Chapter 1
Overview

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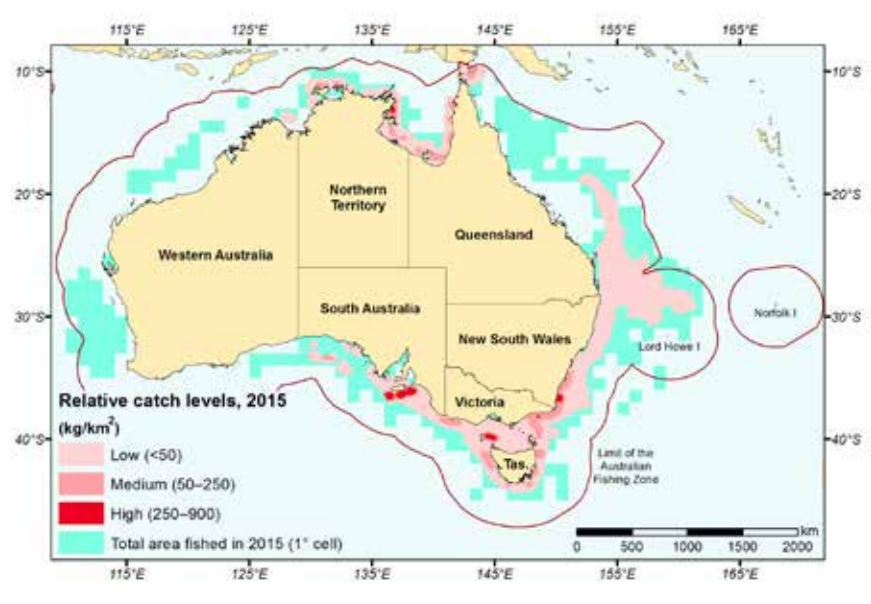
The Australian Government's approach to fisheries management is to maintain fish stocks at ecologically sustainable levels and, within this context, maximise the net economic returns (NER) to the Australian community (DAFF 2007). It also considers the impact of fishing activities on non-target species and the long-term sustainability of the marine environment, as required by the *Fisheries Management Act 1991* and the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). 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 2016 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) (Figure 1.1). It summarises the performance of these fisheries in 2015 and over time, against the requirements of fisheries legislation and policy. The reports assess all key commercial species from Australian Government–managed fisheries and the broader impact of fisheries on the environment, including on non-target species.

To complete these reports, ABARES uses data and information 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 complete fishing season that is available, and the most recent stock assessments. Commonwealth fisheries operate with different fishing season dates, so the currency of catch data in the reports varies. In this edition, all stocks in the Small Pelagic Fishery (SPF) have been assessed for two fishing seasons so that the data for the most recent fishing season can be reported. To compare status from year to year, biological and environmental status is presented retrospectively for '2015'. Economic status is presented for the 2014–15 financial year.

FIGURE 1.1 Relative catch levels of Australian Government–managed fisheries, 2015



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 (B) status indicates how many fish there are—specifically, whether the biomass in the year being assessed is above 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 (F) status reflects the level of fishing mortality on 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 reports 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 or stock managed under a total allowable catch (TAC) in a fishery managed solely or jointly by the Australian Government
- a species or stock 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 2015

Fishery status reports 2016 assesses 93 fish stocks across 22 fisheries (Figure 1.2); 65 stocks were assessed across 9 fisheries that are managed solely by AFMA on behalf of the Australian Government, and 28 stocks were assessed across 13 fisheries that are managed jointly with other Australian jurisdictions or other countries. One new stock is included in *Fishery status reports 2016*: the toothfish stock—which includes both Patagonian toothfish (*Dissostichus eleginoides*) and Antarctic toothfish (*D. mawsoni*)—in the Commission for the Conservation of Antarctic Marine Living Resources exploratory toothfish fishery in the Amundsen Sea, which was fished by an Australian vessel for the first time in 2015. This is a jointly managed stock because it occurs in the area covered by the Convention on the Conservation of Antarctic Marine Living Resources.

The status of the 93 fish stocks managed solely or jointly by the Australian Government changed slightly in 2015, compared with the previous year (Figures 1.3 and 1.4):

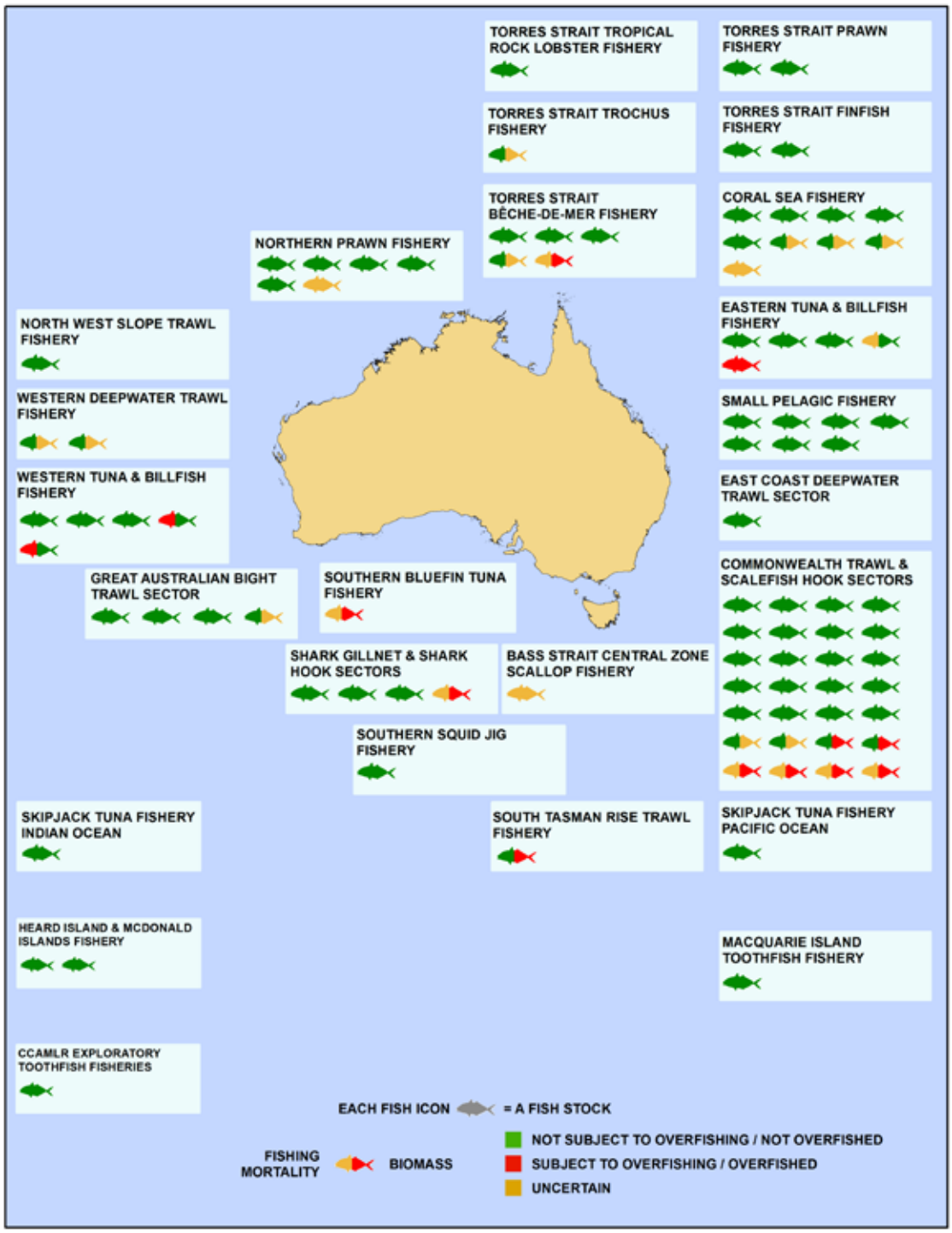
- The number of stocks classified as not subject to overfishing increased to 79 (77 in 2014), and the number of stocks classified as not overfished increased to 69 (66 in 2014). Of these, 66 stocks were both not subject to overfishing and not overfished (63 in 2014)
- The number of stocks classified as subject to overfishing increased to 3 (2 in 2014), and the number of stocks classified as overfished decreased to 11 (12 in 2014). Of these, 1 stock (bigeye tuna [*Thunnus obesus*] in the Eastern Tuna and Billfish Fishery (ETBF) was both subject to overfishing and overfished (2 in 2014).
- The number of stocks classified as uncertain with [regard to fishing mortality] decreased to 11 (13 in 2014), and the number of stocks classified as uncertain with regard to biomass decreased to 13 (14 in 2014). Of these, 3 stocks were uncertain with respect to both fishing mortality and biomass.

The *Fishery status reports 2016* reports show a continuation of the general trends in improvements of performance in terms of the biological status of fish stocks in Australian Government–managed fisheries; specifically, the increasing number of stocks classified as not subject to overfishing and not overfished (Figures 1.3 and 1.4). Rapid increases came before 2009, with more stocks being classified in the reports and the influence of the 2005 Ministerial Direction and the associated implementation of the HSP (2007) and the Securing our Fishing Future structural adjustment package. These factors also influenced the general reduction in the number of stocks classified as overfished or subject to overfishing (Figures 1.3 and 1.4). The 2016 reports are the third year that no stocks in fisheries solely managed by the Australian Government have been classified as subject to overfishing. However, there is ongoing uncertainty surrounding the fishing mortality status of some overfished stocks (discussed further below).

In general, the 2016 reports show continued improvements in our ability to classify stock status. The number of stocks classified as uncertain, with respect to either biomass or fishing mortality has continued to decline after earlier increases, between 2004 and 2005–07 (Figures 1.3 and 1.4). The increased certainty in stock status has been due to the factors already mentioned above, such as the implementation of the HSP, and also the investment in the Reducing Uncertainty in Stock Status project (Larcombe et al. 2015). However, the reduction in the number of stocks that are uncertain with respect to their fishing mortality status appears to have plateaued since 2011 (Figure 1.3).

Longline fishing vessel
Matt Daniel, AFMA

FIGURE 1.2 Biological status of fish stocks in 2015, by fishery or sector



The summary of status outcomes are presented separately for stocks in fisheries solely managed by the Australian Government and stocks in fisheries that are jointly managed. This allows an evaluation of performance of fisheries management against the relevant legislation and policy, which may differ between these groups of fisheries.

FIGURE 1.3 Fishing mortality status (number of stocks), 2004 to 2015

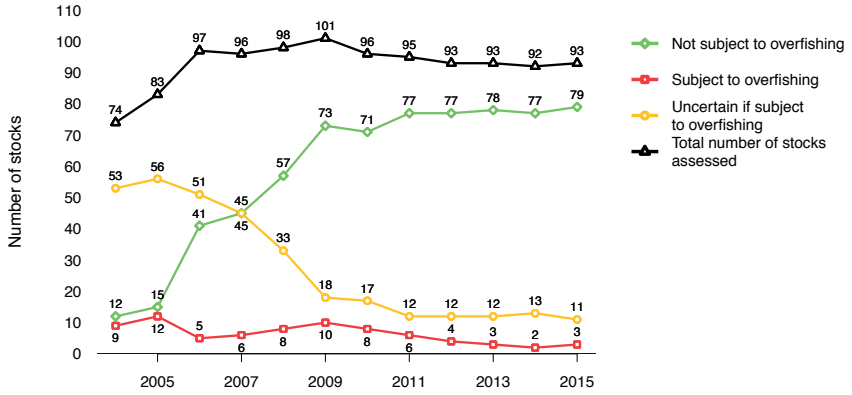
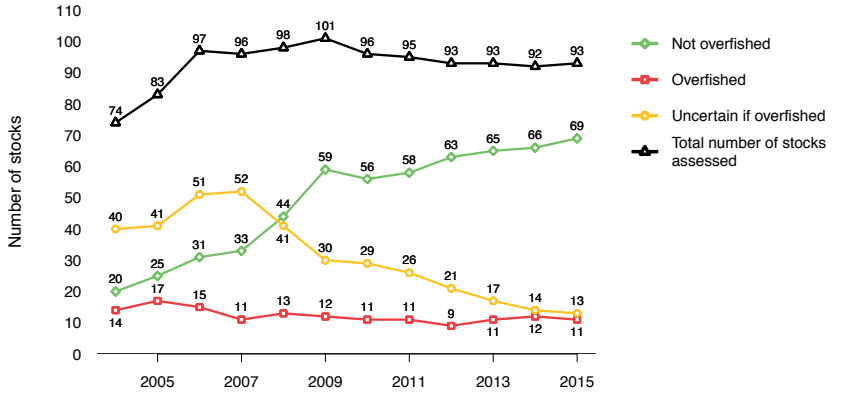


FIGURE 1.4 Biomass status (number of stocks), 2004 to 2015



Stocks that have changed status

The status of three stocks in fisheries solely managed by the Australian Government changed in 2015 (Table 1.1). Two changes reflect increased certainty around the level of fishing mortality, and one reflects increased certainty on biomass.

The level of uncertainty around fishing mortality status of blue-eye trevalla (*Hyperoglyphe antarctica*) in the Southern and Eastern Scalefish and Shark Fishery (SESSF) Commonwealth Trawl Sector (CTS) and Scalefish Hook Sector (SHS) decreased in response to an updated stock assessment (Haddon 2015). The updated assessment indicates that the biomass of the stock was not as depleted as indicated by previous assessments and produced a higher recommended biological catch (RBC). Fishing mortality in the most recent season was constrained to within the RBC and total allowable catch (TAC) for the 2015–16 fishing season, as well as the RBC for 2016–17 produced by the 2015 stock assessment, so the stock was classified as not subject to overfishing in 2015.

The level of uncertainty around fishing mortality of pink ling (*Genypterus blacodes*) in the SESSF CTS and SHS also decreased in response to an updated stock assessment in 2015 (Cordue 2015). The assessment indicated that the eastern pink ling stock should rebuild towards the target under catches of up to 500–550 t per year. Fishing mortality for the eastern stock was constrained to within the constant-catch scenario produced from the 2013 stock assessment (which was used to set the RBC and TAC) for the 2015–16 fishing season, as well as to within the updated constant-catch scenarios produced by the 2015 assessment, so the stock was classified as not subject to overfishing in 2015.

The level of uncertainty around the biomass status of the western stock of redbait (*Emmelichthys nitidus*) in the SPF also changed. While there remains little empirical data on the abundance of the western stock of redbait, ecosystem modelling and management strategy evaluation testing (Giannini et al. 2010; Smith et al. 2015) indicate that the application of the current harvest strategy is unlikely to reduce the stock to an overfished level. This research in combination with the historically low catches are the basis for classifying the stock as not overfished.

TABLE 1.1 Stocks with a changed status in 2015 and their status in 2014

Fishery	Common name (scientific name)	2014		2015	
		Fishing mortality	Biomass	Fishing mortality	Biomass
Stock in fisheries managed solely by the Australian Government					
SESSF: Commonwealth Trawl Sector	Blue-eye trevalla (*Hyperoglyphe antarctica*)				
SESSF: Commonwealth Trawl Sector	Pink ling (*Genypterus blacodes*)				
Small Pelagic Fishery **a**	Redbait west (*Emmelichthys nitidus*)				
Stocks in fisheries managed jointly by the Australian Government					
Torres Strait Bêche-de-mer Fishery	Sandfish (*Holothuria scabra*)				
Torres Strait Bêche-de-mer Fishery	Other sea cucumbers (up to 18 species)				
Western Tuna and Billfish Fishery	Striped marlin (*Tetrapturus audax*)				
Western Tuna and Billfish Fishery	Yellowfin tuna (*Thunnus albacares*)				

a This stock has been assessed for two years in this report (2014 and 2015), but was previously assessed as uncertain for biomass status; it has been assessed for both 2014 and 2015 as not overfished.
Note: **SESSF** Southern and Eastern Scalefish and Shark Fishery.

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

The status of four stocks in fisheries jointly managed by the Australian Government changed in 2015 (Table 1.1). Status considers the impacts of all fleets on the stocks. In the Torres Strait Bêche-de-mer Fishery, illegal catch of sandfish (*Holothuria* spp.) by Papua New Guinea nationals was detected in 2015. Sandfish in Torres Strait is currently considered to be overfished and is subject to a zero TAC. It is uncertain whether the level of illegal catch detected in 2015 will impede the recovery of the stock. As a result, the stock is classified as uncertain with its regard to fishing mortality. The multi-species stock 'other sea cucumbers' in the Torres Strait Bêche-de-mer Fishery comprises up to 18 species. The 2015 catch (1 t) is not considered to result in overfishing and so the stock was classified as not subject to overfishing in 2015.

In the Indian Ocean, the striped marlin (*Tetrapturus audax*) stock was assessed as overfished and subject to overfishing in 2014, based on stock assessments undertaken by the Indian Ocean Tuna Commission (IOTC 2014). An updated assessment in 2015 (IOTC 2015) indicated that the stock biomass was above the limit reference point of 20 per cent of unfished biomass, and the stock is therefore now considered to be not overfished. However, fishing mortality remains high (above the level that would result in maximum sustainable yield), and the stock remains subject to overfishing. In 2015, an updated assessment of the yellowfin tuna (*Thunnus alalunga*) stock in the Indian Ocean (IOTC 2015) also found that fishing mortality was above the level that would result in maximum sustainable yield. Therefore, the stock is now considered to be subject to overfishing.

Stocks classified as subject to overfishing and/or overfished

Stocks classified as overfished or subject to overfishing remained largely the same as in 2014 (Table 1.2, Table 1.3). Table 1.2 summarises the status determinations and why the stocks are classified as overfished or subject to overfishing; the full details and evidence are provided in the relevant chapters. Briefly, seven stocks in fisheries managed solely by the Australian Government were classified as overfished in 2015 (Table 1.2, Table 1.3). These stocks occur in the SESSF and are subject to stock rebuilding strategies, as required by the HSP. Blue warehou (*Seriolella brama*), eastern gemfish (*Rexea solandri*), orange roughy (*Hoplostethus atlanticus*), gulper sharks (*Centrophorus* spp.) and school shark (*Galeorhinus galeus*) are listed as conservation dependent under the EPBC Act. None of these stocks are classified as subject to overfishing in 2015; however, five are classified as uncertain with respect to fishing mortality status (discussed below).

Five stocks in jointly managed fisheries were classified as either overfished or subject to overfishing in 2015. Classification of these stocks remained largely the same as in 2014 (Table 1.2). Sandfish in the Torres Strait Beche-de-mer Fishery and yellowfin tuna and striped marlin in the Western Tuna and Billfish Fishery (WTBF) were discussed in the previous section.

Assessing fishing mortality status for overfished stocks

It is becoming increasingly difficult to assess fishing mortality status for a number of overfished stocks: blue warehou, school shark, eastern gemfish and redfish (*Centroberyx affinis*). This has been due to a range of factors, including a lack of data or uncertainty in the catch data and uncertainty in the assessments. These species are subject to rebuilding strategies that specify a biologically reasonable time frame for recovery to a biomass above the limit reference point. Although all overfished stocks have an RBC of zero, their rebuilding strategies include an incidental catch allowance to account for catches that are regarded as 'unavoidable' when fishing for other species—for example, fishers often catch school shark while fishing for gummy shark (*Mustelus antarcticus*).

Catches that breach these allowances have been reported for each species since the implementation of their rebuilding strategies. Such breaches may constitute overfishing for the purposes of status determination. There is also some level of discarding of these species, which can be difficult to estimate, is variable between years and is often not available for the most recent season at the time of drafting of these reports. In circumstances when the known retained catch of the species approaches the incidental catch allowance, it is often difficult to be certain that the total catch has not exceeded the allowance due to the uncertainties in discard estimates. This consequently increases the uncertainty about how much influence the incidental catch of the species (and potential overfishing) may have on its rebuilding time frame. Furthermore, the assessment models used to project stock trends use average conditions (e.g. recruitment) for the projection. The purpose of these projections is not to track recovery on an annual basis but to predict an 'on average' expected rebuilding time frame. The failure to detect a trend in the catch data that resembles the trajectory of the projection is not necessarily evidence that the species is not responding but may be reflective of 'non-average' conditions. Moreover, some of these assessments are more than six years old and the evidence for fishing mortality effects are inferred from indicators rather than estimated an assessment model. These models also rarely included ecosystem effects such as changes in trophic interactions that may also influence the effect that fishing mortality has on rebuilding time frames.

Given these realities, it can be unclear if incidental catch is hindering recovery of a stock and what time frame of recovery is biologically reasonable, and therefore whether a stock under a rebuilding plan is subject to overfishing. This is the case for blue warehou, school shark, eastern gemfish and redfish. It is becoming increasingly apparent that standard data collection and assessment protocols struggle to deliver a concise picture of fishing mortality status for these overfished stocks.

Status of key Australian Fish Stocks reports

On 10 December 2014, the Fisheries Research and Development Corporation released *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 that are managed by the Commonwealth, the states and the Northern Territory. 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 provide stock assessments for 68 key species (or species complexes), 19 more than in the 2012 inaugural edition. These species and their stocks contributed around 85 per cent of the catch volume and 90 per cent of the value of Australian wild-capture fisheries in 2012–13. The reports consider the same biological information as Fishery Status Reports, but interpret that information within a nationally agreed classification system (Appendix A). Of the 93 stocks assessed in *Fishery status reports 2013–14*, 31 stocks are assessed in *Status of key Australian fish stocks reports 2014* and are comparable. This national reporting framework is designed to improve the ability to compare the status of fish stocks.

Bermagui
Lee Georgeson, ABARES

TABLE 1.2 Stocks classified as subject to overfishing and/or overfished in 2015, and their status in 2014

Fishery	Common name (scientific name)	2014		2015		Comments
		Fishing mortality	Biomass	Fishing mortality	Biomass	
Stocks in fisheries managed solely by the Australian Government						
SESSF: CTS and SHS Chapter 9	Blue warehou (*Seriolella brama*)					Total removals are below the incidental catch allowance but the level of fishing mortality that will allow the stock to rebuild is unknown. There is no evidence that the stock is rebuilding.
SESSF: CTS and SHS Chapter 9	Gemfish, eastern zone (*Rexea solandri*)					Biomass is below the limit reference point. Uncertainty remains around total fishing mortality and rebuilding to the limit reference point within the specified time frame.
SESSF: CTS and SHS Chapter 9	Gulper sharks (*Centrophorus harrissoni*, *C. moluccensis*, *C. zeehaani*)					Populations are likely to be highly depleted, and fishing mortality is uncertain despite low landed catch and protection from closures.
SESSF: CTS Chapter 9	Orange roughy, southern zone (*Hoplostethus atlanticus*)					Closure of most areas deeper than 700 m and negligible catches. No updated stock assessment.
SESSF: CTS Chapter 9	Orange roughy, western zone (*Hoplostethus atlanticus*)					Closure of most areas deeper than 700 m and negligible catches. No updated stock assessment.
SESSF: CTS Chapter 9	Redfish, eastern (*Centroberyx affinis*)					Biomass is below the limit reference point. Catch is above the recommended biological catch and it is unclear if total removals are above the level that will allow rebuilding.
SESSF: SGSHS Chapter 12	School shark (*Galeorhinus galeus*)					Uncertain if total mortality will allow recovery in required time frame. Estimate of pup production is below 20% of unexploited levels.

continued ...

TABLE 1.2 Stocks classified as subject to overfishing and/or overfished in 2015, and their status in 2014 continued

Fishery	Common name (scientific name)	2014		2015		Comments
		Fishing mortality	Biomass	Fishing mortality	Biomass	
Stocks in fisheries managed jointly by the Australian Government						
South Tasman Rise Trawl Fishery Chapter 28	Orange roughy (*Hoplostethus atlanticus*)					Fishery closed under domestic arrangements since 2007 as a result of stock depletion.
Torres Strait Bêche-de-mer Fishery Chapter 19	Sandfish (*Holothuria scabra*)					Uncertain impact of illegal foreign catch in recent years. Most recent full survey (2009) indicated that stock was overfished.
ETBF Chapter 21	Bigeye tuna (*Thunnus obesus*)					Most recent estimate of biomass (2014) is below the limit reference point. Ocean-wide estimates of fishing mortality exceed the level required for MSY to be realised.
SBTF Chapter 23	Southern bluefin tuna (*Thunnus maccoyii*)					The estimate of spawning biomass is well below 20% of unfished biomass. The global total allowable catch, set in line with the management procedure, should allow rebuilding. Significant uncertainty remains around unaccounted catch, which, if occurring, substantially reduces the probability of the stock rebuilding
WTBF Chapter 24	Striped marlin (*Tetrapturus audax*)					Most recent estimate of biomass is above the limit reference point. Current fishing mortality exceeds the level required for MSY to be realised.
WTBF Chapter 24	Yellowfin tuna (*Thunnus albacares*)					Most recent estimate of spawning biomass is above the limit reference point. Current fishing mortality exceed the level required for MSY to be realised.

Note: **CTS** Commonwealth Trawl Sector. **MSY** Maximum sustainable yield. **ETBF** Eastern Tuna and Billfish Fishery. **SBTF** Southern Bluefin Tuna Fishery. **SESSF** Southern and Eastern Scalefish and Shark Fishery. **SGSHS** Shark Gillnet and Shark Hook sectors. **SHS** Scalefish Hook Sector. **WTBF** Western Tuna and Billfish Fishery.

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

TABLE 1.3 Biological stock status of all stocks assessed in 2015, and their status since 1992

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		2014		2015	
											Fishing mortality	Biomass	Fishing mortality	Biomass	Fishing mortality	Biomass	Fishing mortality	Biomass	Fishing mortality	Biomass	Fishing mortality	Biomass	Fishing mortality	Biomass	Fishing mortality	Biomass	Fishing mortality	Biomass	Fishing mortality	Biomass	Fishing mortality	Biomass	Fishing mortality	Biomass	Fishing mortality	Biomass
Stocks in fisheries managed solely by the Australian Government																																					
Bass Strait Central Zone Scallop Fishery	Commercial scallop (*Pecten fumatus*)																																				
Coral Sea Fishery: Sea Cucumber Sector	Black teatfish (*Holothuria whitmaei*)																																				
Coral Sea Fishery: Sea Cucumber Sector	Prickly redfish (*Thelenota ananas*)																																				
Coral Sea Fishery: Sea Cucumber Sector	Surf redfish (*Actinopyga mauritiana*)																																				
Coral Sea Fishery: Sea Cucumber Sector	White teatfish (*Holothuria fuscogilva*)																																				
Coral Sea Fishery: Sea Cucumber Sector	Other sea cucumber species (~11 spp.)																																				
Coral Sea Fishery: Aquarium Sector	Multiple species																																				
Coral Sea Fishery: Lobster and Trochus Sector	Tropical rock lobster (*Panulirus ornatus*, possibly other species)																																				
Coral Sea Fishery: Line and Trap Sector	Mixed reef fish and sharks																																				
Coral Sea Fishery: Trawl and Trap Sector	Numerous fish, shark and crustacean species																																				
Northern Prawn Fishery	Red-legged banana prawn (*Fenneropenaeus indicus*)																																				

continued ...

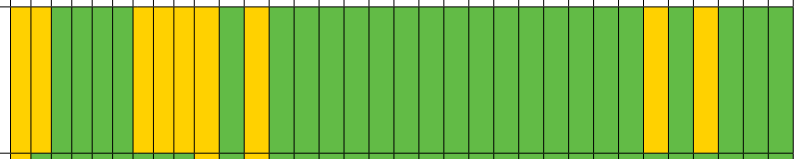
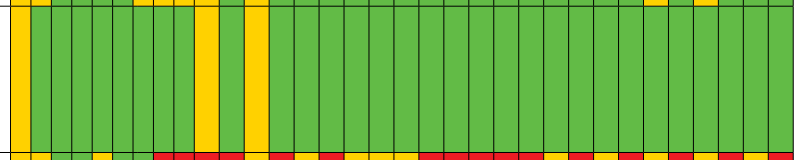
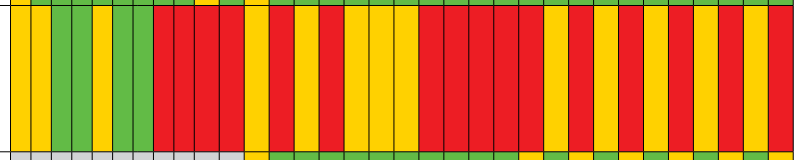
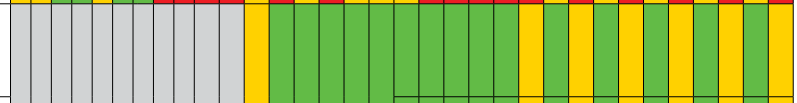
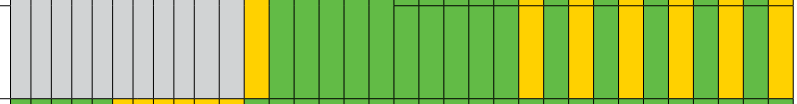
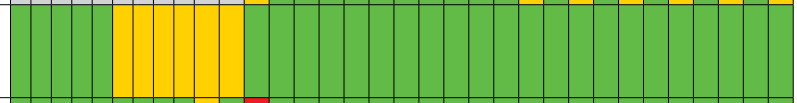
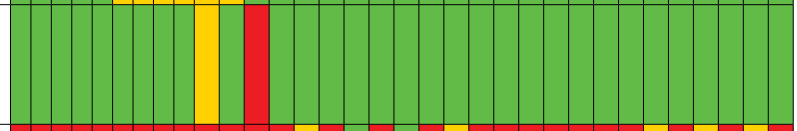
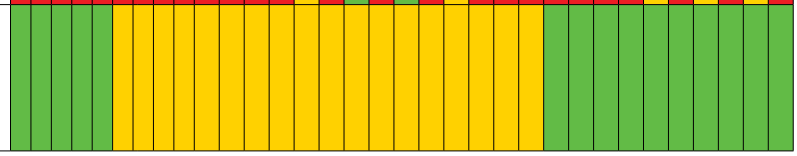
TABLE 1.3 Biological stock status of all stocks assessed in 2015, and their status since 1992 continued

Fishery	Common name (scientific name)	Status
Northern Prawn Fishery	White banana prawn (*Fenneropenaeus merguiensis*)	
Northern Prawn Fishery	Brown tiger prawn (*Penaeus esculentus*)	
Northern Prawn Fishery	Grooved tiger prawn (*Penaeus semisulcatus*)	
Northern Prawn Fishery	Blue endeavour prawn (*Metapenaeus endeavouri*)	
Northern Prawn Fishery	Red endeavour prawn (*Metapenaeus ensis*)	
North West Slope Trawl Fishery	Scampi (*Metanephrops australiensis, M. boschmai, M. velutinus*)	
Small Pelagic Fishery	Australian sardine (*Sardinops sagax*)	
Small Pelagic Fishery	Blue mackerel, east (*Scomber australasicus*)	
Small Pelagic Fishery	Blue mackerel, west (*Scomber australasicus*)	
Small Pelagic Fishery	Jack mackerel, east (*Trachurus declivis*)	
Small Pelagic Fishery	Jack mackerel, west (*Trachurus declivis*)	
Small Pelagic Fishery	Redbait, east (*Emmelichthys nitidus*)	
Small Pelagic Fishery	Redbait, west (*Emmelichthys nitidus*)	

1992 1993 1994 1996 1997 1998 1999 2001–02 2002–03 | 2004 Fishing mortality Biomass | 2005 Fishing mortality Biomass | 2006 Fishing mortality Biomass | 2007 Fishing mortality Biomass | 2008 Fishing mortality Biomass | 2009 Fishing mortality Biomass | 2010 Fishing mortality Biomass | 2011 Fishing mortality Biomass | 2012 Fishing mortality Biomass | 2013 Fishing mortality Biomass | 2014 Fishing mortality Biomass | 2015 Fishing mortality Biomass

continued ...

TABLE 1.3 Biological stock status of all stocks assessed in 2015, and their status since 1992 continued

Fishery	Common name (scientific name)	Status
SESSF: Commonwealth Trawl and Scalefish Hook sectors	Blue-eye trevalla (*Hyperoglyphe antarctica*)	
SESSF: Commonwealth Trawl and Scalefish Hook sectors	Blue grenadier (*Macruronus novaezelandiae*)	
SESSF: Commonwealth Trawl and Scalefish Hook sectors	Blue warehou (*Seriolella brama*)	
SESSF: Commonwealth Trawl Sector	Deepwater sharks, eastern zone (18 spp.)	
SESSF: Commonwealth Trawl Sector	Deepwater sharks, western zone (18 spp.)	
SESSF: Commonwealth Trawl Sector	Eastern school whiting (*Sillago flindersi*)	
SESSF: Commonwealth Trawl Sector	Flathead (*Platycephalus richardsoni* and 4 other spp.)	
SESSF: Commonwealth Trawl and Scalefish Hook sectors	Gemfish, eastern zone (*Rexea solandri*)	
SESSF: Commonwealth Trawl and Scalefish Hook sectors	Gemfish, western zone (*Rexea solandri*)	

continued ...

TABLE 1.3 Biological stock status of all stocks assessed in 2015, and their status since 1992 continued

Fishery	Common name (scientific name)	Status
		1992
		1993
		1994
		1996
		1997
		1998
		1999
		2001–02
		2002–03
		2004 Fishing mortality
		2004 Biomass
		2005 Fishing mortality
		2005 Biomass
		2006 Fishing mortality
		2006 Biomass
		2007 Fishing mortality
		2007 Biomass
		2008 Fishing mortality
		2008 Biomass
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		2010 Fishing mortality
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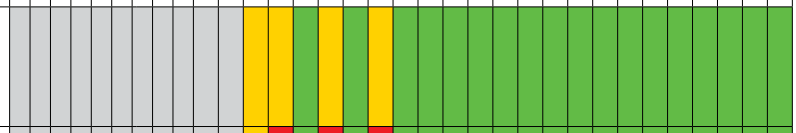
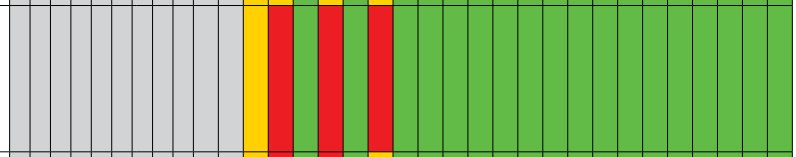
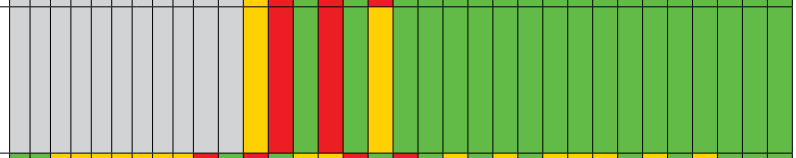
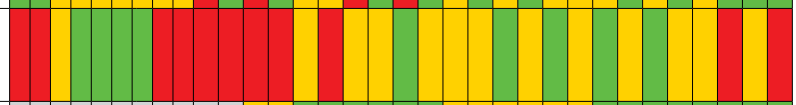
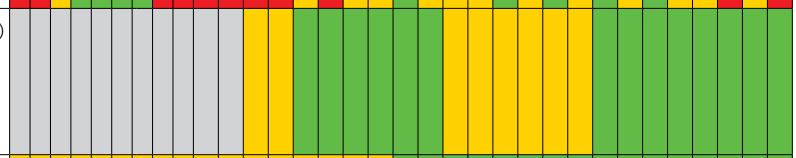
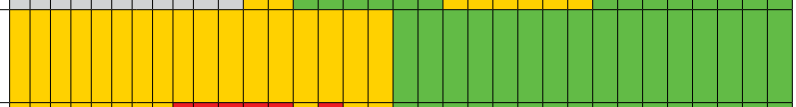
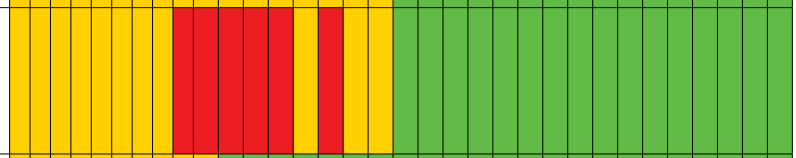
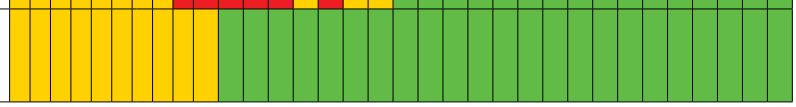
		2011 Fishing mortality
		2011 Biomass
		2012 Fishing mortality
		2012 Biomass
		2013 Fishing mortality
		2013 Biomass
		2014 Fishing mortality
		2014 Biomass
		2015 Fishing mortality
		2015 Biomass
SESSF: Commonwealth Trawl and Scalefish Hook sectors	Gulper sharks (*Centrophorus harrissoni*, *C. moluccensis*, *C. zeehaani*)	
SESSF: Commonwealth Trawl and Scalefish Hook sectors	Jackass morwong (*Nemadactylus macropterus*)	
SESSF: Commonwealth Trawl Sector	John dory (*Zeus faber*)	
SESSF: Commonwealth Trawl Sector	Mirror dory (*Zenopsis nebulosa*)	
SESSF: Commonwealth Trawl Sector	Ocean jacket, eastern zone (*Nelusetta ayraud*)	
SESSF: Commonwealth Trawl and Scalefish Hook sectors	Ocean perch (*Helicolenus barathri*, *H. percoides*)	
SESSF: Commonwealth Trawl Sector	Orange roughy, Cascade Plateau (*Hoplostethus atlanticus*)	
SESSF: Commonwealth Trawl Sector	Orange roughy, eastern zone (*Hoplostethus atlanticus*)	
SESSF: Commonwealth Trawl Sector	Orange roughy, southern zone (*Hoplostethus atlanticus*)	
SESSF: Commonwealth Trawl Sector	Orange roughy, western zone (*Hoplostethus atlanticus*)	

continued ...

TABLE 1.3 Biological stock status of all stocks assessed in 2015, and their status since 1992 continued

Fishery	Common name (scientific name)	Status
SESSF: Commonwealth Trawl Sector	Oreodory: smooth, Cascade Plateau (*Pseudocyttus maculatus*)	
SESSF: Commonwealth Trawl Sector	Oreodory: smooth, non–Cascade Plateau (*Pseudocyttus maculatus*)	
SESSF: Commonwealth Trawl Sector	Oreodory: other (*Neocyttus rhomboidalis, Allocyttus niger, A. verrucosus*)	
SESSF: Commonwealth Trawl and Scalefish Hook sectors	Pink ling (*Genypterus blacodes*)	
SESSF: Commonwealth Trawl Sector	Redfish, eastern (*Centroberyx affinis*)	
SESSF: Commonwealth Trawl and Scalefish Hook sectors	Ribaldo (*Mora moro*)	
SESSF: Commonwealth Trawl Sector	Royal red prawn (*Haliporoides sibogae*)	
SESSF: Commonwealth Trawl and Scalefish Hook sectors	Silver trevally (*Pseudocaranx georgianus*)	
SESSF: Commonwealth Trawl Sector	Silver warehou (*Seriolella punctata*)	

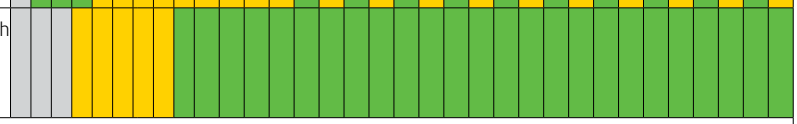
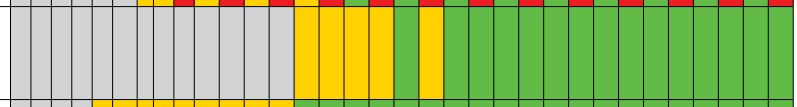
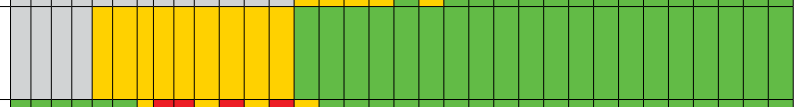
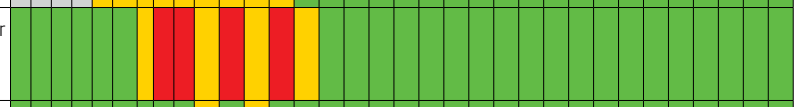
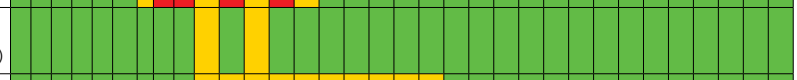
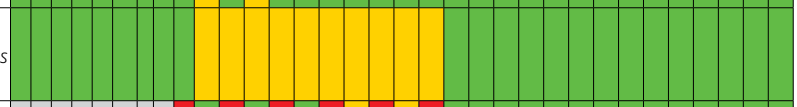
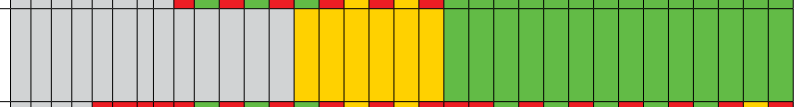
continued ...

TABLE 1.3 Biological stock status of all stocks assessed in 2015, and their status since 1992 continued

Fishery	Common name (scientific name)	Status
		1992
		1993
		1994
		1996
		1997
		1998
		1999
		2001–02
		2002–03
		2004 Fishing mortality
		2004 Biomass
		2005 Fishing mortality
		2005 Biomass
		2006 Fishing mortality
		2006 Biomass
		2007 Fishing mortality
		2007 Biomass
		2008 Fishing mortality
		2008 Biomass
		2009 Fishing mortality
		2009 Biomass
		2010 Fishing mortality
		2010 Biomass
		2011 Fishing mortality
		2011 Biomass
		2012 Fishing mortality
		2012 Biomass
		2013 Fishing mortality
		2013 Biomass
		2014 Fishing mortality
		2014 Biomass
		2015 Fishing mortality
		2015 Biomass
SESSF: East Coast Deepwater Trawl Sector	Alfonsino (*Beryx splendens*)	
SESSF: Great Australian Bight Trawl Sector	Bight redfish (*Centroberyx gerrardi*)	
SESSF: Great Australian Bight Trawl Sector	Deepwater flathead (*Platycephalus conatus*)	
SESSF: Great Australian Bight Trawl Sector	Ocean jacket, west (*Nelusetta ayraud*)	
SESSF: Great Australian Bight Trawl Sector	Orange roughy (*Hoplostethus atlanticus*)	
SESSF: Shark Gillnet and Shark Hook sectors	Elephantfish (*Callorhinchus milii*)	
SESSF: Shark Gillnet and Shark Hook sectors	Gummy shark (*Mustelus antarcticus*)	
SESSF: Shark Gillnet and Shark Hook sectors	Sawshark (*Pristiophorus cirratus*, *P. nudipinnis*)	
SESSF: Shark Gillnet and Shark Hook sectors	School shark (*Galeorhinus galeus*)	
Southern Squid Jig Fishery	Gould's squid (*Nototodarus gouldi*)	
Western Deepwater Trawl Fishery	Bugs (*Ibacus* spp.)	

continued ...

TABLE 1.3 Biological stock status of all stocks assessed in 2015, and their status since 1992 continued

Fishery	Common name (scientific name)	Status
Western Deepwater Trawl Fishery	Ruby snapper (*Etelis carbunculus*)	
Macquarie Island Toothfish Fishery	Patagonian toothfish (*Dissostichus eleginoides*)	
Stocks in fisheries managed jointly by the Australian Government		
South Tasman Rise Trawl Fishery	Orange roughy (*Hoplostethus atlanticus*)	
Torres Strait Finfish Fishery	Coral trout (*Plectropomus* spp., *Variola* spp.)	
Torres Strait Finfish Fishery	Spanish mackerel (*Scomberomorus commerson*)	
Torres Strait Tropical Rock Lobster Fishery	Tropical rock lobster (*Panulirus ornatus*)	
Torres Strait Prawn Fishery	Brown tiger prawn (*Penaeus esculentus*)	
Torres Strait Prawn Fishery	Blue endeavour prawn (*Metapenaeus endeavouri*)	
Torres Strait Bêche-de-mer Fishery	Black teatfish (*Holothuria whitmaei*)	
Torres Strait Bêche-de-mer Fishery	Prickly redfish (*Thelenota ananas*)	
Torres Strait Bêche-de-mer Fishery	Sandfish (*Holothuria scabra*)	

continued ...

TABLE 1.3 Biological stock status of all stocks assessed in 2015, and their status since 1992 continued

Fishery	Common name (scientific name)	Status
		1992
		1993
		1994
		1996
		1997
		1998
		1999
		2001–02
		2002–03
		2004 Fishing mortality
		2004 Biomass
		2005 Fishing mortality
		2005 Biomass
		2006 Fishing mortality
		2006 Biomass
		2007 Fishing mortality
		2007 Biomass
		2008 Fishing mortality
		2008 Biomass
		2009 Fishing mortality
		2009 Biomass
		2010 Fishing mortality
		2010 Biomass
		2011 Fishing mortality
		2011 Biomass
		2012 Fishing mortality
		2012 Biomass
		2013 Fishing mortality
		2013 Biomass
		2014 Fishing mortality
		2014 Biomass
		2015 Fishing mortality
		2015 Biomass
Torres Strait Bêche-de-mer Fishery	White teatfish (*Holothuria fuscogilva*)	
Torres Strait Bêche-de-mer Fishery	Other sea cucumbers (up to 18 spp.)	
Torres Strait Trochus Fishery	Trochus (*Trochus niloticus*)	
Eastern Tuna and Billfish Fishery	Striped marlin (*Tetrapturus audax*)	
Eastern Tuna and Billfish Fishery	Swordfish (*Xiphias gladius*)	
Eastern Tuna and Billfish Fishery	Albacore (*Thunnus alalunga*)	
Eastern Tuna and Billfish Fishery	Bigeye tuna (*Thunnus obesus*)	
Eastern Tuna and Billfish Fishery	Yellowfin tuna (*Thunnus albacares*)	
Skipjack Tuna Fishery: Pacific Ocean	Skipjack tuna (*Katsuwonus pelamis*)	
Skipjack Tuna Fishery: Indian Ocean	Skipjack tuna (*Katsuwonus pelamis*)	
Southern Bluefin Tuna Fishery	Southern bluefin tuna (*Thunnus maccoyii*)	
Western Tuna and Billfish Fishery	Striped marlin (*Tetrapturus audax*)	
Western Tuna and Billfish Fishery	Swordfish (*Xiphias gladius*)	
Western Tuna and Billfish Fishery	Albacore (*Thunnus alalunga*)	
Western Tuna and Billfish Fishery	Bigeye tuna (*Thunnus obesus*)	
Western Tuna and Billfish Fishery	Yellowfin tuna (*Thunnus albacares*)	

continued ...

TABLE 1.3 Biological stock status of all stocks assessed in 2015, 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		2014		2015	
											Fishing mortality	Biomass	Fishing mortality	Biomass	Fishing mortality	Biomass	Fishing mortality	Biomass	Fishing mortality	Biomass	Fishing mortality	Biomass	Fishing mortality	Biomass	Fishing mortality	Biomass	Fishing mortality	Biomass	Fishing mortality	Biomass	Fishing mortality	Biomass	Fishing mortality	Biomass	Fishing mortality	Biomass
Heard Island and McDonald Islands Fishery	Mackerel icefish (*Champsocephalus gunnari*)																																				
Heard Island and McDonald Islands Fishery	Patagonian toothfish (*Dissostichus eleginoides*)																																				
CCAMLR eExploratory toothfish fisheries	Toothfish (*Dissostichus eleginoides*, *D. mawsoni*)																																				

Notes: **CCAMLR** Commission for the Conservation of Antarctic Marine Living Resources. **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. Grey shading indicates that the stock was not assessed.

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

Electronic monitoring gear on a vessel
Matt Daniel, AFMA

1.3 Economic status

Assessing economic status

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. Economic status is expressed in relation to the target reference points prescribed by the HSP, which are set at more conservative levels than the limit reference points used to assess biological status. The economic status indicates whether the biomass level is at a point that is consistent with achieving the HSP target reference point—a point consistent with achieving maximum economic yield (MEY). Below this point, the stock is considered to be economically overfished.

Although biomass estimates indicate whether the economic target reference point is being achieved, determination of whether economic overfishing is occurring requires consideration of the annual biomass movement with respect to the target reference point. When biomass is below the target reference point and, over time, moving further away from it, economic overfishing is occurring, and rebuilding of the stock would be required to bring the biomass closer to the reference point.

Determining whether economic performance of a fishery is improving (moving closer to the economic target reference point) or deteriorating (moving away from the economic target reference point) is constrained by data limitations and relies on interpretation of a number of economic indicators. For example, an increasing trend in fishery-level NER driven predominantly by an increasing trend in the economic productivity of a fishery provides a strong indicator that the fishery biomass is moving closer to its economic target reference point. However, an increasing trend in fishery-level NER caused predominantly by favourable movements in market prices for inputs and outputs is not conclusive evidence that the fishery is moving closer to its target, because changes in market prices change the position of the economic target reference point.

Direct estimates of NER are only available for key Commonwealth fisheries for which ABARES routinely assesses financial and economic performance by surveying industry. Where direct estimates of NER are not available, a range of indicators are used to assess the economic performance of fisheries, and to make inferences about trends in NER. Effects of management arrangements and performance of the fishery against the HSP's MEY objective are also assessed. For jointly managed fisheries (to which the HSP does not apply), economic performance is evaluated against relevant management objectives. Table 1.4 presents a summary of indicators of economic performance.

Economic status in 2014–15

Fishery status reports 2016 assesses the economic status of all fisheries managed solely and jointly by the Australian Government. These fisheries generated an estimated gross value of production (GVP) of $348.0 million in 2014–15, contributing 22 per cent of Australia's wild catch fisheries GVP ($1.6 billion).

The Commonwealth fisheries GVP is dominated by production from four major fisheries that together accounted for 71 per cent of total fishery GVP. In 2014–15, the Northern Prawn Fishery (NPF) was the most valuable fishery, with a GVP of $106.8 million. The multisector SESSF was the second most valuable Australian Government–managed fishery, with a GVP of $68.0 million (Figure 1.5). The wild-catch sector of the Southern Bluefin Tuna Fishery (SBTF) and the ETBF also made substantial contributions to fisheries GVP in 2014–15, with values of $36.8 million and $35.0 million, respectively.

FIGURE 1.5 Gross value of production of fisheries managed solely or jointly by the Australian Government, 2004–05 to 2014–15

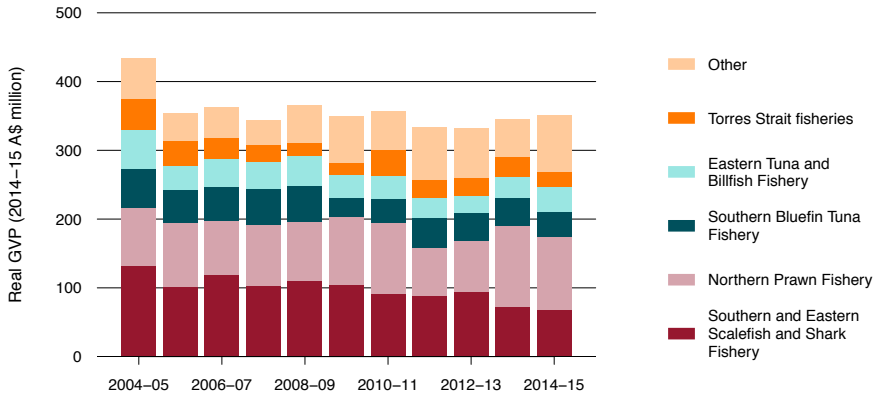


TABLE 1.4 Indicators and summary of economic status of Commonwealth fisheries for 2014–15

Fishery	Performance relative to MEY target	NER trend	Fishing right latency in fishing season	2014–15 fishery GVP (% change from 2013–14)
Bass Strait Central Zone Scallop Fishery	MEY target not specified	Negative in 2009–10 and 2010–11 (–$1.1 million)	Low uncaught TAC	$2.8 million (+460%)
Coral Sea Fishery	MEY target not specified	Not available	High uncaught TAC in the non-aquarium part of the fishery	Confidential
Norfolk Island Fishery	MEY target not specified	Not available	Offshore fishery closed to commercial fishing. Unknown in the inshore fishery	Not available
Northern Prawn Fishery	Tiger prawn stocks approaching B_{MEY} target. MEY targets not specified for banana prawn	Positive and increasing	Low unused effort	$106.8 million (–7%)
North West Slope Trawl Fishery	MEY target not specified	Not available	High non-participation by licence holders	Confidential
Small Pelagic Fishery	MEY target not specified	Not available	High uncaught TAC, typically over 90%, but reduced latency in the 2015–16 fishing season (70%)	Confidential
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 but decreasing	High uncaught TAC (above 50% in the 2014–15 and 2015–16 fishing seasons	$38.4 million (–7%)
SESSF: East Coast Deepwater Trawl Sector	Fishing mortality below economic target reference point	Not available	High uncaught TAC (100%)	Confidential
SESSF: Great Australian Bight Trawl Sector	Bight redfish above B_{MEY} target. Deepwater flathead just below B_{MEY} target	Not available but likely to be positive, but have decreased	High uncaught TAC (70%)	$8.5 million (–24%)
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 GHTS. Estimated to remain negative in 2011–14	Low uncaught TAC	$16.9 million (+7%)
Southern Squid Jig Fishery	MEY target not specified	Not available	High non-participation by licence holders	Confidential
Western Deepwater Trawl Fishery	MEY target not specified	Not available	High non-participation by licence holders	Confidential

2014–15 management costs (% share of GVP)	Primary management instrument	Comments about economic status
0.3 million (9%)	ITQs and spatial management	NER are likely to have improved since 2010–11 when NER were –$1.1 million, because similar levels of GVP are generated with lower effort levels, and lower management and fuel costs.
$0.1 million (confidential)	Catch triggers and TACs	Estimates of NER are not available. Catch in the Aquarium Sector declined substantially in 2014–15; however, because of a lack of information about the mix of fish caught, it is unclear how this affected NER. Catch and effort declined in the remainder of the fishery in 2014–15, including in the Sea Cucumber Sector, especially for white teatfish and prickly redfish. A high degree of latent effort in the non-aquarium part of the fishery suggests low NER.
Not available	Input controls	Economic status is unknown.
$2.3 million (2%)	Individual transferable gear units (headrope length)	The Northern Prawn Fishery was surveyed in 2015, which provided estimates of NER for the 2012–13 and 2013–14 financial years. NER were estimated at $5 million in 2012–13 and continued to improve in 2013–14 to $12 million as a result of improved prices. In 2014–15, lower fuel prices and improved banana prawn prices indicate positive signs for NER in the fishery.
$0.09 million (confidential)	Limited entry and catch triggers	Estimates of NER are not available, although the high degree of latent effort indicates that NER are likely to be low.
$0.6 million (confidential)	ITQs	Estimates of NER are not available for 2014–15 or 2015–16. An increase in the catch in 2014–15 and 2015–16 suggests that GVP is likely to have increased. Changes in NER are uncertain because of a lack of information about changes in cost structures of the industry.
$3.0 million for CTS (8% of CTS GVP)	ITQs	NER for the CTS were $4.2 million in 2012–13 and $1.4 million in 2013–14 (preliminary). NER have been positive since 2002–03, partly driven by increased economic productivity, and lower fuel prices since 2014 have likely maintained this performance. Some key species are close to their B_{MEY} targets, but economic status could still be improved with rebuilding of some overfished stocks. The disinclination of fishers to fish-down blue grenadier stock may suggest that the proxy target is misaligned with the MEY objective, at least in the short term.
$0 million (confidential)	ITQs	A high level of latency indicates low NER.
$0.6 million (7%)	ITQs	NER are likely to have increased slightly in 2014–15, because the positive impacts of lower effort and lower fuel price are likely to have offset the negative impact of falling GVP.
$2.3 million for GHTS (15% of GHTS GVP)	ITQs	NER in 2012–13 were –$2.9 million. Preliminary estimates for 2013–14 indicate that NER are likely to remain negative. Although gummy shark biomass is above the level associated with MEY, the management of non-target species and marine mammal interactions has likely contributed to a fall in NER in recent years.
$0.07 million (confidential)	Individual transferable gear units (jig machines)	Latent effort in the fishery remains high, but has decreased in the 2015 fishing season. The increased effort and higher catch levels in the 2015 fishing season suggest that NER may have improved.
$0.02 million (confidential)	Limited entry	No fishing activity occurred in the fishery during the 2015 fishing season. Estimates of NER for previous years are not available, but decline in 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 2014–15 continued

Fishery	Performance relative to MEY target	NER trend	Fishing right latency in fishing season	2014–15 fishery GVP (% change from 2013–14)
Torres Strait Finfish Fishery	Not applicable **c**	Not available	Not applicable	$1.1 million (–26%)
Torres Strait Tropical Rock Lobster Fishery	Not applicable **c**	Not available	Low uncaught TAC	$12.2 million (–42%)
Torres Strait Prawn Fishery	Not applicable **c**	Negative	High unused effort	$9.5 million (+64%)
Torres Strait Bêche-de-mer and Trochus fisheries	Not applicable **c**	Not available	Low uncaught quota for teatfish; high for all other stocks	Not available
Eastern Tuna and Billfish Fishery	MEY target not adequately specified or applied	Increasing trend; turned positive in 2010–11	Low uncaught quota for striped marlin, swordfish and yellowfin tuna; high for albacore and bigeye tuna	$35.0 million (+12%)
Skipjack Tuna Fishery	MEY target not specified	No fishing	High non-participation by licence holders	No fishing
Southern Bluefin Tuna Fishery	MEY target not specified	Not available but likely to be positive	Low uncaught TAC	$36.8 million (–7%)
Western Tuna and Billfish Fishery	MEY target not specified	Not available	High uncaught TAC (greater than 95% in the 2014 and 2015 fishing seasons)	Confidential
Heard and McDonald Islands Fishery	Not applicable **c**	Not available but likely to be positive	Low uncaught TAC	Confidential
Macquarie Island Toothfish Fishery	Not applicable **c**	Not available but likely to be positive	Low uncaught TAC	Confidential

2014–15 management costs (% share of GVP)	Primary management instrument	Comments about economic status
Not available	Non-tradeable quota	Estimates of NER are not available. Economic performance in 2014–15 remains uncertain because the effect on revenue of lower prices received and lower catch may have been offset by lower fishing costs.
Not available	Limited entry, size limits, gear limits and bag limits	NER are likely to have declined in 2014–15, as effort applied to the fishery increased but GVP declined. The fishery is meeting its objective to provide commercial opportunities for Traditional Inhabitants, but it is uncertain whether its objective to optimise value is being met.
$0.3 million (3%, AFMA costs only)	Tradeable effort units (nights)	NER for the fishery were negative in 2012–13, at –$2.3 million. No estimates of NER are available for 2013–14 or 2014–15. Increases in catch and GVP, and lower fuel prices suggest that NER in 2014–15 increased. However, substantial latency in the fishery suggests that NER are below potential.
Not available	TACs	Estimates of NER are not available.
$1.4 million (4%)	ITQs	NER remained positive in 2013–14 (preliminary estimate) after a long period of negative NER (2001–02 to 2009–10). NER for 2014–15 are likely to have increased as a result of higher GVP and lower fuel prices. The move to individual transferable quotas and a new harvest strategy may be supporting increases in NER; however, neither have been implemented long enough to determine whether there has been a positive effect.
$0.06 million (no fishing)	Limited entry	No Australian vessels fished in 2014 or 2015. Fishing is opportunistic, and highly dependent on availability and the domestic cannery market.
$0.9 million (2%)	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.
$0.3 million (confidential)	ITQs	Latency remained high in 2015, with only a small proportion of the total allowable commercial catch caught, suggesting low NER.
$1.6 million (confidential)	ITQs	Estimates of NER are not available but were most likely positive in 2013–14 and 2014–15 because the TACs for mackerel icefish and Patagonian toothfish were mostly caught.
$0.4 million (confidential)	ITQs	Estimates of NER are not available but were most likely positive in 2013–14 and 2014–15 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 GHTS, 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. **GHTS** 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. The South Tasman Rise Trawl Fishery is not shown because it has been closed since 2007.

Fisheries managed solely by the Australian Government

The ABARES financial and economic surveys are important for estimating NER and thereby assessing the economic performance of fisheries managed by the Australian Government. NER provide a full account of the return to the community from managing fisheries because they include all revenues earned and costs incurred. These costs include economic costs (for example, use of family labour in the business, economic depreciation), fishery management costs (including those components not cost recovered from industry) and the full cost of fuel–that is, inclusive of fuel tax credits gained by the fishery. As a result, NER are typically lower than aggregate fishery profitability derived through an accounting framework, because only explicit costs and revenues are considered in deriving estimates of profits.

ABARES undertakes regular economic surveys of the most valuable fisheries managed solely by the Australian Government: the CTS, and the Gillnet, Hook and Trap Sector (GHTS) of the SESSF; and the NPF. These fisheries are managed under the MEY objectives. Together, they accounted for 48 per cent of the GVP of all Australian Government–managed fisheries in 2014–15.

The NPF is explicitly managed to an MEY target for the tiger prawn (*Penaeus esculentus*) component of the fishery, using a bio-economic model to set effort levels that are estimated to produce MEY. NER in the NPF increased to $12 million in 2013–14 and continued to improve in 2014–15 as a result of improved prices (Bath & Green 2016). The bio-economic modelling for tiger prawn has allowed this component of the fishery to improve its economic performance. The identification and application of effort levels that achieve MEY from fishing for tiger prawns has led to an increase in spawning stock levels and reduced fishing costs.

In the CTS and the GHTS, MEY is targeted through the application of proxies for B_{MEY}. 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 NER can be improved by fishing down stocks to the B_{MEY} target. For the CTS, estimates of NER increased from $1.7 million in 2005–06 to $4.5 million in 2011–12. Since then, NER are estimated to have decreased substantially by 2013–14, following a 29 per cent decrease in GVP generated in the fishery in that year. In the GHTS, 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, as spatial closures aimed at reducing marine mammal interactions and efforts to avoid school shark affected the sector's economic performance (Skirtun & Green 2015).

In the Great Australian Bight Trawl Sector (GABTS), the development of a bio-economic 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 assessments for bight redfish and deepwater flathead indicate biomass levels are above the B_{MEY} target and NER can be improved by increased fishing effort.

The TAC for the Heard Island and Macdonald Islands Fishery (HIMIF) was almost fully caught in the 2013–14 and 2014–15 fishing seasons, mainly as a result of improved sea conditions. This suggests that NER is likely to be positive for the fishery.

Low catch-and-effort levels in the other fisheries (Bass Strait Central Zone Scallop Fishery, Coral Sea Fishery, East Coast Deepwater Trawl Sector, North West Slope Trawl Fishery, SPF, Southern Squid Jig Fishery and Western Deepwater Trawl Fishery) indicate low NER in these fisheries in 2014–15.

Jointly managed fisheries

Of the fisheries jointly managed by the Australian Government, major fisheries in value terms include the SBTF, the ETBF and the Torres Strait Tropical Rock Lobster Fishery (TSTRLF). In 2014–15, these fisheries generated GVP of $36.8 million, $35.0 million and $12.2 million, respectively. Combined, these three fisheries accounted for 24 per cent of the GVP of all Australian Government–managed fisheries in 2014–15.

Estimates of NER are not available for the SBTF. However, the fishery provides fish to South Australia's southern bluefin tuna aquaculture industry (generating a GVP of $131 million). Although the stock's current low biomass level poses a risk to the future flow of NER from the fishery, the current international management arrangements, which are designed to allow the stock to rebuild, would be expected to improve NER in future.

Economic status in the ETBF has improved. Based on the most recent estimates, 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, with a decrease in operating costs outweighing a decline in revenue. The NER estimates for 2012–13 are not available and are uncertain. 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. As a result, these fisheries are not evaluated against the MEY objective of the HSP in these reports, and achieving the fishery's economic potential needs to be considered alongside the social and cultural objectives of Torres Strait Islander and Aboriginal people. The TSTRLF was the most valuable commercial fishery in Torres Strait in 2014–15, followed by the Torres Strait Prawn Fishery.

Latency in fisheries

In many fisheries, the degree of latency—that is, the proportion of TAC left uncaught, or the level of non-participation by licence holders—is high (Table 1.4). High levels of latency indicate that the economic incentive to participate actively in the fishery is lacking and that the overall economic performance of the fishery is likely to be low. In general, input controls, such as allowable effort, and output controls, such as TACs, should be set in line with the aim of achieving MEY. If fishers collectively are fishing below the TAC, then fishers their economically profitable opportunities are being foregone as, the MEY target has been set too high or there are practical difficulties preventing fishers catching to the MEY target.

For some fisheries the degree of latency can be explained in terms of the type of fishery and industry structure. For example, for some jointly managed fisheries where Australia maintains an economic interest, latency may be high because the negotiated TAC for Australian fishers is not set according to MEY criteria. For some fisheries managed solely by the Australian Government, the fleet structure of the fishery may not be well aligned with the MEY target, and hence the TAC remains uncaught at the end of the fishing season. For example, the introduction of a factory vessel into the SPF of a factory trawler has led to reduced latency in that fishery in the 2015–16 fishing season. For some fisheries managed solely by the Australian Government the reasons for a high degree of latency to persist remain unclear and warrant further investigation.

For example, a number of species in the SESSF fishery have increasingly been under caught in terms of their TAC in recent seasons and the reasons for the under catch require investigation so that appropriate management responses can be undertaken.

The MEY target can be set higher than the optimum level for a number of reasons, including that:

- estimating MEY targets requires investments in data collection and modelling that are constrained by available resources; managers therefore frequently use proxy targets that may not be optimal for a given species or multispecies stock
- market conditions, such as fish prices or input prices for fuel and labour, may have changed, making a model-derived MEY target and/or proxy redundant
- a stock may be less abundant than anticipated, or located further afield, and thus more costly to catch
- regulatory changes in gear or spatial restrictions may mean that it is no longer economically profitable to catch to the previous MEY target.

Practical considerations sometimes make it difficult to catch to the MEY target. For example, an undercaught species may be co-caught with a targeted high-value species that has been fished to quota. Targeting the undercaught species may be too costly or impractical within a season. Similarly, a reduction in quota for a target species will likely reduce the catch of co-caught species. MEY targets designed for multispecies fisheries would help to address this cause of undercatch. As well, fishers may not be able to obtain quota for the undercaught species because of the costs involved in obtaining quota in a market with few transactions.

1.4 Environmental status in 2015

The Fishery Status Reports examines the broader impact of fisheries on the environment, in response to the requirements of the *Fisheries Management Act 1991* and the EPBC Act. The Australian Government aims to implement an ecosystem-based approach to fisheries management as part of meeting the principles of ecologically sustainable development. This requires a holistic approach to management that considers fisheries' interactions with, and impacts on, bycatch species (including protected species), marine habitats, communities and ecosystems.

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, and detail AFMA's management response. Fishery-specific actions with respect to bycatch and discarding are identified in fishery-specific bycatch and discarding workplans.

Commonwealth Policy on Fisheries Bycatch

The Commonwealth Policy on Fisheries Bycatch 2000 (bycatch policy) was reviewed in 2012. The main objectives of the policy are to reduce bycatch, to improve protection of vulnerable species and to arrive at decisions on the acceptable extent of ecological impacts (DAFF 2013a). The review of the bycatch policy found that a revised policy would be best developed within a framework of policy instruments for fisheries management that address all relevant aspects of fisheries management and its effect on the marine environment.

Cumulative impacts

The wide distribution of many protected 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 can be significant. Data constraints limit the assessment and understanding of cumulative impacts across fisheries and jurisdictions (Phillips et al. 2010). The current bycatch policy does not explicitly address the issue of cumulative effects on bycatch species. The bycatch policy review found that a revised policy should identify approaches to assessing and managing cumulative effects as a priority (DAFF 2013a).

Protected species interactions

During the normal course of fishing operations, fishers can interact with protected species listed under the EPBC Act. Legislation requires them to take all reasonable steps to minimise interactions and report any interactions that occur. AFMA reports interactions with protected species reported by fishers in logbooks to the Australian Government Department of the Environment and Energy on a quarterly basis. The species involved and the level of interactions vary between fisheries and sectors, as well as with gear, area and season. Although interactions with protected species are usually rare, they can still be a significant source of mortality for the affected populations.

Considerable progress has been made in some fisheries to implement measures to reduce interactions with protected species. Some examples are:

- compulsory use of turtle excluder devices in the NPF
- development of a threat abatement plan for the incidental catch (or bycatch) of seabirds during pelagic longline fishing operations in the ETBF, the WTBF and Macquarie Island Toothfish Fishery
- use of seal excluder devices in the SPF and in the winter blue grenadier trawl fishery of the SESSF
- gillnet fishing closures in the Shark Gillnet and Shark Hook sectors of the SESSF to avoid interactions with Australian sea lions.

Recently there has been a focus on seabird interactions with trawl fisheries. Following sea trials in 2015 to assess the impact of two new devices designed to reduce seabird interactions, from 1 May 2017, all vessels in the CTS and GABTS fisheries must use one of the following mitigation devices: sprayers, bird bafflers or pinkies (large floats attached in front of trawl warps to scare birds away), with zero discharge of fish waste.

Data collection

Limited availability of reliable data on interactions with protected species remains problematic in some fisheries. The rare nature of interactions with protected species creates a challenge for obtaining reliable estimates of interaction rates, particularly at lower levels of observer coverage. Reliable data are critical for determining the extent of interactions, evaluating the potential impact on populations (particularly for high-risk species) and demonstrating the effectiveness of management measures.

AFMA has continued to strengthen independent monitoring capabilities by introducing electronic monitoring programmes in several fisheries and subfisheries to improve logbook reporting and for logbook verification of interactions with protected species. Indeed, a preliminary comparison of catch and discard data for target and bycatch species, as well as wildlife interactions, recorded in logbooks before the introduction of e-monitoring and afterwards shows a marked change in most cases after e-monitoring was introduced, indicating that fishers are recording data in their logbooks more accurately than before e-monitoring was implemented (Larcombe et al. 2016).

Electronic monitoring became mandatory on 1 September 2014 for boats using automatic demersal longline gear, and on 1 July 2015 for gillnet boats that fish more than 50 days per year and manual demersal longline boats that fish more than 100 days per year. Electronic monitoring became mandatory in the ETBF and the WTBF on 1 July 2015 for pelagic longline boats that fish more than 30 days per year.

At a minimum, 10 per cent of the video footage is analysed at random, and a risk-based approach is used to audit more footage from boats that are suspected of misreporting. In the GHTS, all gillnet hauls are audited in the Australian sea lion management zones, to verify any protected species bycatch. More information on electronic monitoring can be found on the AFMA website.[1]

1 www.afma.gov.au/monitoring-enforcement/electronic-monitoring-program

1.5 Policy reviews

In May 2013, the Australian Government Department of Agriculture, Fisheries and Forestry (now the Department of Agriculture and Water Resources) released separate review reports on the HSP (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 the 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; implementing 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 the 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 development of a performance monitoring and reporting framework to evaluate the implementation and effectiveness of the bycatch policy.

The reports on the HSP and bycatch policy reviews 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 Commonwealth fisheries management undertaken by Mr David Borthwick, AO, PSM, in 2012. Both policies are now being revised; the current policy settings will continue to apply until this process is complete and new policies are adopted.

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