Chapter 1
Overview

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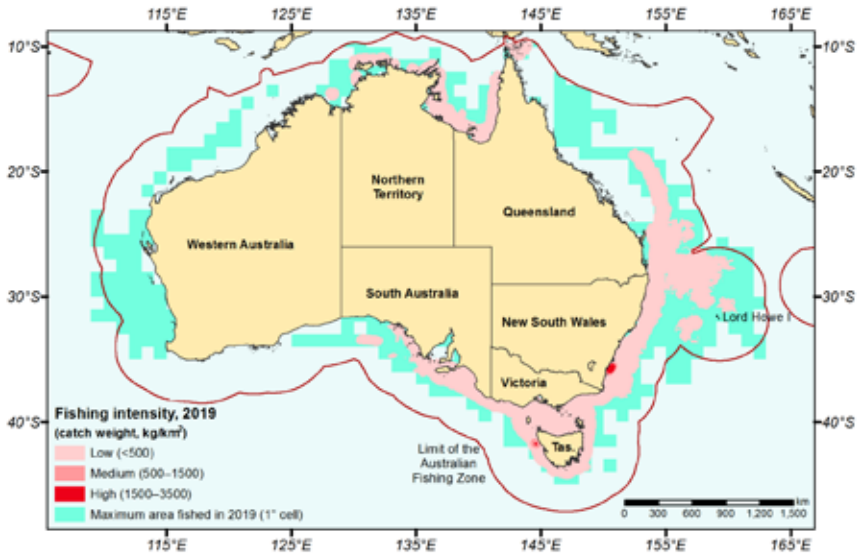
The Australian Government's approach to fisheries management includes maintaining fish stocks at ecologically sustainable levels and, within this context, maximising the net economic returns (NER) to the Australian community (Department of Agriculture and Water Resources 2018b). It also considers the 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 2020 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 2019 and over time, against the requirements of fisheries legislation and policy. The reports 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.

To complete these reports, ABARES uses data and information from agencies such as the Australian Fisheries Management Authority (AFMA) and regional fisheries management organisations such as the Commission for the Conservation of Southern Bluefin Tuna, the Indian Ocean Tuna Commission, and the Western and Central Pacific Fisheries Commission, among others. The reports use information on catch and fishing effort, along with 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. To compare status from year to year, biological status and environmental status are presented for 2019. Economic status is presented for the 2018–19 financial year.

FIGURE 1.1 Fishing intensity of all Australian Government–managed fisheries, 2019



1.1 Assessing biological status

Stock status addresses 2 questions—whether the current size of the fish stock is above the level at which the stock is considered to be overfished (biomass status) and whether current levels of fishing mortality (landed catch, discards and other sources of mortality) will cause the stock to become overfished (fishing mortality status). Stock status is expressed in relation to the reference points prescribed by the Commonwealth Fisheries Harvest Strategy Policy (HSP; Department of Agriculture and Water Resources 2018b).

Biomass (B) status typically relates to 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 relates to the level of fishing pressure on a stock—specifically, whether fishing mortality in the year(s) being assessed 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 are currently, or have been, an important part of a fishery.

Specifically, stocks may be included if they meet 1 or more of the criteria below:

- a species that represents a significant component of the fishery in terms of volume or value
- a species or stock managed under a total allowable catch (TAC)
- 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 1 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 (ERA) process for the fishery or sector.

Conversely, stocks may be removed from the reports if they cease to be an important part of a fishery (that is, the fishery changes practices or markets change). The following stocks will not be removed:

- a species or stock managed under a TAC
- a species or stock previously classified as 'overfished' that has not yet recovered to above the limit reference point.

1.2 Biological status in 2019

Fishery status reports 2020 assesses 96 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 31 stocks were assessed across 13 fisheries that are managed jointly by the Australian Government and 1 or more other Australian jurisdictions or other countries.

The status of the 96 fish stocks managed solely or jointly by the Australian Government in 2019 is summarised as follows:

- The number of stocks classified as not subject to overfishing (Figure 1.3) decreased to 78 (79 in 2018), and the number of stocks classified as not overfished (Figure 1.4) remained at 70 (70 in 2018). Of these, 66 stocks were both not subject to overfishing and not overfished (67 in 2018).
- The number of stocks classified as subject to overfishing (Figure 1.3) increased to 4 (2 in 2018), and the number of stocks classified as overfished (Figure 1.4) increased to 12 (11 in 2018). One stock remained classified as both overfished and subject to overfishing (1 in 2018).
- The number of stocks classified as uncertain with regard to fishing mortality decreased to 14 (15 in 2018), and the number of stocks classified as uncertain with regard to biomass decreased to 14 (15 in 2018). Of these, 6 stocks were uncertain with respect to both fishing mortality and biomass.

Status outcomes are summarised separately for stocks in fisheries solely managed by the Australian Government and stocks in fisheries that are jointly managed. This allows an evaluation of the performance of fisheries management against the relevant legislation and policies.

FIGURE 1.2 Biological status of fish stocks in 2019, by fishery or sector

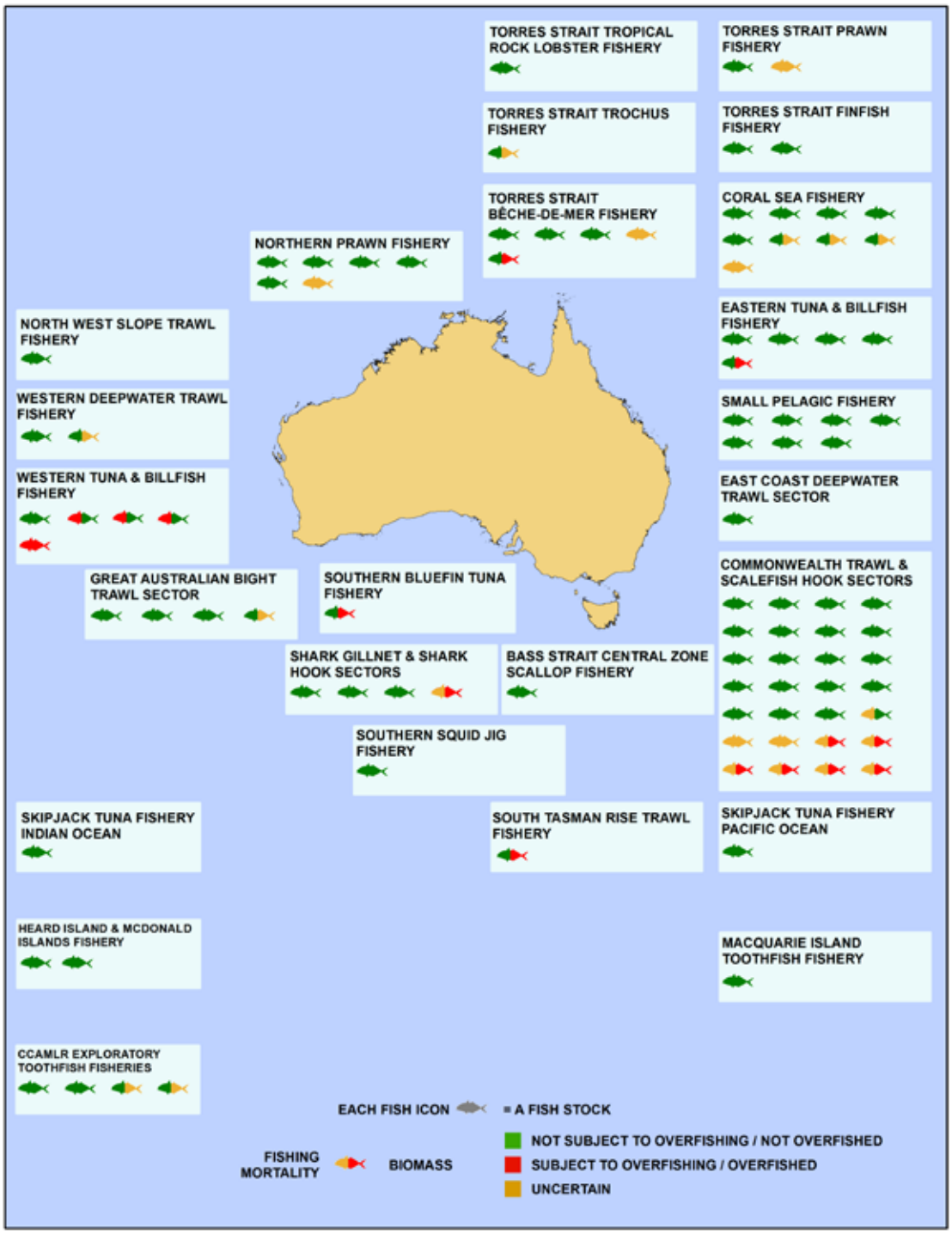


FIGURE 1.3 Fishing mortality status (number of stocks), 2004 to 2019

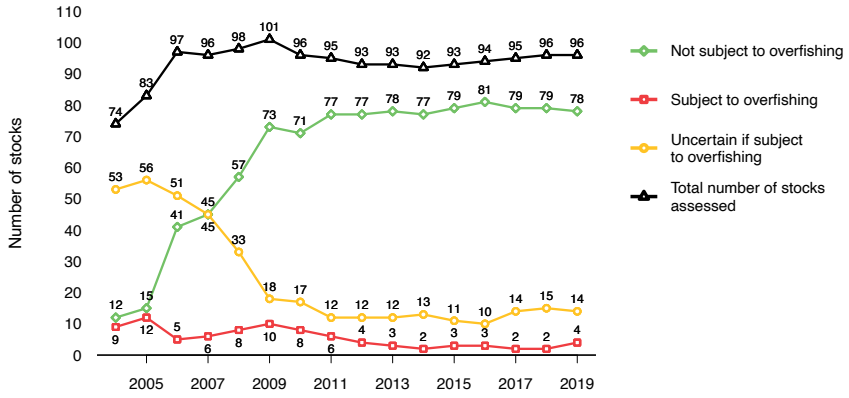
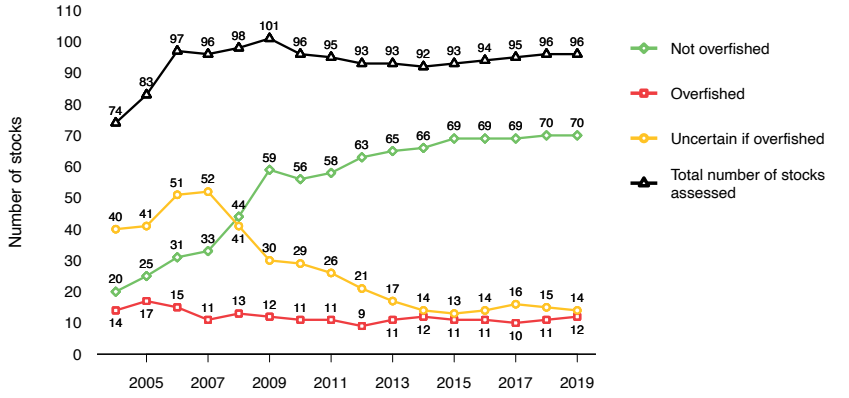


FIGURE 1.4 Biomass status (number of stocks), 2004 to 2019



Stocks that have changed status

Four stocks managed solely by the Australian Government changed status in 2019 (Table 1.1). In the Coral Sea Fishery, white teatfish (*Holothuria fuscogilva*) is considered not subject to overfishing as there was no commercial catch in 2018–19. In the Northern Prawn Fishery (NPF), redleg banana prawn (*Fenneropenaeus indicus*) are now considered not subject to overfishing as the low level of fishing mortality is unlikely to reduce the relatively high biomass to below the limit reference point. In the Southern and Eastern Scalefish and Shark Fishery (SESSF), the southern and western zone orange roughy (*Hoplostethus atlanticus*) stocks are considered uncertain for fishing mortality status in 2019. While in previous years both stocks were classified as not subject to overfishing, this was considered inappropriate when (similar to other rebuilding species) there are no reliable indicators to determine whether the current level of fishing mortality will allow the stock to rebuild to above the limit reference point within a biologically reasonable time frame. To ensure consistency in approach across like stocks, both the southern zone and western zone orange roughy stocks have been classified as uncertain with regard to fishing mortality status in 2019.

Four stocks in jointly managed fisheries changed status in 2019. The status of brown tiger prawn (*Penaeus esculentus*) in the Torres Strait Prawn Fishery is now considered to be not subject to overfishing and not overfished, based on the results of a 2019 assessment. The biomass status of striped marlin (*Kajikia audax*) stock in the Eastern Tuna and Billfish Fishery (ETBF) changed to overfished in 2019 because the stock assessment indicated the biomass was below the default limit reference point. In the Western Tuna and Billfish Fishery (WTBF), both the albacore (*Thunnus alalunga*) and bigeye tuna (*T. obesus*) stocks are now classified as subject to overfishing because updated stock assessments indicate that the fishing mortality rates are above that required to produce maximum sustainable yield (MSY).

TABLE 1.1 Stocks with a changed status in 2019 and their status in 2018

Fishery	Common name (scientific name)	2018		2019	
		Fishing mortality	Biomass	Fishing mortality	Biomass
Stocks in fisheries managed solely by the Australian Government					
Coral Sea Fishery	White teatfish *(Holothuria fuscogilva)*	Uncertain	Uncertain	Not subject to overfishing	Uncertain
Northern Prawn Fishery	Redleg banana prawn *(Fenneropenaeus indicus)*	Uncertain	Not overfished	Not subject to overfishing	Not overfished
Southern and Eastern Scalefish and Shark Fishery: Commonwealth Trawl Sector	Orange roughy, southern zone *(Hoplostethus atlanticus)*	Not subject to overfishing	Overfished	Uncertain	Overfished
Southern and Eastern Scalefish and Shark Fishery: Commonwealth Trawl Sector	Orange roughy, western zone *(Hoplostethus atlanticus)*	Not subject to overfishing	Overfished	Uncertain	Overfished
Stocks in fisheries managed jointly by the Australian Government					
Torres Strait Prawn Fishery	Brown tiger prawn *(Penaeus esculentus)*	Uncertain	Uncertain	Not subject to overfishing	Not overfished
Eastern Tuna and Billfish Fishery	Striped marlin *(Kajikia audax)*	Not subject to overfishing	Not overfished	Not subject to overfishing	Overfished
Western Tuna and Billfish Fishery	Albacore *(Thunnus alalunga)*	Not subject to overfishing	Not overfished	Subject to overfishing	Not overfished
Western Tuna and Billfish Fishery	Bigeye tuna *(Thunnus obesus)*	Not subject to overfishing	Not overfished	Subject to overfishing	Not overfished

Fishing mortality Not subject to overfishing; Subject to overfishing; Uncertain

Biomass Not overfished; Overfished; Uncertain

Stocks classified as overfished and/or subject to overfishing

Stocks classified as overfished and/or subject to overfishing in 2019 are largely the same as in 2018 for fisheries solely managed by the Australian Government, but there were 3 new stocks classified as overfished or subject to overfishing for jointly managed stocks (Tables 1.2 and 1.3). Table 1.2 summarises the status determinations and why the stocks were classified as overfished or subject to overfishing; the full details and evidence are provided in the relevant chapters. Briefly, 7 stocks in fisheries managed solely by the Australian Government were classified as overfished in 2019 (Tables 1.2 and 1.3). These stocks occur in the SESSF and are subject to stock rebuilding strategies. Blue warehou (*Seriolella brama*), eastern gemfish (*Rexea solandri*), orange roughy, gulper sharks (*Centrophorus harrissoni*, *C. moluccensis* and C. *zeehaani*) and school shark (*Galeorhinus galeus*) are also listed as conservation-dependent under the EPBC Act, which carries management requirements.

Eight stocks in jointly managed fisheries were classified as overfished or subject to overfishing in 2019 based on the results of updated stock assessments. This is 3 more stocks than in 2018 (Table 1.2). One stock, striped marlin in the WTBF, remains classified as both overfished and subject to overfishing.

Assessing status for overfished stocks

It is becoming increasingly difficult to assess status for a number of overfished stocks. This is a result of a range of factors, including uncertainty in the level of total fishing mortality (commercial catch, discards, recreational catch and post-release survival), uncertainty associated with the current biomass stemming from outdated and/or increasingly uncertain stock assessments, and uncertainty in the level of catch that would provide for rebuilding in the specified time frame (for example, the time frame articulated by rebuilding strategies).

A robust evaluation of the state of overfished stocks (biomass) and the fishing mortality required to rebuild those stocks is often outdated or increasingly uncertain. Examples include blue warehou (last published assessment in 2013) and eastern gemfish (last published assessment in 2010) (see Chapter 9 for further detail). Similarly, the last full assessment for school shark was published in 2009; this was the last time an estimate of relative biomass was provided. A close-kin mark recapture (CKMR) study, a relatively new technique being applied to fish stocks, led to an assessment of the school shark stock in 2019 (Thomson et al. 2019). This assessment estimated the future stock response to various fishing mortality rates, but was not able to provide an estimate of current biomass relative to unfished biomass (see Chapter 12 for further detail).

Quantitative assessments for long-term overfished stocks are typically not being updated because the time series of necessary data (for example, catch, effort, catch-per-unit-effort and/or biological data) required to update them has been disrupted, often by management efforts and interventions aimed at recovering the stocks (for example, zero commercial TACs), affecting the potential reliability of an updated assessment. While efforts to improve our understanding of the state of these stocks and their response to management intervention have begun (such as in the case of school shark and the CKMR work), this is not the case for all species. Further, assessment efforts to date have demonstrated limitations in what can be achieved (see Chapter 12 for a full description). These realities continue to make it difficult to evaluate the management performance (status) for overfished stocks.

Status of Australian fish stocks reports

In January 2019, the Fisheries Research and Development Corporation (FRDC) released *Status of Australian fish stocks reports 2018*, the fourth edition in the series. The reports intend to provide a national assessment of the status of key wild-capture fish stocks managed around Australia. The reports were initiated in 2012 by the FRDC and ABARES. They are developed collaboratively by the FRDC, ABARES, CSIRO, and government fishery research agencies in the states and territories.

The 2018 reports provide assessments for 406 stocks across 120 key species (or species complexes). The reports consider similar biological information to that considered by the *Fishery status reports*, but interpret that information within a nationally agreed classification system, which is different from that reported on in the *Fishery status reports* (see Appendix). *Status of Australian fish stocks reports 2020* is due to be released in late 2020.

TABLE 1.2 Stocks classified as overfished and/or subject to overfishing in 2019, and their status in 2018

Fishery	Common name (scientific name)	2018		2019		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. Biomass is below the limit reference point.
SESSF: CTS and SHS Chapter 9	Gemfish, eastern zone (*Rexea solandri*)					Uncertainty remains around total fishing mortality and rebuilding to the limit reference point within the specified time frame. Biomass is below the limit reference point.
SESSF: CTS and SHS Chapter 9	Gulper sharks (*Centrophorus harrissoni*, *C. moluccensis*, *C. zeehaani*)					Fishing mortality is uncertain despite low landed catch and protection through closures. Populations are likely to be highly depleted.
SESSF: CTS Chapter 9	Orange roughy, southern zone (*Hoplostethus atlanticus*)					No reliable indicators to determine whether current fishing mortality will allow stock to rebuild within the specified time frame. No updated stock assessment to estimate the biomass is available.

TABLE 1.2 Stocks classified as overfished and/or subject to overfishing in 2019, and their status in 2018 continued

Fishery	Common name (scientific name)	2018		2019		Comments
		Fishing mortality	Biomass	Fishing mortality	Biomass	
SESSF: CTS Chapter 9	Orange roughy, western zone (*Hoplostethus atlanticus*)					No reliable indicators to determine whether current fishing mortality will allow stock to rebuild within the specified time frame. No updated stock assessment to estimate the biomass is available.
SESSF: CTS Chapter 9	Redfish (*Centroberyx affinis*)					Catch is above the RBC, and it is unclear whether total removals are above the level that will allow rebuilding. Biomass is below the limit reference point.
SESSF: SGSHS Chapter 12	School shark (*Galeorhinus galeus*)					Uncertain if the current fishing mortality rate in will allow recovery within the specified time frame. Biomass is likely below 20% of unexploited levels.
Stocks in fisheries managed jointly by the Australian Government						
South Tasman Rise Trawl Fishery Chapter 28	Orange roughy (*Hoplostethus atlanticus*)					Fishery has been closed under domestic arrangements since 2007 because of stock depletion. No updated stock assessment to estimate the biomass is available.
Torres Strait Bêche-de-mer Fishery Chapter 19	Sandfish (*Holothuria scabra*)					No catch in 2019. The most recent full survey (2009) indicated that the stock was overfished.
Southern Bluefin Tuna Fishery Chapter 23	Southern bluefin tuna (*Thunnus maccoyii*)					The global TAC, set in line with the management procedure, should allow rebuilding within the prescribed time frame. The estimate of spawning biomass is below 20% of unfished biomass.
Eastern Tuna and Billfish Fishery Chapter 21	Striped marlin *(Kajikia audax)*					The current fishing mortality rate is below that required to produce MSY. The current estimate of biomass is below the default Commonwealth limit reference point.

continued ...

TABLE 1.2 Stocks classified as overfished and/or subject to overfishing in 2019, and their status in 2018 continued

Fishery	Common name (scientific name)	2018		2019		Comments
		Fishing mortality	Biomass	Fishing mortality	Biomass	
WTBF Chapter 24	Striped marlin (*Kajikia audax*)					The current fishing mortality rate exceeds that required to produce MSY. The current estimate of biomass is below the default Commonwealth limit reference point.
WTBF Chapter 24	Albacore *(Thunnus alalunga)*					The current fishing mortality rate is above that required to produce MSY. The most recent estimate of spawning biomass is above the default Commonwealth limit reference point.
WTBF Chapter 24	Bigeye tuna *(Thunnus obesus)*					The current fishing mortality rate is above that required to produce MSY. The most recent estimate of spawning biomass is above the default Commonwealth limit reference point.
WTBF Chapter 24	Yellowfin tuna (*Thunnus albacares*)					The current fishing mortality rate is above that required to produce MSY. The most recent estimate of spawning biomass is above the default Commonwealth limit reference point.

Notes: **CTS** Commonwealth Trawl Sector. **MSY** Maximum sustainable yield. **RBC** Recommended biological catch. **SESSF** Southern and Eastern Scalefish and Shark Fishery. **SGSHS** Shark Gillnet and Shark Hook sectors. **SHS** Scalefish Hook Sector. **TAC** Total allowable catch. **WTBF** Western Tuna and Billfish Fishery.

TABLE 1.3 Biological stock status of all stocks assessed in 2019, and their status since 2004

Fishery	Common name (scientific name)	Status																													
		2004		2005		2006		2007		2008		2009		2010		2011		2012		2013		2014		2015		2016		2017		2018		2019	
		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	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 species)																														
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																														

continued ...

TABLE 1.3 Biological stock status of all stocks assessed in 2019, and their status since 2004 continued

Fishery	Common name (scientific name)	Status																															
		2004		2005		2006		2007		2008		2009		2010		2011		2012		2013		2014		2015		2016		2017		2018		2019	
		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	Fishing mortality	Biomass	Fishing mortality	Biomass	Fishing mortality	Biomass
Northern Prawn Fishery	Redleg banana prawn (*Fenneropenaeus indicus*)																																
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*)																																

continued ...

TABLE 1.3 Biological stock status of all stocks assessed in 2019, and their status since 2004 continued

Fishery	Common name (scientific name)	Status																															
		2004		2005		2006		2007		2008		2009		2010		2011		2012		2013		2014		2015		2016		2017		2018		2019	
		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	Fishing mortality	Biomass	Fishing mortality	Biomass	Fishing mortality	Biomass
Small Pelagic Fishery	Redbait, east (*Emmelichthys nitidus*)																																
Small Pelagic Fishery	Redbait, west (*Emmelichthys nitidus*)																																
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 species)																																
SESSF: Commonwealth Trawl Sector	Deepwater sharks, western zone (18 species)																																
SESSF: Commonwealth Trawl Sector	Eastern school whiting (*Sillago flindersi*)																																
SESSF: Commonwealth Trawl Sector	Flathead (*Neoplatycephalus richardsoni* and 4 other species)																																
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 2019, and their status since 2004 continued

Fishery	Common name (scientific name)	Status																															
		2004		2005		2006		2007		2008		2009		2010		2011		2012		2013		2014		2015		2016		2017		2018		2019	
		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	Fishing mortality	Biomass	Fishing mortality	Biomass	Fishing mortality	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 (*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 2019, and their status since 2004 continued

Fishery	Common name (scientific name)	Status																															
		2004		2005		2006		2007		2008		2009		2010		2011		2012		2013		2014		2015		2016		2017		2018		2019	
		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	Fishing mortality	Biomass	Fishing mortality	Biomass	Fishing mortality	Biomass
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 (*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*)																																
SESSF: East Coast Deepwater Trawl Sector	Alfonsino (*Beryx splendens*)																																

continued ...

TABLE 1.3 Biological stock status of all stocks assessed in 2019, and their status since 2004 continued

Fishery	Common name (scientific name)	Status																															
		2004		2005		2006		2007		2008		2009		2010		2011		2012		2013		2014		2015		2016		2017		2018		2019	
		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	Fishing mortality	Biomass	Fishing mortality	Biomass	Fishing mortality	Biomass
SESSF: Great Australian Bight Trawl Sector	Bight redfish (*Centroberyx gerrardi*)																																
SESSF: Great Australian Bight Trawl Sector	Deepwater flathead (*Neoplatycephalus 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	Deepwater bugs (*Ibacus* spp.)																																
Western Deepwater Trawl Fishery	Ruby snapper (*Etelis carbunculus*)																																
Macquarie Island Toothfish Fishery	Patagonian toothfish (*Dissostichus eleginoides*)																																

continued ...

TABLE 1.3 Biological stock status of all stocks assessed in 2019, and their status since 2004 continued

Fishery	Common name (scientific name)	Status																													
		2004		2005		2006		2007		2008		2009		2010		2011		2012		2013		2014		2015		2016		2017		2018		2019	
		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	Fishing mortality	Biomass	Fishing mortality	Biomass
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*)																														
Torres Strait Bêche-de-mer Fishery	White teatfish (*Holothuria fuscogilva*)																														
Torres Strait Bêche-de-mer Fishery	Other sea cucumbers (up to 18 species)																														
Torres Strait Trochus Fishery	Trochus (*Trochus niloticus*)																														

continued ...

TABLE 1.3 Biological stock status of all stocks assessed in 2019, and their status since 2004 continued

Fishery	Common name (scientific name)	Status																													
		2004		2005		2006		2007		2008		2009		2010		2011		2012		2013		2014		2015		2016		2017		2018		2019	
		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	Fishing mortality	Biomass	Fishing mortality	Biomass
Eastern Tuna and Billfish Fishery	Striped marlin (*Kajikia 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 (*Kajikia 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 2019, and their status since 2004 continued

Fishery	Common name (scientific name)	Status																													
		2004		2005		2006		2007		2008		2009		2010		2011		2012		2013		2014		2015		2016		2017		2018		2019	
		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	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 exploratory toothfish fisheries 58.4.1	Toothfish (*Dissostichus mawsoni*)																														
CCAMLR exploratory toothfish fisheries 58.4.2	Toothfish (*Dissostichus mawsoni*)																														
CCAMLR exploratory toothfish fisheries 88.1	Toothfish (*Dissostichus mawsoni*)																														
CCAMLR exploratory toothfish fisheries 88.2	Toothfish (*Dissostichus mawsoni*)																														

Fishing mortality Not subject to overfishing; Subject to overfishing; Uncertain

Biomass Not overfished; Overfished; Uncertain

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.

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. At the stock level, economic status indicates whether the biomass is at a level that is consistent with achieving the HSP target reference point—a biomass target consistent with achieving maximum economic yield (MEY) from the fishery. When biomass is below the target reference point and/or declining away from this point, rebuilding of the stock is required to increase biomass and maximise NER. When biomass is above the target reference point, a higher level of fishing mortality (catch) is required to bring the stock down to the target reference point and maximise NER. At the fishery level, moving stocks towards their respective target reference points leads to an improvement in the economic status of the fishery and helps ensure that the economic objective of the *Fisheries Management Act 1991* is met.

Determining whether economic status of a fishery is improving or deteriorating 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 economic status of the fishery is improving. 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.

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 estimates 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, wages, 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, which only considers explicit costs and revenues in deriving estimates of profits. To assess economic status, movements in NER are assessed alongside other economic indicators, including the extent to which stocks managed in the fishery have moved closer to their respective economic target reference points.

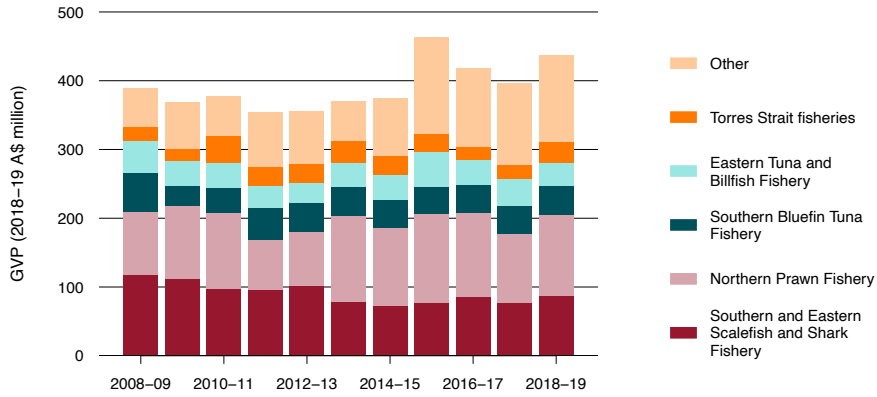
Direct estimates of NER are only available for key Commonwealth fisheries for which ABARES routinely assesses financial and economic performance by surveying industry. Where direct estimates of NER are not available, a range of indicators are used to assess the economic performance of fisheries, and 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 the relevant objectives for those fisheries. Table 1.4 summarises indicators of economic performance.

Economic status in 2018–19

Fishery status reports 2020 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 $437 million in 2018–19, accounting for 24% of wild-catch fisheries GVP in Australia ($1.79 billion).[1] These fisheries also accounted for about 14% of Australia's total fisheries and aquaculture GVP in 2018–19.

The 2018–19 Commonwealth fisheries GVP was dominated by production from 4 major fisheries that together accounted for 65% of total Commonwealth fisheries GVP. The NPF made a large contribution to overall Commonwealth fishery GVP, with a GVP of $117.6 million (27% contribution). The multisector SESSF was also a valuable Commonwealth fishery, with a GVP of $86.9 million (20% contribution). The wild-catch sector of the Southern Bluefin Tuna Fishery (SBTF) and the ETBF also made substantial contributions to fisheries GVP, with values of $43.4 million and $32.1 million, respectively (Figure 1.5).

FIGURE 1.5 Gross value of production of fisheries managed solely or jointly by the Australian Government, 2008–09 to 2018–19



1 GVP figures are subject to revision, and consequently may differ in past and future publications.

TABLE 1.4 Indicators and summary of economic status of Commonwealth fisheries for 2018–19

Fishery	Performance relative to MEY target	NER trend	Fishing right latency in fishing season	2018–19 fishery GVP (% change from 2017–18)
Bass Strait Central Zone Scallop Fishery	MEY target not specified	Negative in 2009–10 and 2010–11 (–$1.1 million). Likely to be increasing since 2010–11	Low uncaught TAC	$6.33 million (–6%)
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 above B_{MEY} target. MEY catch trigger in place for banana prawns but too early to determine its effect on NER	Positive	Low unused effort	$117.63 million (+20%)
North West Slope Trawl Fishery	MEY target not specified	Increasing	High non-participation by licence holders	Confidential
Small Pelagic Fishery	MEY target not specified	Not available but likely increasing	High uncaught TAC	Confidential
SESSF: Commonwealth Trawl and Scalefish Hook sectors **a**	Of the 4 key species, 3 are above or close to B_{MEY} targets. Some overfished stocks require rebuilding for improvement in economic status	Declining	High uncaught TAC for some species	$49.47 million (16%)
SESSF: East Coast Deepwater Trawl Sector	No fishing effort	Not available	High uncaught TAC	Confidential
SESSF: Great Australian Bight Trawl Sector	Bight redfish and deepwater flathead above or close to B_{MEY} target	Not available but likely to be positive, and have decreased	High uncaught TAC	$8.48 million (–7%)
SESSF: Shark Hook and Shark Gillnet sectors **b**	Gummy shark stock close to, or above, target. Biomass of school shark requires rebuilding	Volatile: Positive in 2016–17; estimated to become negative in 2017–18 and then positive in 2018–19	Low uncaught TAC for key target species	$23.66 million (19%)
Southern Squid Jig Fishery	MEY target not specified	Not available	High non-participation by licence holders	Confidential

2018–19 management costs (% share of GVP)	Primary management instrument	Economic status
$0.28 million (4%)	ITQs and spatial management	NER are likely to have improved since 2010–11 (the last available survey year) when real NER were –$1.2 million (in 2017–18 dollars). Compared with 2010–11, GVP in 2018–19 was higher and fewer vessels were used in the fishery.
$0.16 million (confidential)	Catch triggers and TACs	Estimates of NER are not available. Catch in the Aquarium Sector decreased in 2018–19 and the economic performance of this sector is uncertain. No catch was taken in the Sea Cucumber, or Lobster and Trochus sectors in 2018–19, and catch in the Line Sector decreased relative to the previous year. The trend in economic performance for these sectors is also uncertain.
Not available	Input controls	Economic status is unknown.
$1.97 million (2%)	Individual transferable gear units (headrope length)	NER reached a high of $32.1 million in 2015–16, supported by a strong increase in tiger prawn catch, marking a fourth consecutive annual increase in NER. The performance in 2016–17 remained stable at $30.9 million. In 2017–18, lower GVP and higher unit fuel prices are expected to have a dampening effect on NER.
$0.14 million (confidential)	Limited entry and catch triggers	Estimates of NER are not available for the fishery. It is likely that operating costs in the fishery decreased in 2018–19 following a decrease in average effort per vessel. This, combined with higher catch per hour trawled, indicates that NER improved in 2018–19.
$1.11 million (confidential)	ITQs	Estimates of NER are not available for the fishery. A substantial increase in catch in the 2018–19 and 2019–20 fishing seasons suggests that the GVP is likely to have increased, and also indicate a potential increase in NER.
$2.96 million for CTS (6% of CTS GVP)	ITQs	NER in the CTS rose to reach $4.0 million in 2016–17, largely driven by lower operating costs. Preliminary estimates from the survey suggest that NER were –$0.17 million in 2017–18 and –$1.07 million in 2018–19. These negative results are driven by lower forecast income and higher forecast operating costs.
$0.00 million (confidential)	ITQs	A high level of latency exists for this fishery. No fishing effort between 2013–14 and 2017–18, and low catches in 2018–19 and 2019–20 indicate low NER.
$0.37 million (4%)	ITQs	An increase in fuel price, together with lower GVP indicate that NER are likely to have been lower in 2018–19 than in 2017–18.
$2.50 million for GHTS (8% of GHTS GVP)	ITQs	NER for the GHTS were $3.4 million in 2016–17. Preliminary estimates indicate that NER were likely negative for 2017–18 but recovering to $5.6 million in 2018–19.
$0.09 million (confidential)	Individual transferable gear units (jig machines)	Catch in the fishery decreased significantly in 2019 while effort remained similar to 2018 levels. NER in the fishery are likely to have declined in 2018–19.

continued ...

TABLE 1.4 Indicators and summary of economic status of Commonwealth fisheries for 2018–19 continued

Fishery	Performance relative to MEY target	NER trend	Fishing right latency in fishing season	2018–19 fishery GVP (% change from 2017–18)
Western Deepwater Trawl Fishery	MEY target not specified	Not available	High non-participation by licence holders	Confidential
Torres Strait Finfish Fishery	Not applicable **c**	Not available	Not applicable	$0.86 million (–16%)
Torres Strait Tropical Rock Lobster Fishery	Not applicable **c**	Not available	Low uncaught TAC	$19.72 million (+31%)
Torres Strait Prawn Fishery	Not applicable **c**	Not available	High unused effort	$11.23 million (+144%)
Torres Strait Bêche-de-mer Fishery	Not applicable **c**	Not available	High uncaught TAC	Not available
Torres Strait Trochus Fishery	Not applicable **c**	Not available	High uncaught TAC	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 target species	$32.08 million (–16%)
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	Low uncaught TAC	$43.43 million (+9%)
Western Tuna and Billfish Fishery	MEY target not specified	Not available	High uncaught TAC (more than 95% in 2015 and 2016 fishing seasons)	Confidential
Heard Island 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
CCAMLR exploratory toothfish fisheries	Not applicable **c**	Not available	Low uncaught TAC	Confidential

2018–19 management costs (% share of GVP)	Primary management instrument	Economic status
$0.14 million (confidential)	Limited entry	Estimates of NER are unavailable and GVP is confidential because of the low number of active vessels in the fishery. In 2018–19, an increase in catch per active vessel was balanced with an increase in effort per active vessel and higher fuel costs, indicating an uncertain trend in NER.
Not available	Non-tradeable quota	Estimated NER are not available for the fishery. GVP declined in the 2018–19 fishing season, likely due to lower catch. However, participation from the Traditional Inhabitant Boat Sector increased in 2018–19, indicating a potential increase in the socio-economic benefits for Torres Strait Islander communities.
Not available	Limited entry for non–Traditional Inhabitant Sector and TAC	NER in the fishery are uncertain, although positive economic improvements are likely to have occurred in the 2018–19 fishing season as a result of significant increases in TAC and gross value of product.
$0.27 million (1%, AFMA costs only)	Tradeable effort units (nights)	An increase in average GVP per vessel was matched by a similar increase in hours trawled per vessel, indicating that NER remained steady in 2018–19. The strong increase in GVP and increased vessel participation indicate positive NER.
Not available	TACs	Estimates of NER and GVP are unavailable. Despite a decline in catch in 2019, NER are likely positive for this fishery. Increasing opportunities and participation for traditional inhabitants in the fishery are important objectives for this fishery.
Not available	TACs	Little to no catch has been recorded in the fishery since 2010, suggesting fishers have a low incentive to fish.
$1.41 million (4%)	ITQs	NER followed an increasing trend over the decade to 2016–17 and became positive in 2010–11. Non–survey based estimates of NER for 2017–18 and 2018–19 indicate positive NER.
$0.07 million (no fishing)	Limited entry	No Australian vessels fished in 2018 or 2019.
$1.47 million (3%)	ITQs	NER are expected to have remained positive in 2018–19, reflecting low levels of quota latency. However, the overfished status of the stock poses a risk to future NER. Economic status will improve as the stock is rebuilt under the management procedure.
$0.27 million (confidential)	ITQs	Participation rate was low and latency remained high in 2019, suggesting little economic incentive to fish and relatively small NER.
$0.84 million (confidential)	ITQs	Estimates of NER are not available but are likely to be positive. Likely positive NER for the 2018–19 and 2019–20 fishing seasons are indicated by low levels of latency for targeted species.
$0.43 million (confidential)	ITQs	Estimates of NER are not available but are likely to be positive for the 2017–18 and 2018–19 fishing seasons due to low TAC latency for Patagonian toothfish in both seasons.
Confidential	Limited entry and TACs	Estimates of NER are not available, and NER remain uncertain. Australian fishers have been active across the exploratory areas from 2014–15 to 2017–18.

a NER estimates and management costs are only available for the CTS 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. **CCAMLR** Commission for the Conservation of Antarctic Marine Living Resources. **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

ABARES undertakes regular economic surveys of the most valuable fisheries managed solely by the Australian Government: the Commonwealth Trawl Sector (CTS), and the Gillnet, Hook and Trap Sector (GHTS) of the SESSF; and the NPF. These fisheries are managed under MEY objectives. Together, they accounted for 88% of the GVP of all solely Australian Government–managed fisheries in 2018–19.

The tiger prawn component of the NPF is explicitly managed to a MEY target, using a bio-economic model to set effort levels that are estimated to produce MEY. The banana prawn component of the NPF is separately managed through an MEY-based catch rate trigger for season closure. NER in the NPF increased to $30.9 million in 2015–16, and preliminary estimates indicate that NER remained stable in 2016–17 as a result of a strong catch season for banana prawn. In 2017–18, lower GVP and higher unit fuel prices are expected to have a dampening effect on NER (Bath, Curtotti & Mobsby 2018). The bio-economic modelling of the tiger prawn component of the fishery has facilitated an improvement in the economic performance of the fishery.

In the CTS and the GHTS, MEY is pursued through the application of proxies for biomass targets (B_{MEY}) for individual stocks. For the most valuable species targeted in these 2 sectors, current biomass levels are generally estimated to be close to, or above, their respective B_{MEY} targets, meaning that stock levels are not constraining profits. NER in the CTS rose to $4.0 million in 2016–17, a result largely driven by lower operating costs. Preliminary estimates from the survey suggest that NER were –$0.17 million in 2017–18 and –$1.07 million in 2018–19. These negative results are driven by lower forecast income and higher operating costs. In the GHTS, positive NER were maintained in the decade leading up to, and including, 2008–09. However, NER were negative from 2009–10 to 2014–15, as spatial closures aimed at reducing marine mammal interactions and efforts to avoid (overfished) school shark affected the sector's economic performance (Skirtun & Green 2015). Since then, NER have been volatile, with an estimated NER of –$3.5 million in 2017–18 and $5.60 million in 2018–19.

In the Great Australian Bight Trawl Sector, the development of a bio-economic model for the 2 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 suggest that fishery profitability is unlikely to be constrained by stock status.

Some fisheries that had low GVP in previous years were significantly larger by 2018–19, including the Small Pelagic Fishery (SPF) and the Bass Strait Central Zone Scallop Fishery (BSCZSF). The BSCZSF and the SPF underwent management changes that allowed growth in GVP. For the BSCZSF, surveys in recent years have shown substantially larger biomass levels that have allowed higher TACs and more areas to be opened to fishing under the rules of the harvest strategy. In the SPF, the use of a large factory freezer midwater trawl vessel allowed a larger catch in 2015–16, but catches were sharply down in 2016–17 as a result of the trawler no longer operating in the fishery. An increase in the level of catch in 2017–18 and 2018–19 taken by other vessels suggests that GVP is likely to have recovered. Changes in NER are uncertain, however, because of a lack of information about changes in the cost structures of the fishery. For the Southern Squid Jig Fishery, catch and effort increased from 2016–17 to 2017–18 but declined in 2018–19. NER in the fishery are indicated to have declined in 2018–19, driven mainly by lower catch in the fishery, despite similar effort levels to 2017–18.

Low catch-and-effort levels in the other fisheries (Coral Sea Fishery, East Coast Deepwater Trawl Sector, North West Slope Trawl Fishery and Western Deepwater Trawl Fishery) indicate low NER in 2018–19. For these fisheries, it is often difficult to assess economic status because of a lack of economic data.

Jointly managed fisheries

Of the fisheries jointly managed by the Australian Government, the major fisheries include the SBTF, the ETBF, and the Torres Strait Tropical Rock Lobster Fishery (TSTRLF). Combined, these 3 fisheries generated a GVP of $95.2 million and accounted for 44% of the GVP of all jointly managed fisheries in 2018–19. Individually, these fisheries generated GVPs of $43.4 million (wild-caught southern bluefin tuna as input to tuna farms), $32.1 million and $19.7 million, respectively, in 2018–19.

Estimates of NER are not available for the SBTF. However, the fishery provides fish to South Australia's southern bluefin tuna aquaculture industry (generating $129 million GVP at the farm gate in 2018–19). Although the stock's current low biomass level has dampened the 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 the future.

Economic status in the ETBF has improved. Preliminary estimates suggest that NER for the fishery remained positive between 2015–16 and 2017–18, driven by increased catch, higher prices of key species and a significant fall in the fuel price.

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 peoples. The TSTRLF was the most valuable commercial fishery in Torres Strait in 2018–19, 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. Sometimes this is not possible when the economic fundamentals of the fishery are poorly understood. When targets are not set at MEY levels, profits tend to be dissipated as a result of unconstrained fishing effort or catch. This may be the case when fishers collectively fish below the TAC or effort control target.

For some fisheries, the degree of latency can be explained in terms of the type of fishery and the 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.

However, for some fisheries, the reasons for persistently high latency remain unclear and warrant further investigation. For example, the TACs for a number of species in the SESSF have increasingly been undercaught in recent seasons (Knuckey et al. 2018).

The target can be set higher than the MEY 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 inaccurate
- 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. In addition, 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 2019

The *Fishery status reports* examines the broader impact of fisheries on the environment, in response to the requirements of the *Fisheries Management Act 1991,* the EPBC Act and the Commonwealth Fisheries Bycatch Policy (Department of Agriculture and Water Resources 2018a). 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 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 for bycatch and discarding are identified in fishery-specific bycatch and discarding workplans.

In 2018–19, AFMA's focus on ERA was updated when the revised Commonwealth Fisheries Harvest Strategy and Commonwealth Bycatch policies and their respective supporting guidelines were implemented in November 2018. The framework requires that each fishery set out how it will address any impacts identified through the risk assessment process, particularly those impacts that fishing has on commercial; bycatch; and threatened, endangered and protected species.

The updated ERA methodology has been applied to 11 fisheries. A number of these reassessments resulted in a significant reduction in the number of 'potential high-risk species' identified—for example, from 7 to 1 species in the ETBF, and from 8 to 0 species in the Small Pelagic Fishery (midwater trawl).

Protected species interactions

During the normal course of fishing operations, fishers can interact with protected species listed under the EPBC Act. All Commonwealth-managed fisheries have been accredited under the EPBC Act. To be accredited, the fishery's management regime must require fishers to take all reasonable steps to ensure that members of listed threatened species (other than conservation-dependent species), listed migratory species, cetaceans and listed marine species are not killed or injured as a result of fishing. The ERA must find that the regime does not, or is not likely to adversely affect the survival or recovery of a protected species, or the conservation status of a listed migratory species, cetacean or listed marine species or a population of that species. After the management plan is accredited, operators are exempt from requiring permits under part 13 of the EPBC Act for interactions with the species detailed above, but interactions must be reported.

AFMA publishes and reports quarterly on interactions with protected species on behalf of Commonwealth fishing operators to the Department of Agriculture, Water and the Environment, and these are summarised in each chapter.

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

- compulsory use of turtle excluder devices in the NPF
- implementation and continued running of a threat abatement plan for the incidental catch (or bycatch) of seabirds during oceanic longline fishing operations in the ETBF, the WTBF, the longline sectors in the SESSF, the Heard Island and McDonald Islands Fishery, and the Macquarie Island Toothfish Fishery
- refinement of seabird mitigation monitoring and measures in the ETBF
- introduction of biological material retention requirements in the CTS of the SESSF to minimise seabird interactions in high-risk areas
- 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.

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 (e-monitoring) programs in several fisheries and subfisheries to improve logbook reporting and to verify logbook reports of interactions with protected species. A preliminary comparison of catch-and-discard data for target, byproduct and bycatch species, as well as wildlife interactions, identified a significant increase in reported nominal discard and interactions per unit effort in the first 2 years after e-monitoring was introduced (Emery et al. 2019). While not discounting possible environmentally driven shifts in availability and abundance, or individual vessel effects, evidence suggests that e-monitoring has led to significant changes in logbook reporting, particularly in the ETBF (Emery et al. 2019).

E-monitoring became mandatory on 1 September 2014 in the GHTS 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. E-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.

The aim is for e-monitoring analysts to randomly review 10% of the video footage, and a risk-based approach is used to audit more footage from boats that are suspected of misreporting. In the GHTS, all gillnet hauls in the Australian sea lion management zones are audited, to verify any bycatch of protected species. It should be noted that e-monitoring, while very good at certain data collection activities (for example, counts of target species) cannot replace all the activities performed by physical observers, such as the collection of biological samples. Furthermore, efforts should be made to calibrate reporting through e-monitoring with physical observation to understand inherent differences in reporting rates (Bartholomew et al. 2018). More information on e-monitoring can be found on the AFMA website.[2]

2 afma.gov.au/monitoring-enforcement/electronic-monitoring-program

1.5 References

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