of other large animals, such as stingrays and sharks.

The provisions of the TAP for the incidental catch (or bycatch) of seabirds during pelagic longline fishing operations (AAD 2001, 2006) apply to all longline fisheries managed by the Australian Government, including the ETBF, the WTBF and the Macquarie Island Toothfish Fishery. Over the life of the first plan (2001 to 2006), substantial progress was made towards reducing the threat of pelagic longline fishing operations to seabirds (AAD 2006). A review of the 2006 TAP for seabirds in 2011 noted that positive results had been achieved, including improved avoidance of, and reduction in, seabird bycatch over nearly five years. Despite considerable progress in mitigation of seabird bycatch in Commonwealth longline fisheries, the review concluded that a TAP was still required and that a variation to the 2006 TAP for seabirds was appropriate.

Interactions with fur seals and dolphins in the Small Pelagic Fishery were identified as an issue of concern in 2004–05. Management has focused on collection of data to understand the level of interaction, research into mitigation measures, and introduction of seal excluder devices. AFMA established the Cetacean Mitigation Working Group to help develop long-term management strategies. Low levels of effort in recent years, coupled with use of mitigation measures, are understood to have resulted in few interactions.

Seal excluder devices have been compulsory in the winter blue grenadier trawl fishery (of the SESSF) since 2005. The changed fishing practices appear to have reduced the incidence of seal bycatch in the midwater trawl nets of factory vessels.

The AFMA observer program covers most Commonwealth fisheries. Dedicated observer coverage in 2006 to examine interactions between the SGSHS of the SESSF and Australian sea lions (*Neophoca cinerea*) identified a level of bycatch that was potentially significant for this endemic species. AFMA has since implemented management measures to reduce the bycatch of Australian sea lions in shark gillnets (AFMA 2010, 2011a). These include gillnet fishing closures around known breeding colonies and the establishment of seven areas (zones) that will be closed if gillnet fishing interactions exceed the zone-based triggers. Zone-based triggers set an overall bycatch level of 15 animals per year across the seven management zones. As at 1 October 2014, all zones were open. All boats using gillnets in these management areas are subject to 100 per cent observer coverage, using either AFMA observers or an electronic monitoring system. In 2013, one Australian sea lion was netted and died in gillnet operations in the SESSF Gillnet Hook and Trawl sector.

The recent increase in observer coverage in the SGSHS identified bycatch and mortalities of dolphins as an issue of concern when using gillnets. The limited historical observer coverage in the SGSHS means that the extent or significance of the issue is uncertain. In September 2011, AFMA implemented a closure in the area of most observed interactions and increased observer coverage to 100 per cent in adjacent areas (AFMA 2011a). This measure was extended to 23 September 2014. Interactions with seabirds in the SGSHS also became apparent as a result of the increased observer coverage in the sector. In response, AFMA required offal management measures and net cleaning to reduce seabird interactions (AFMA 2011b).

The potential significance of seabird mortalities resulting from interactions with trawl cables (warp strikes) has been identified globally, in Commonwealth fisheries and in early fishery bycatch action plans (Phillips et al. 2010). However, obtaining reliable data is difficult because of the difficulties associated with observing warp strikes. A dedicated seabird bycatch observer program is being trialled in the SESSF. Industry has implemented vessel-specific seabird management plans in the CTS and GABTS.

The potential for interactions with seals in the CTS wet-boat and Danish-seine sectors of the SESSF was identified by the ERA process for these sectors. Previous studies suggested that more than 700 seals could be caught annually in the wet-boat sector (NSSG & Stewardson 2007). Trials of seal excluder devices in the wet-boat sector have achieved positive results (Knuckey 2009), and industry has adopted a code of conduct that includes voluntary measures to minimise seal bycatch. However, reliably estimating the level of interactions remains difficult.

Data collection

Limited availability of reliable data on interactions with TEP species remains a key constraint in some fisheries. The rare nature of interactions with TEP species creates a challenge for obtaining reliable estimates of interaction rates, particularly at lower levels of observer coverage. Reliable data are critical to determining the extent of interactions, evaluating the potential impact on populations, particularly for high-risk species, and demonstrating the effectiveness of management measures. Electronic monitoring programs have been trialled in several fisheries and subfisheries (ETBF and SGSHS). These may provide more data to inform future fisheries management, but it is not yet known whether they will provide sufficient data to manage infrequent events or animals that are difficult to identify on screen. AFMA is moving on to an implementation phase for electronic monitoring in the ETBF and SGSHS and will use the footage and data to audit and improve logbook records of fishing activity that includes catches, discards and interactions with TEP species.

Cumulative impacts

The wide distribution of many TEP species across the Australian Fishing Zone means that some species may interact with a number of fisheries, including fisheries in other jurisdictions and on the high seas. Although interactions in a single fishery may be low, the cumulative impact across several fisheries could be significant and needs to be considered. Data constraints limit the assessment and understanding of cumulative impacts across fisheries and jurisdictions (Phillips et al. 2010).

1.5 Policy reviews

In May 2013, the Australian Government Department of Agriculture, Fisheries and Forestry (now the Department of Agriculture) released separate review reports on the Commonwealth Fisheries Harvest Strategy Policy 2007 (DAFF 2013a) and the Commonwealth Policy on Fisheries Bycatch 2000 (DAFF 2013b). The reviews included public comment on discussion papers, stakeholder workshops, and technical reviews by ABARES, CSIRO and the University of Wollongong.

The review of the HSP concluded that this policy has largely been successful in improving the management of Commonwealth fisheries and has provided a strong foundation for fisheries management. The review noted that, in most respects, the policy and guidelines meet or exceed international obligations and best practice. The review's key recommendations for improving the policy include providing additional direction or guidelines on stock rebuilding strategies and discarding of commercial species; implementation of the MEY objective in multispecies fisheries; and ensuring that the policy applies to all commercial species, including byproduct species.

The bycatch policy review recommended the development of a revised bycatch policy, including new policy objectives and principles and a revised definition of bycatch. Key recommendations of this review included development of a tiered approach to monitoring, assessing and managing bycatch; development of guidelines to underpin implementation of the revised policy (similar to those for the HSP); use of trigger points and decision rules, where appropriate; and a performance monitoring and reporting framework to evaluate the implementation and effectiveness of the bycatch policy.

The HSP and bycatch policy review reports do not provide any policy direction themselves, but are intended to inform the future revision and update of the policy framework for Commonwealth fisheries. These reviews complement the high-level Review of Fisheries Management undertaken by Mr David Borthwick, AO, PSM, in 2012–13. The current policies will continue to apply until any updated policies are endorsed.

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