



Department of
Primary Industries

Status of fisheries resources in NSW 2014–15

Summary



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Background

Scientists from DPI Fisheries assess the stock status of most exploited marine species annually. The Resource Assessment Workshop (RAW) for 2016 assessed the available data from 2014/15 for all 117 species that are currently listed in the Department's Resource Assessment System. The outcomes from the workshop included the formal assignment of an exploitation status for each species as well as a Resource Assessment Class (RAC) that indicates the level of assessment performed¹. Note that each species has a designated Target RAC that indicates the level of assessment ideally required based on that species relative importance to fisheries.

The Exploitation Status and RAC categories used by Fisheries NSW to assess exploited marine species are described below.

Stock exploitation categories

Category	Characteristic
Overfished	<ul style="list-style-type: none"> Recruitment is being significantly suppressed as a result of a small spawning biomass (as determined by a population model or measured stock-recruitment relationship) Fishing mortality rates are significantly greater than natural mortality rates Estimates of spawning biomass are less than 20-30% of the estimated unfished spawning stock The 'Spawning Potential Ratio' is less than 20-40% (depending on life history characteristics) Catch rates are less than 30% of the initial catch rates Length and age distributions unstable (excessively affected by recruitment, too few age or size classes in the exploitable population given a species' life history) Trends in length/age compositions are evident which indicate increasing (and/or excessive) fishing mortality
Growth Overfished	<ul style="list-style-type: none"> Yield per recruit would increase if length at first capture was increased or fishing mortality decreased A population model has determined that sustainable yield would increase if fishing mortality was decreased or size at first capture were increased
Fully Fished	<ul style="list-style-type: none"> Fishing mortality is approximately the same as Natural mortality Estimates of the spawning biomass are greater than 30% of the estimated unfished spawning biomass Catch rates have been steady for 5-10 years and/or catch rates are greater than 30% of initial catch rates Length and age distributions are stable Species are fished throughout their entire geographic range
Moderately Fished	<ul style="list-style-type: none"> Fishing mortality is less than half of natural mortality Estimates of the biomass are greater than 70% of the estimated unfished biomass Catch rates are greater than 70% of initial catch rates Species are fished in most of their geographic range but non-fishing areas are known to exist Markets may limit catch and effort
Uncertain	<ul style="list-style-type: none"> A significant amount of evidence has been collected and considered, but there are inconsistent or contradictory signals in the data that preclude determination of exploitation status
Undefined	<ul style="list-style-type: none"> Commercial catch data are available but no reasonable attempt has been made to determine exploitation status Recreational species - some data are available but no reasonable attempt has been made to determine exploitation status

¹ Further details on the NSW resource assessment framework can be found in [Scandol 2004](http://www.dpi.nsw.gov.au/research/areas/fisheries-and-ecosystems/wild-fisheries/outputs/2004/382) 2004 at www.dpi.nsw.gov.au/research/areas/fisheries-and-ecosystems/wild-fisheries/outputs/2004/382

Resource assessment class definitions

Attribute	Class of assessment				
	One	Two	Three	Four	Five
Current population dynamic models producing estimates of relative biomass	yes				
Estimates of biological reference points (e.g. SPR, YPR, F0.1)		yes			
Current estimates of total, natural and fishing mortality		yes			
Time series of age composition data (finfish only)		yes			
Current local (NSW) information for growth, mortality, selectivity and maturity		yes			
Current qualitative risk analysis of future harvesting		yes			
Current indicator of abundance			yes		
Representative time-series of commercial catch			yes		
Current estimate of recreational catch			yes		
Time series of length-composition data			yes		
Current non-local (not NSW) information for growth, mortality, selectivity and maturity				yes	
Known biological stock structure				yes	
Complex of related species					yes

Exploitation Status

Seven species/species complexes had their exploitation status changed for the 2014/15 year (Table 1).

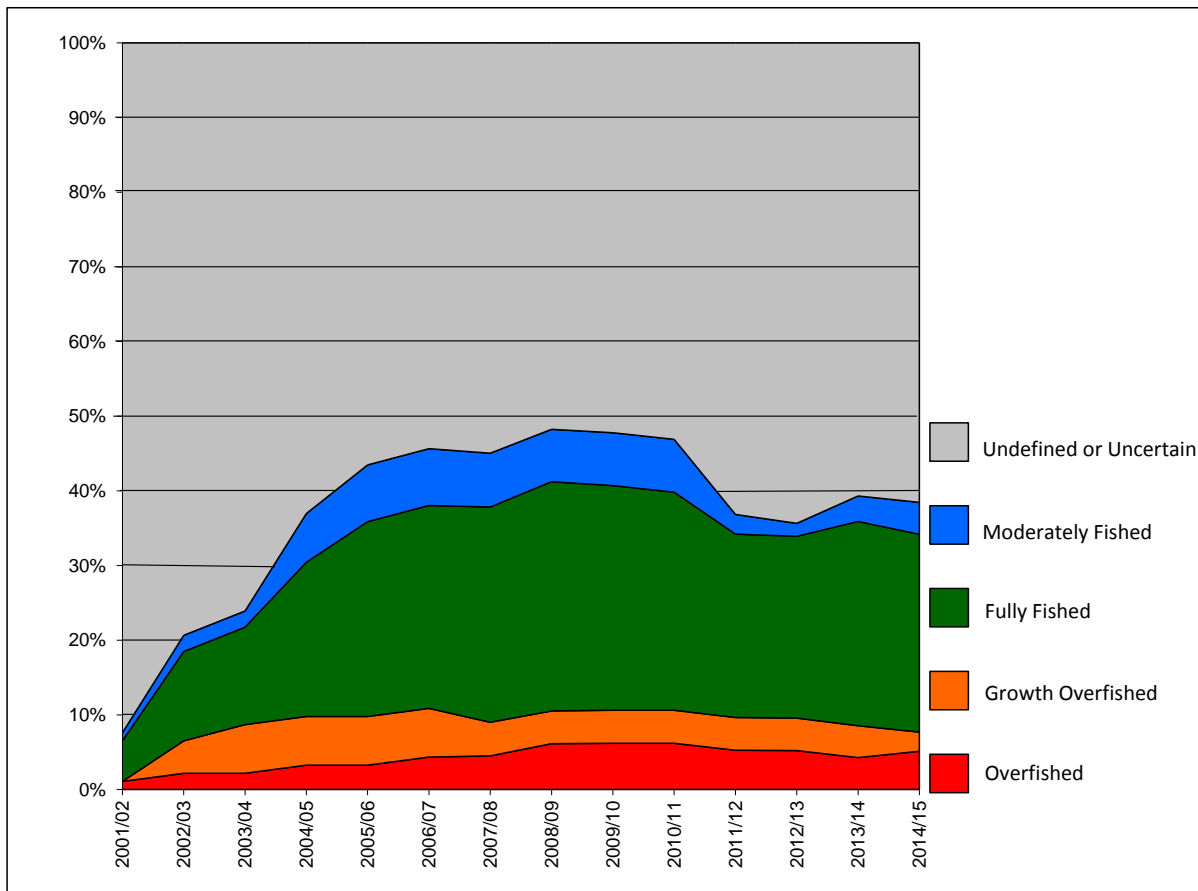
- Blue Swimmer Crab was moved from the Uncertain category to a status of Fully Fished based on improvements in the quality of commercial logbook data indicating stable to increasing catch rates.
- Australian Sardine was moved from the Uncertain category to a status of Moderately Fished based on a 2014 biomass estimate indicating that current east-coast landings were much less than 10% of the spawning biomass.
- Redfish was moved from being Growth Overfished to Overfished based on a Commonwealth assessment that the biomass was less than acceptable levels of virgin biomass.
- Yellowtail Kingfish was moved from Growth Overfished to the Uncertain category, noting that while Yellowtail Kingfish remain growth overfished that some updated mortality and spawning potential ratio estimates indicated that this species may be overfished. However, current commercial catch rate data was not considered robust enough to infer a substantial decline in the relative abundance of Yellowtail Kingfish at this time.
- River Garfish was moved from being Uncertain to Undefined to reflect the opinion that the current commercial fishery is too small to be of use in assessing the exploitation status of this species.
- Bluespotted Flathead was moved from a Fully Fished status to an Uncertain status in response to a substantial decline in commercial landings and catch rates during the past 4 years, the recreational harvest falling by more than 50% since 2000/01 and variable size and age compositions.
- Eastern School Whiting was moved from a Fully Fished status to an Uncertain status based on declining catches, declining catch rates in some sectors and the lack of a current assessment model.

There are currently six Overfished and three Growth Overfished species in NSW. Thirty one species are Fully Fished, five species are Moderately Fished and 72 species are either Undefined or Uncertain (Figure 1).

Table 1. Summary of changes to Exploitation Status for species assessed at the 2016 Resource Assessment Workshop.

Species	2013–14 Exploitation status	2014–15 Exploitation status
Bluespotted Flathead	Fully Fished	Uncertain
Redfish	Growth Overfished	Overfished
Eastern School Whiting	Fully Fished	Uncertain
Yellowtail Kingfish	Growth Overfished	Uncertain
River Garfish	Uncertain	Undefined
Blue Swimmer Crab	Uncertain	Fully Fished
Australian Sardine	Uncertain	Moderately Fished

Figure 1. Summary of Exploitation Status for species assessed by DPI Fisheries since 2001–02.



Resource Assessment Class

Nine species/species complexes had their Resource Assessment Classes (RACs) changed for the 2014/15 year (Table 2). In a positive step, 8 of these 9 species had their RAC increased.

- Eastern School Whiting had its RAC downgraded from a 1 to a 3 reflecting the outdated Commonwealth assessment that NSW DPI have relied upon during recent years.
- Redfish had its RAC of 3 increased to a 1 because of a recent Commonwealth stock assessment.
- Australian Sardine, Blue Mackerel and Common Jack Mackerel all had RACs increased to 2 as a result of updated Daily Egg Production Method (DEPM) based biomass estimates.
- Yellowtail Kingfish and Silver Sweep had their RACs increased from 3 to 2 as a result of updated mortality estimates and biological reference points.
- Greentail Prawn had its RAC of 4 increased to a 3 in response to some length-based assessment done during Fishery Independent Surveys and new information on biological parameters and life-history.
- Blue Swimmer Crab had its RAC increased from a 4 to a 3 as a result of more reliable commercial catch rate data and an updated estimate of the recreational harvest.

Currently 50 species of the 117 assessed have RACs at their target levels or above.

Table 2. Summary of changes to Resource Assessment Class (RAC) for species assessed at the 2016 Resource Assessment Workshop.

Species	2013-14 RAC	2014-15 RAC
Greentail prawn	4	3
Redfish	3	1
Eastern school whiting	1	3
Yellowtail kingfish	3	2
Silver sweep	3	2
Blue swimmer crab	4	3
Australian sardine	3	2
Blue mackerel	3	2
Common jack mackerel	3	2

Table 3. Exploitation status and Resource Assessment Class (RAC) for all species listed in the DPI Fisheries Resource Assessment System for 2014/15. A RAC shaded green denotes that the level of understanding about this species is at or above the target level. Assessment Classes shaded red are below the target level.

SPECIES	STOCK STATUS					
	2012-13		2013-14		2014-15	
	RAC	Exploitation Status	RAC	Exploitation Status	RAC	Exploitation Status
Angel Sharks (<i>Squatina</i> spp.)	Five	Undefined	Three	Fully Fished	Three	Fully Fished
Australian Anchovy (<i>Engraulis australis</i>)	Four	Undefined	Four	Undefined	Four	Undefined
Australian Bonito (<i>Sarda australis</i>)	Two	Fully Fished	Two	Fully Fished	Two	Fully Fished
Australian Sardine (<i>Sardinops sagax</i>)	Three	Uncertain	Three	Uncertain	Two	Moderately Fished
Banded Morwong (<i>Cheilodactylus spectabilis</i>)	Four	Undefined	Four	Undefined	Four	Undefined
Banded Rockcod (<i>Epinephelus ergastularius</i>)	Three	Undefined	Three	Undefined	Three	Undefined
Bass Groper (<i>Polyprion americanus</i>)	Four	Undefined	Four	Undefined	Four	Undefined
Beachworms (Onuphidae)	Five	Undefined	Five	Undefined	Five	Undefined
Bigeyes (Priacanthidae)	Four	Undefined	Four	Undefined	Four	Undefined
Blacklip Abalone (<i>Haliotis rubra</i>)	Three	Uncertain	Three	Uncertain	Three	Uncertain
Blue Mackerel (<i>Scomber australasicus</i>)	Three	Moderately Fished	Three	Moderately Fished	Two	Moderately Fished
Blue Shark (<i>Prionace glauca</i>)	Four	Uncertain	Four	Undefined	Four	Undefined
Blue Swimmer Crab (<i>Portunus armatus</i>)	Four	Uncertain	Four	Uncertain	Three	Fully Fished
Blue-eye Trevalla (Centrolophidae)	Three	Fully Fished	Three	Fully Fished	Three	Fully Fished
Bluespotted Flathead (<i>Platycephalus caeruleopunctatus</i>)	Three	Fully Fished	Three	Fully Fished	Three	Uncertain
Boarfish (Pentacerotidae)	Four	Undefined	Four	Undefined	Four	Undefined
Brown Tiger Prawn (<i>Penaeus esculentus</i>)	Four	Undefined	Four	Undefined	Four	Undefined
Bugs (<i>Ibacus</i> spp.)	Three	Fully Fished	Three	Fully Fished	Three	Fully Fished
Catfish (Siluriformes)	Five	Undefined	Five	Undefined	Five	Undefined
Cobia (<i>Rachycentron canadum</i>)	Four	Undefined	Four	Undefined	Four	Undefined
Cockles (Arcoida and Veneroida)	Five	Undefined	Five	Undefined	Five	Undefined

SPECIES	STOCK STATUS					
	2012-13		2013-14		2014-15	
	RAC	Exploitation Status	RAC	Exploitation Status	RAC	Exploitation Status
Common Jack Mackerel (<i>Trachurus declivis</i>)	Four	Uncertain	Three	Moderately Fished	Two	Moderately Fished
Common Silverbiddy (<i>Gerres subfasciatus</i>)	Four	Uncertain	Four	Uncertain	Four	Uncertain
Crimsonband Wrasse (<i>Notolabrus gymnogenis</i>)	Three	Uncertain	Three	Uncertain	Three	Uncertain
Cunjevoi (<i>Pyura stolonifera</i>)	Four	Undefined	Four	Undefined	Four	Undefined
Cuttlefish (<i>Sepia</i> spp.)	Five	Undefined	Five	Undefined	Five	Undefined
Dart (<i>Trachinotus</i> spp.)	Four	Undefined	Four	Undefined	Four	Undefined
Diamondfish (<i>Monodactylus argenteus</i>)	Four	Undefined	Four	Undefined	Four	Undefined
Dogfish (Squaliformes)	Five	Overfished	Five	Overfished	Five	Overfished
Dusky Flathead (<i>Platycephalus fuscus</i>)	Three	Uncertain	Three	Uncertain	Three	Uncertain
Eastern Australian Salmon (<i>Arripis trutta</i>)	Three	Fully Fished	Three	Fully Fished	Three	Fully Fished
Eastern Blue Groper (<i>Achoerodus viridis</i>)	Four	Undefined	Four	Undefined	Four	Undefined
Eastern King Prawn (<i>Melicertus plebejus</i>)	One	Growth Overfished	One	Growth Overfished	One	Growth Overfished
Eastern Pigfish (<i>Bodianus unimaculatus</i>)	Three	Fully Fished	Three	Fully Fished	Three	Fully Fished
Eastern Red Scorpionfish (<i>Scorpaena cardinalis</i>)	Two	Fully Fished	Three	Undefined	Three	Undefined
Eastern Rock Lobster (<i>Jasus verreauxi</i>)	One	Fully Fished	One	Fully Fished	One	Fully Fished
Eastern School Whiting (<i>Sillago flindersi</i>)	One	Fully Fished	One	Fully Fished	Three	Uncertain
Eastern Sea Garfish (<i>Hyporhamphus australis</i>)	Two	Overfished	Two	Fully Fished	Two	Fully Fished
Estuary Perch (<i>Macquaria colonorum</i>)	Three	Undefined	Three	Undefined	Three	Undefined
Flounders (Paralichthyidae and Pleuronectidae)	Five	Undefined	Five	Undefined	Five	Undefined

SPECIES	STOCK STATUS					
	2012-13		2013-14		2014-15	
	RAC	Exploitation Status	RAC	Exploitation Status	RAC	Exploitation Status
Frigate Mackerel (<i>Auxis thazard</i>)	Four	Undefined	Four	Undefined	Four	Undefined
Gemfish (<i>Rexea solandri</i>)	One	Overfished	One	Overfished	One	Overfished
Ghost Nipper (<i>Trypaea australiensis</i>)	Four	Undefined	Four	Undefined	Four	Undefined
Ghostsharks (Chimaeriformes)	Four	Undefined	Four	Undefined	Four	Undefined
Giant Mud Crab (<i>Scylla serrata</i>)	Three	Uncertain	Three	Uncertain	Three	Uncertain
Goatfish (Mullidae)	Four	Undefined	Four	Undefined	Four	Undefined
Goldspot Mullet (<i>Liza argentea</i>)	Three	Uncertain	Three	Uncertain	Three	Uncertain
Gould's (Arrow) squid (<i>Nototodarus gouldi</i>)	Five	Undefined	Three	Fully Fished	Three	Fully Fished
Greentail Prawn (<i>Metapenaeus bennettiae</i>)	Four	Undefined	Four	Undefined	Three	Undefined
Grey Morwong (<i>Nemadactylus douglasii</i>)	Two	Overfished	Two	Overfished	Two	Overfished
Gummy Shark (<i>Mustelus antarcticus</i>)	One	Fully Fished	One	Fully Fished	One	Fully Fished
Hairtail (<i>Trichiurus lepturus</i>)	Four	Undefined	Four	Undefined	Four	Undefined
Hammerhead Sharks (<i>Sphyrna</i> spp.)	Five	Undefined	Five	Undefined	Five	Undefined
Hapuku (<i>Polyprion oxygeneios</i>)	Four	Undefined	Four	Undefined	Four	Undefined
Jackass Morwong (<i>Nemadactylus macropterus</i>)	One	Fully Fished	One	Fully Fished	One	Fully Fished
John Dory (<i>Zeus faber</i>)	Three	Fully Fished	Three	Fully Fished	Three	Fully Fished
Leatherjackets-other (Monacanthidae)	Five	Undefined	Five	Undefined	Five	Undefined
Loligo Squid (<i>Uroteuthis</i> species)	Five	Undefined	Five	Undefined	Five	Undefined
Longtail Tuna (<i>Thunnus tonggol</i>)	Four	Undefined	Four	Undefined	Four	Undefined
Luderick (<i>Girella tricuspidata</i>)	Three	Fully Fished	Three	Fully Fished	Three	Fully Fished
Mackerel Tuna (<i>Euthynnus affinis</i>)	Four	Undefined	Four	Undefined	Four	Undefined
Mahi Mahi (<i>Coryphaena hippurus</i>)	Four	Undefined	Four	Undefined	Four	Undefined
Mako Sharks (<i>Isurus</i> spp.)	Four	Undefined	Four	Undefined	Four	Undefined

SPECIES	STOCK STATUS					
	2012-13		2013-14		2014-15	
	RAC	Exploitation Status	RAC	Exploitation Status	RAC	Exploitation Status
Mangrove Jack (<i>Lutjanus argentimaculatus</i>)	Four	Undefined	Four	Undefined	Four	Undefined
Mantis Shrimps (Stomatopoda)	Five	Undefined	Five	Undefined	Five	Undefined
Mirror Dory (<i>Zenopsis nebulosus</i>)	Three	Fully Fished	Three	Fully Fished	Three	Fully Fished
Mulloway (<i>Argyrosomus japonicus</i>)	Three	Overfished	Two	Overfished	Two	Overfished
Ocean Jackets (<i>Nelusetta ayraudi</i>)	Three	Fully Fished	Three	Fully Fished	Three	Fully Fished
Ocean Perch (Sebastidae)	Three	Fully Fished	Three	Fully Fished	Three	Fully Fished
Octopus (<i>Octopus</i> spp.)	Five	Undefined	Five	Undefined	Five	Undefined
Pearl Perch (<i>Glaucosoma scapulare</i>)	Three	Uncertain	Three	Uncertain	Three	Uncertain
Pink Ling (<i>Genypterus blacodes</i>)	One	Uncertain	One	Uncertain	One	Uncertain
Pipi (<i>Donax deltoides</i>)	Three	Uncertain	Three	Uncertain	Three	Uncertain
Red Gurnard and Latchets (Triglidae)	Four	Undefined	Four	Undefined	Four	Undefined
Red Morwong (<i>Cheilodactylus fuscus</i>)	Four	Undefined	Four	Undefined	Four	Undefined
Redfish (<i>Centroberyx affinis</i>)	Three	Growth Overfished	Three	Growth Overfished	One	Overfished
River Eels (<i>Anguilla</i> spp.)	Five	Undefined	Five	Undefined	Five	Undefined
River Garfish (<i>Hyporhamphus regularis ardelio</i>)	Three	Uncertain	Three	Uncertain	Three	Undefined
Rock Blackfish (<i>Girella elevata</i>)	Five	Undefined	Five	Undefined	Five	Undefined
Royal Red Prawn (<i>Haliporoides sibogae</i>)	Three	Moderately Fished	Three	Moderately Fished	Three	Moderately Fished
Sand Mullet (<i>Myxus elongatus</i>)	Three	Undefined	Three	Undefined	Three	Undefined
Sand Whiting (<i>Sillago ciliata</i>)	Three	Fully Fished	Three	Fully Fished	Three	Fully Fished
Sawsharks (<i>Pristiophorus</i> spp.)	Five	Undefined	Five	Undefined	Five	Undefined
School Prawn (<i>Metapenaeus macleayi</i>)	Three	Fully Fished	Three	Fully Fished	Three	Fully Fished
School Shark (<i>Galeorhinus galeus</i>)	One	Overfished	One	Overfished	One	Overfished
Sea Mullet (<i>Mugil cephalus</i>)	Two	Fully Fished	Two	Fully Fished	Two	Fully Fished

SPECIES	STOCK STATUS					
	2012-13		2013-14		2014-15	
	RAC	Exploitation Status	RAC	Exploitation Status	RAC	Exploitation Status
Green Sea Urchin (<i>Heliocidaris erythrogramma</i>)	Three	Undefined	Three	Uncertain	Three	Uncertain
Purple Sea Urchin (<i>Centrostephanus rodgersii</i>)	Three	Undefined	Three	Moderately Fished	Three	Moderately Fished
Red Sea Urchin (<i>Heliocidaris tuberculata</i>)	Three	Undefined	Three	Uncertain	Three	Uncertain
Shovelnose Rays (Rajiformes)	Five	Undefined	Five	Undefined	Five	Undefined
Silver Sweep (<i>Scorpius lineolatus</i>)	Three	Uncertain	Three	Uncertain	Two	Uncertain
Silver Trevally (<i>Pseudocaranx georgianus</i>)	Three	Growth Overfished	Three	Growth Overfished	Three	Growth Overfished
Snapper (<i>Pagrus auratus</i>)	Two	Growth Overfished	Two	Growth Overfished	Two	Growth Overfished
Soles (Soleidae and Cynoglossidae)	Four	Undefined	Four	Undefined	Four	Undefined
Southern Calamari (<i>Sepioteuthis australis</i>)	Four	Undefined	Three	Fully Fished	Three	Fully Fished
Southern Maori Wrasse (<i>Ophthalmolepis lineolatus</i>)	Four	Undefined	Four	Undefined	Four	Undefined
Spanish Mackerel (<i>Scomberomorus commerson</i>)	One	Fully Fished	One	Fully Fished	One	Fully Fished
Spanner Crab (<i>Ranina ranina</i>)	Two	Fully Fished	Two	Fully Fished	Two	Fully Fished
Spotted Mackerel (<i>Scomberomorus munroi</i>)	One	Fully Fished	One	Fully Fished	One	Fully Fished
Stout Whiting (<i>Sillago robusta</i>)	Two	Fully Fished	Two	Fully Fished	Two	Fully Fished
Striped Grunters (Terapontidae)	Four	Undefined	Four	Undefined	Four	Undefined
Striped Marlin (<i>Tetrapturus audax</i>)	Two	Uncertain	One	Fully Fished	One	Fully Fished
Tailor (<i>Pomatomus saltatrix</i>)	Three	Fully Fished	Three	Fully Fished	Three	Fully Fished
Tarwhine (<i>Rhabdosargus sarba</i>)	Three	Uncertain	Three	Uncertain	Three	Uncertain
Teraglin (<i>Atractoscion aequidens</i>)	Three	Uncertain	Three	Uncertain	Three	Uncertain
Tiger Flathead (<i>Neoplatycephalus richardsoni</i>)	One	Fully Fished	One	Fully Fished	One	Fully Fished
Tiger Shark (<i>Galeocerdo cuvier</i>)	Four	Undefined	Four	Undefined	Four	Undefined
Tilefish (<i>Branchiostegus</i> spp.)	Three	Undefined	Three	Undefined	Three	Undefined

SPECIES	STOCK STATUS					
	2012-13		2013-14		2014-15	
	RAC	Exploitation Status	RAC	Exploitation Status	RAC	Exploitation Status
Trumpeter Whiting (<i>Sillago maculata</i>)	Three	Undefined	Three	Uncertain	Three	Uncertain
Turban Shells (<i>Turbo torquatus</i> , <i>Turbo imperialis</i> , <i>Turbo undulatus</i>)	Five	Undefined	Five	Undefined	Five	Undefined
Whaler Sharks (<i>Carcharhinus</i> spp.)	Five	Undefined	Five	Undefined	Five	Undefined
Whitebait - Sandy Sprat (<i>Hyperlophus vittatus</i>)	Three	Undefined	Three	Undefined	Three	Undefined
Wobbegong Sharks (<i>Orectolobus</i> spp.)	Three	Undefined	Three	Undefined	Three	Undefined
Yellowfin Bream (<i>Acanthopagrus australis</i>)	Three	Fully Fished	Three	Fully Fished	Three	Fully Fished
Yellowfin Tuna (<i>Thunnus albacares</i>)	One	Fully Fished	One	Fully Fished	One	Fully Fished
Yellowtail Kingfish (<i>Seriola lalandi</i>)	Three	Growth Overfished	Three	Growth Overfished	Two	Uncertain
Yellowtail Scad (<i>Trachurus novaezelandiae</i>)	Two	Fully Fished	Two	Fully Fished	Two	Fully Fished