

9 Commonwealth Trawl and Scalefish Hook Sectors

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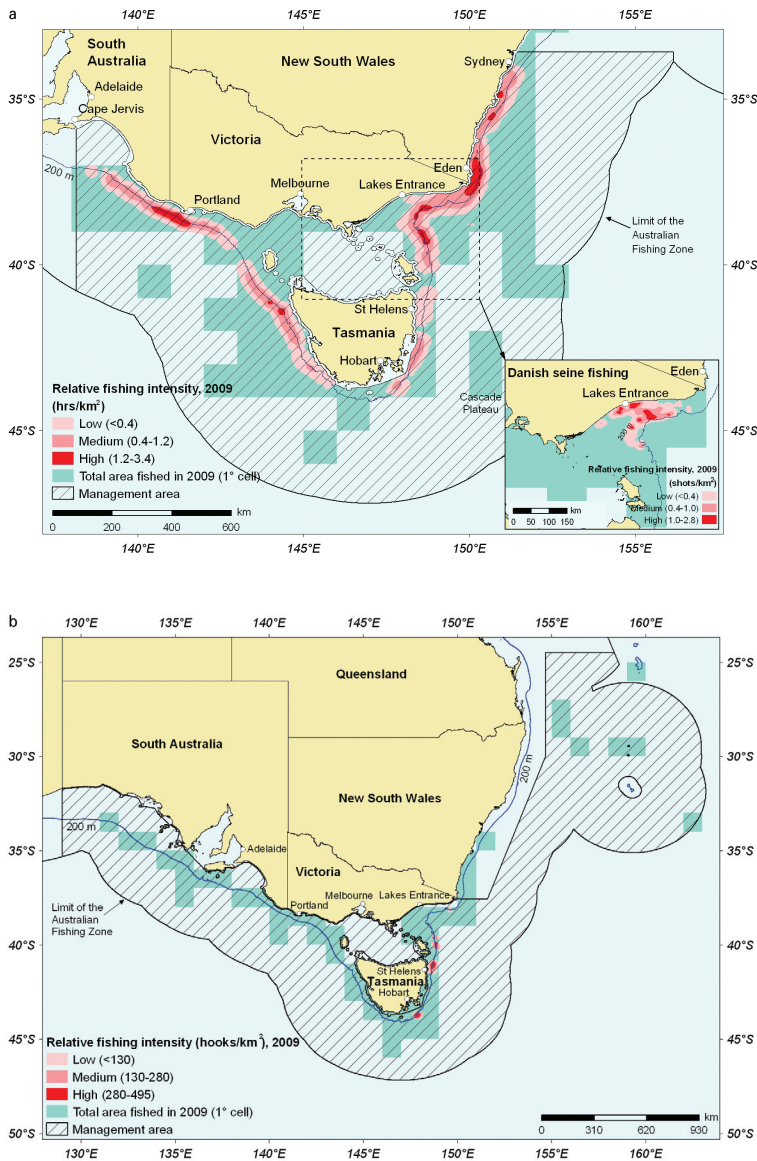


FIGURE 9.1 Relative fishing intensity in the a) Commonwealth Trawl Sector and b) Scalefish Hook Sector, 2009

TABLE 9.1 Status of the Commonwealth Trawl and Scalefish Hook Sectors

Fishery status	2008		2009		Comments
Biological status	Overfishing	Overfished	Overfishing	Overfished	
Blue-eye trevalla (<i>Hyperoglyphe antarctica</i>)					Tier 4 assessment; CPUE is near the target level; catches in line with the RBC indicate overfishing is not occurring.
Blue grenadier (<i>Macrurus novaezelandiae</i>)					Tier 1 assessment; biomass near the target level; catches in line with RBC indicate overfishing is not occurring.
Blue warehou (<i>Seriotelella brama</i>)					Tier 4 assessment; CPUE is below limit reference point; total fishing mortality is unlikely to facilitate rebuilding.
Deepwater sharks, eastern (18 species)					Tier 4 assessment; low catches indicate overfishing is not occurring.
Deepwater sharks, western (18 species)					Tier 4 assessment; low catches indicate overfishing is not occurring.
Eastern school whiting (<i>Sillago flindersi</i>)					Tier 1 assessment; biomass near the target level; catch in line with RBC indicate overfishing is not occurring.
Flathead (5 species)					Tier 1 assessment; biomass above target for past three years in 2009 assessment; catches in line with RBC indicate overfishing is not occurring.
Gemfish, eastern (<i>Rexea solandri</i>)					Tier 1 assessment; biomass below limit reference point. Uncertain whether current fishing mortality will enable rebuilding.
Gemfish, western (<i>Rexea solandri</i>)					Tier 4 assessment based on CPUE from a minor part of the total fishery.
Gulper sharks (<i>Centrophorus harrissoni</i> , <i>C. moluccensis</i> , <i>C. zeehaani</i>) (upper-slope)					Current fishing level constitutes overfishing. Stock reduced by >90% on east coast.
Jackass morwong (<i>Nemadactylus macropterus</i>)					Tier 1 assessment; biomass below target level, most of the catch being taken from more depleted eastern stock.
John dory (<i>Zeus faber</i>)					Tier 3 and Tier 4 assessments; CPUE trend increasing and just above limit.

Table 9.1 continues over the page

TABLE 9.1 Status of the Commonwealth Trawl and Scalefish Hook Sectors CONTINUED

Fishery status	2008		2009		Comments
Biological status	Overfishing	Overfished	Overfishing	Overfished	
Mirror dory (<i>Zenopsis nebulosus</i>)					Tier 3 and Tier 4 assessments; CPUE trend increasing and approaching target level.
Ocean jacket, eastern (<i>Nelusetta ayraudi</i>)					No formal assessment.
Ocean perch (<i>Helicolenus barathri</i> , <i>H. percoides</i>)					Tier 4 assessment; low catches; CPUE trend stable and above limit.
Orange roughy, Cascade Plateau (<i>Hoplostethus atlanticus</i>)					Tier 2 assessment; current biomass >60% B ₀ .
Orange roughy, eastern zone (<i>Hoplostethus atlanticus</i>)					Tier 1 assessment; low catches indicate overfishing is not occurring.
Orange roughy, southern zone (<i>Hoplostethus atlanticus</i>)					Tier 2 assessment; low catches indicate overfishing is not occurring.
Orange roughy, western zone (<i>Hoplostethus atlanticus</i>)					Tier 2 assessment; low catches indicate overfishing is not occurring.
Smooth oreodory, Cascade Plateau (<i>Pseudocyttus maculatus</i>)					Tier 4 assessment; CPUE low catches indicate overfishing is not occurring.
Smooth oreodory, other					Tier 4 assessment; low catches indicate overfishing is not occurring.
Other oreodories (4 species)					Tier 4 assessment; low catches indicate overfishing is not occurring.
Pink ling (<i>Genypterus blacodes</i>)					Tier 1 assessment; biomass is below target, but above limit reference point; however, it is uncertain whether overfishing is occurring.
Redfish (<i>Centroberyx affinis</i>)					Tier 3 and Tier 4 assessments; low biomass with relatively high fishing mortality.
Ribaldo (<i>Mora moro</i>)					Tier 4 assessment; limited data.

Table 9.1 continues over the page

TABLE 9.1 Status of the Commonwealth Trawl and Scalefish Hook Sectors CONTINUED

Fishery status	2008		2009		Comments
Biological status	Overfishing	Overfished	Overfishing	Overfished	
Royal red prawn (<i>Haliporoides sibogae</i>)					Tier 4 assessment; low catches indicate overfishing is not occurring.
Silver trevally (<i>Pseudocaranx georgianus</i>)					Tier 4 assessment; low catches and catch rates close to target indicate overfishing is not occurring.
Silver warehou (<i>Seriotelella punctata</i>)					Tier 1 assessment; low catches and CPUE indicate overfishing is not occurring.
Economic status Fishery level	Net economic returns were \$7.1 million in 2007–08		Estimates of net economic returns not available, but likely to be positive in 2008–09		Economic status likely to be improving given recent stock recovery and restructuring.

 NOT OVERFISHED / NOT SUBJECT TO OVERFISHING

 OVERFISHED / OVERFISHING

 UNCERTAIN

 NOT ASSESSED

CPUE = catch per unit effort; RBC = recommended biological catch

TABLE 9.2 Main features and statistics of the Commonwealth Trawl Sector and Scalefish Hook Sector of the Southern and Eastern Scalefish and Shark Fishery

Feature	Description
Key target and byproduct species	16 individual quota species and 29 species in basket or multispecies quotas (see below for species details); a number of species under TAC that are considered byproduct (e.g. orange roughy); three species of gulper sharks (under trip limits)
Other byproduct species	Numerous species (see Table 9.5)
Fishing methods	Trawl, hook methods (dropline, demersal longline), Danish-seine
Primary landing ports	Ulladulla, Lakes Entrance, Eden, Hobart, Portland
Management methods	Input controls: limited entry, gear restrictions, area closures Output controls: TACs, ITQs, trip limits
Management plan	<i>Southern and Eastern Scalefish and Shark Fishery Management Plan 2003</i> (DAFF 2003, amended 2009)
Harvest strategy	<i>Southern and Eastern Scalefish and Shark Fishery Harvest Strategy Framework</i> (AFMA 2009a; Smith & Smith 2005)
Consultative forums	South East Management Advisory Committee (SEMAC), Slope Resource Assessment Group (SlopeRAG), Shelf Resource Assessment Group (ShelfRAG), Deepwater Resource Assessment Group (DeepRAG)
Main markets	Domestic: Sydney and Melbourne—fresh, frozen International: minor exports

Table 9.2 continues over the page

TABLE 9.2 Main features and statistics of the Commonwealth Trawl Sector and Scalefish Hook Sector of the Southern and Eastern Scalefish and Shark Fishery CONTINUED

Feature	Description			
EPBC Act assessments: —listed species (Part 13) —international movement of wildlife specimens (Part 13A)	Current accreditation dated 2 February 2010 Current accreditation (Wildlife Trade Operation) expires 30 July 2012			
Ecological risk assessment	Level 1: Scale Intensity Consequence Analysis (SICA) completed on 600 species (Daley et al. 2007; Wayte et al. 2007a,b) Level 2: Productivity Susceptibility Analysis (PSA) completed on 600 species—159 high-risk species (trawl), 1 high-risk (Danish-seine), 56 high-risk (auto-longline) (Daley et al. 2007; Wayte et al. 2007a,b) Level 3: Sustainability Assessment for Fishing Effects (SAFE) completed on 440 species—23 high-risk species (trawl), 43 high-risk (auto-longline) (Zhou et al. 2007) Residual risk: 10 high risk (trawl); 1 high risk (Danish seine); 9 high risk (auto-longline) (AFMA 2010a,b,c)			
Bycatch workplans	South East Trawl Fishery Bycatch and Discarding Workplan (1 July 2009–30 June 2011) (AFMA 2009b) Auto Longline Fishery Bycatch and Discarding Workplan (1 July 2009–30 June 2011) (AFMA 2009c)			
Fishery statistics ^a	2008–2009 fishing season		2009–2010 fishing season	
Fishing season/year	1 May 2008–30 April 2009		1 May 2009–30 April 2010	
TAC and catch by fishing season:	TAC (tonnes) ^b	Catch (trawl, hook) (tonnes)	TAC (tonnes) ^b	Catch (trawl, hook) (tonnes)
blue-eye trevalla	560	439 (38, 400)	560	421 (40, 381)
blue grenadier	4368	3820 (3810, 11)	4700	3281 (3270, 11)
blue warehou	365	161 (160, 1)	183	122 (121, 2)
deepwater sharks—mid-slope				
eastern zone	50	30 (30, <1)	75	40 (38, 2)
western zone	50	33 (32, <1)	63	43 (42, 1)
eastern school whiting	750	471 (trawl)	1125	490 (trawl)
flathead	2850	2916 (2915, <1)	2850	2832 (2831, <1)
gemfish, eastern	100	104 (84, 20)	100	87 (71, 16)
gemfish, western	167	99 (88, 11)	125	77 (64, 13)
gulper sharks (upper-slope) ^c	none	6 (5, 1)	none	3 (3, <1)
jackass morwong	560	578 (572, 5)	450	410 (408, 2)
John dory	190	140 (140, <1)	190	97 (97, <1)
mirror dory	634	430 (430, <1)	718	535 (531, 3)
ocean jacket, eastern	none	245 (245, <1)	none	253 (253, <1)
ocean perch	500	231 (182, 49)	400	203 (146, 21)
orange roughy, eastern	25	4 (trawl)	25	9 (trawl)
orange roughy, southern	25	<1 (trawl)	35	17 (trawl)
orange roughy, western	50	6 (trawl)	60	25 (trawl)
orange roughy, Cascade Plateau	700	125 (trawl)	500	465 (trawl)
smooth oreodory, Cascade Plateau	80	1 (trawl)	100	1 (trawl)
smooth oreodory, other	40	1 (trawl)	30	1 (trawl)
oreodory, other	150	103 (trawl)	188	96 (trawl)
pink ling	1080	1109 (645, 463)	800	838 (542, 296)
redfish	850	188 (188, <1)	678	190 (190, <1)
ribaldo	165	115 (37, 78)	165	130 (45, 86)
royal red prawn	400	86 (trawl)	400	108 (trawl)
silver trevally	296	128 (127, 1)	360	189 (188, 1)
silver warehou	3227	1544 (1544, <1)	3000	1323 (1321, 2)

Table 9.2 continues over the page

TABLE 9.2 Main features and statistics of the Commonwealth Trawl Sector and Scalefish Hook Sector of the Southern and Eastern Scalefish and Shark Fishery *CONTINUED*

Feature	Description			
Fishery statistics ^a	2008–2009 fishing season		2009–2010 fishing season	
TAC and catch by fishing season:	TAC (tonnes) ^b	Catch (trawl, hook) (tonnes)	TAC (tonnes) ^b	Catch (trawl, hook) (tonnes)
Effort	Fishing season 2008–2009	Calendar year 2008	Fishing season 2009–2010 (preliminary ^d)	Calendar year 2009
	Otter trawl: 59 823 bottom-time hours Danish-seine: 5685 shots Scalefish hook: 7 151 516 hooks	Otter trawl: 61 240 bottom-time hours Danish-seine: 6520 shots Scalefish hook: 6 745 084 hooks	Otter trawl: 57 066 bottom-time hours Danish-seine: 6381 shots Scalefish hook: 5 387 435 hooks	Otter trawl: 57 160 bottom-time hours Danish-seine: 5980 shots Scalefish hook: 5 946 801 hooks
Fishing permits	59 CTS vessels 22 Victorian coastal waters trawl permits 58 Scalefish hook vessels		59 CTS vessels 22 Victorian coastal waters trawl permits 58 Scalefish hook vessels	
Active vessels	Trawl: 53; non-trawl: 20		Trawl: 51; non-trawl: 21	
Observer coverage	462 trawl shots (3.6% of trawling hours) 15 Danish-seine shots (0.2% of shots) 612 990 auto-longline hooks set (9.1%)		657 trawl shots (3.1% of trawling hours) 32 Danish-seine shots (0.5% of shots) 658 750 auto-longline hooks set (11.1%)	
Real gross value of production (2008–09 dollars)	2007–08: \$46.6 million in the CTS and \$8.1 million in the SchS		2008–09: \$54.3 million in the CTS and \$9.4 million in the SchS	
Allocated management costs (2008–09 dollars)	2007–08: \$3.7 million		2008–09: \$3.4 million	

CTS = Commonwealth Trawl Sector; EPBC Act = *Environment Protection and Biodiversity Conservation Act 1999*; SchS = Scalefish Hook Sector; TAC = total allowable catch; ITQ = individual transferable quota

a Fishery statistics are provided by fishing season unless otherwise indicated.

b Agreed TAC: TACs for individual quota species set annually by the AFMA Commission; the actual TAC may vary depending on carryover of undercatch and overcatch from the previous year. The TAC shown is for all sectors and fisheries (state and Commonwealth).

c 150 kg trip limit. Catches for gulper sharks are derived from logbooks using the Codes for Australian Aquatic Biota (CAAB) code for 'endeavour dogfish'. This code is generally used to describe the three species in this group, rather than just the true endeavour dogfish. Another CAAB code that may include gulper sharks was excluded, as it also contains sharks from four other families and therefore is not a good indication of gulper shark catch. Thus, reported catches are an underestimate.

d Preliminary effort data as of 27 May 2010.

9.1 BACKGROUND

The Commonwealth Trawl Sector (CTS) of the Southern and Eastern Scalefish and Shark Fishery (SESSF) stretches from Sydney southwards around Tasmania to Cape Jervis in South Australia, where it abuts the Great Australian Bight Trawl Sector (GABTS, Chapter 11) (Fig. 9.1a). To the north, the CTS adjoins the East Coast Deepwater Trawl Sector (Chapter 10), which extends to 24°30'S off Queensland. The Scalefish Hook Sector (SchS) extends from the same boundary off Queensland to the South Australia–Western Australia border (Fig. 9.1b). The SchS is managed as part of the Gillnet, Hook and Trap Sector (GHTS)

of the SESSF, but is reported here because most target species are shared with the CTS.

Some of the species and stocks extend beyond the fisheries' boundaries and are managed by other jurisdictions. However, under Offshore Constitutional Settlement arrangements, the relevant states have largely ceded control of the SESSF quota-managed species to the Australian Government. Thus, in most instances, the catches in state waters by Commonwealth-endorsed vessels are debited against the respective SESSF total allowable catch (TAC) limits (Table 9.2). However, New South Wales retains jurisdiction over non-trawl fishers out to 80 nautical miles (nm) along its entire coastline, and over trawl fishers for the same distance offshore north of Sydney and out to 3 nm offshore south of Sydney.

TABLE 9.3 History of the Commonwealth Trawl Sector of the SESSF

Year	Description
1915	Fishery started with introduction of three steam trawlers by New South Wales Government.
1920–1928	Steam trawler fleet expanded.
1928–1929	Flathead catches peaked at more than 5000 t.
1933–1947	Danish-seining introduced to New South Wales, then Victorian waters.
Late 1940s	Declines in flathead stocks led to increased catches of redfish and jackass morwong.
1960	Last steam trawler left fishery.
1961–1971	Fleet consisted of Danish-seiners only.
1971–1985	Expansion of otter trawlers into fishery and reduction in the number of Danish-seine vessels by 1979. New South Wales otter trawl fleet expanded the area fished southward and to deeper waters. This fleet was 130 vessels by the early 1980s.
1985	South East Trawl Fishery Management Plan introduced, including limited entry to the fishery, the formation of the South East Trawl Management Advisory Committee and mandatory logbooks.
1988	TAC introduced for eastern gemfish (after catches peaked in the 1980s).
1989	ITQs introduced for eastern gemfish.
1989–1990	TACs introduced for orange roughy off eastern and southern Tasmania.
1992	Sector-wide TACs and ITQs implemented for 16 species and species groups.
1993–1996	Zero TAC implemented for eastern gemfish from 1993 to 1996.
1994	Independent scientific monitoring program initiated to collect data on discards, catch and fishing practices, and port data on the size composition of landings. TAC introduced for blue-eye trevalla in the trawl sector to reduce targeting.
1997	Structural adjustment removed 27 permits from the fishery.
1998	Global TAC ^a introduced for blue-eye trevalla.
2001	Global TACs extended to all 16 quota species/groups.
2002	Eastern gemfish catch reduced to 100 t. Trip limits introduced for Harrison's, endeavour and southern dogfish.
2003	St Helens Hill closure implemented for orange roughy (all trawl methods prohibited).
2005	Harvest strategy framework adopted by AFMA; TACs introduced for additional six stocks.
2006	Structural adjustment package reduced concessions from 118 to 59. Orange roughy listed as conservation dependent under the EPBC Act. The Orange Roughy Conservation Programme (AFMA 2006) commenced, prohibiting targeted fishing for orange roughy outside the Cascade Plateau.
2007	16-month fishing year (season) from 1 Jan 2007 to 30 April 2008 to enable the fishery to move to a fishing year running from 1 May 2008 to 30 April 2009 (and the same period for all subsequent years). Gulper shark closures implemented: i) endeavour dogfish—waters off Sydney in the area of the submarine cable protection zone closed to all fishing methods; ii) Harrison's dogfish—eastern Bass Strait closed to all hook and trawl methods. In line with the Orange Roughy Conservation Programme, areas deeper than 700 m were closed to all trawl methods (except those exempt). Tasmanian Seamounts Marine Reserve was declared with all trawl methods prohibited. South-east Commonwealth marine reserve network declared.
2008	Trawling in the SESSF nominated as a key threatening process under the EPBC Act. Three species of gulper sharks (<i>Centrophorus harrissoni</i> , <i>C. moluccensis</i> , <i>C. zeehaani</i>) nominated for listing as threatened under the EPBC Act. Rebuilding strategies commenced for blue warehou (AFMA 2008b), eastern gemfish (AFMA 2008c) and school shark (AFMA 2008d).
2009	Eastern gemfish and school shark listed as conservation dependent under the EPBC Act. Creation of SEMAC with the amalgamation of SETMAC and GHATMAC. SPFMAC and SquidMAC to be included in 2010.

AFMA = Australian Fisheries Management Authority; EPBC Act = *Environment Protection and Biodiversity Conservation Act 1999*; SETMAC = South East Trawl Management Advisory Committee; GHATMAC = Gillnet, Hook and Trap Management Advisory Committee; ITQ = individual transferable quota; SEMAC = South East Management Advisory Committee; SESSF = Southern and Eastern Scalefish and Shark Fishery; SPFMAC = Small Pelagic Fishery Management Advisory Committee; SquidMAC = Southern Squid Fishery Management Advisory Committee; TAC = total allowable catch

a Global TACs encompassed all commercial fishing methods in Commonwealth-managed CTS waters.

SOURCE: Tilzey (1994); www.environment.gov.au; AFMA (2006, 2008b,c,d, 2009b,c); Wilson et al. (2009).

TABLE 9.4 History of the Scalefish Hook Sector of the SESSF

Year	Description
1980s	Non-trawl sector with limited entry, primarily droplining. Targeting of blue-eye trevalla started.
1992	Trip limits introduced for eastern gemfish.
1996	Sector combined with the SESSF.
1997	Mandatory Commonwealth logbooks replaced state reporting. 160 non-trawl endorsed fishers (including gillnet). A TAC of 250 t introduced for blue warehou.
1998	Global TACs introduced for blue-eye trevalla, blue warehou and pink ling.
2001	Global TACs extended to all SESSF quota species and groups.
2002	183 m auto-longline closure: all waters shallower than 183 m closed to auto-longlining.
2002–04	Auto-longlining increased in effort to peak in 2004 (8 504 902 hooks set).
2003	Trip limits introduced for gulper sharks (Harrison's, endeavour and southern dogfish).
2004	Cascade Plateau closed to hook methods as a precaution for blue-eye trevalla. The auto-longline sector expanded into Great Australian Bight waters.
2005	Harvest strategy framework adopted by AFMA.
2006	Structural adjustment package reduced concessions from 122 to 59.
2007	ScHS gulper shark closure: southern dogfish area closure to hook methods.
2009	Creation of SEMAC with the amalgamation of SETMAC and GHATMAC. SPFMAC and SquidMAC to be included in 2010.

AFMA = Australian Fisheries Management Authority; SETMAC = South East Trawl Management Advisory Committee; GHATMAC = Gillnet, Hook and Trap Management Advisory Committee; ScHS = Scalefish Hook Sector of the SESSF; SEMAC = South East Management Advisory Committee; SESSF = Southern and Eastern Scalefish and Shark Fishery; SPFMAC = Small Pelagic Fishery Management Advisory Committee; SquidMAC = Southern Squid Fishery Management Advisory Committee; TAC = total allowable catch

Source: Tilzey (1994); Wilson et al. (2009).

9.2 THE 2009 FISHERY

The CTS and ScHS continue to be an important component of the Australian fishing industry, particularly as a significant supplier of fresh fish for Sydney and Melbourne fish markets. In 2009–10 fishing season, a total of 19 280 t of quota was agreed upon across the quota species and groups (Table 9.2); the actual total quota available was 20 501 t, once overcatch and undercatch were taken into account. This was a reduction from the total available quota in the 2008–09 fishing season. The majority of the quota (18 877 t) was for target species and groups, while 403 t was allocated as ‘bycatch quota’ to cover the incidental catch of eastern gemfish, blue warehou and orange roughy (eastern, southern and western regions). The total landings of target quota species in 2009–10 were 11 770 t, and the landings of bycatch quota species were 260 t, both around 61% of the available quota.

The total landings of quota species in the CTS were 11 066 t, decreasing from 12 839 t in the 2008–09 fishing season; of this amount, 242 t was for ‘bycatch quota’ species. In 2009–10 blue grenadier, flathead and silver warehou remain key species in terms of catch volume; however, all three showed reductions in catches, in line with reduced TACs (Table 9.2). Catches of orange roughy from all sectors with a byproduct TAC increased, and catches on the Cascade Plateau also increased to 465 t from 125 t in 2008–09. Catches of several species—blue warehou, blue grenadier, whiting, western gemfish, jackass morwong, ocean perch, redfish, ribaldo, royal red prawn and silver warehou—declined by more than 10% from 2008–09 (Table 9.2). There were increases (>10%) in the catch of deepwater sharks, mirror dory and silver trevally (Table 9.2).

Annual (calendar year) fishing effort in the CTS (hours of bottom-time) peaked in 2001

at 112 000 hours (Fig. 9.2a). After the removal of fishing concessions by the *Securing our Fishing Future* structural adjustment package, trawl effort declined to 58 000 hours in 2007. Effort decreased by 7% in 2009 to 57 160 hours (61 240 hours in 2008). Effort in the Danish-seine fleet has been more consistent and was 5980 shots in the 2009 calendar year (Fig. 9.2a).

Landings of quota species in the ScHS in 2009–10 fishing season totalled 964 t, 1.7% lower than in 2008–09 (981 t) and 37.0% lower than the peak of 1529 t in 2004 (Fig. 9.2b), noting the change from calendar year to fishing year. Blue-eye trevalla and pink ling remain the key species however, their catches reduced by 30.5% and 38%, respectively, in line with TAC reductions (Table 9.2). Hook effort peaked at around 10 million hooks in 2005 and has since declined; effort was 5 946 801 hooks set in 2009, compared with 6 745 084 hooks sets in 2008.

Scalefish catches in the CTS typically account for more than 85% of the gross value of production (GVP) in the SESSF. In the 2008–09 financial year, GVP in the CTS increased by \$8.3 million (18%) to \$54.2 million, while GVP in the ScHS increased by \$1.3 million (16%) to \$9.4 million (in real terms). This resulted in a combined GVP for both sectors of \$63.6 million. Blue grenadier and flathead were the most valuable species in 2008–09, valued at \$14.8 million and \$11.8 million, respectively. Other important species in terms of value included pink ling (\$7.8 million), silver warehou (\$3.7 million) and blue-eye trevalla (\$3.6 million) (Fig. 9.3).



Port of Eden PHOTO: NEIL BENSLEY, ABARE-BRS

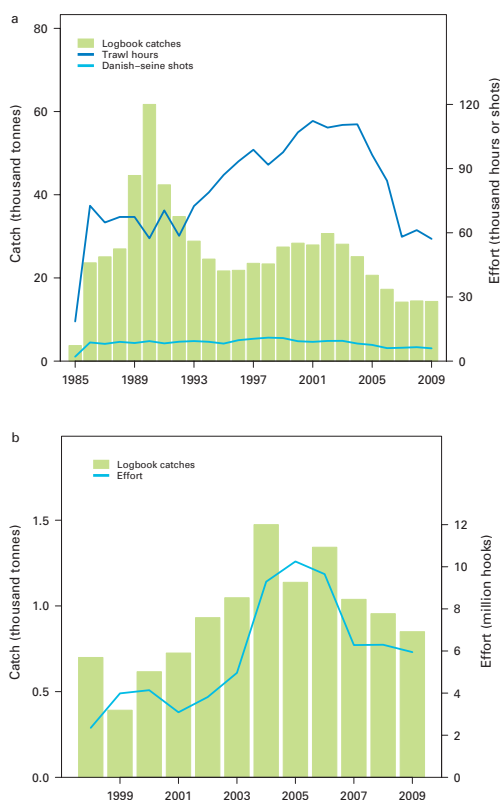


FIGURE 9.2 Total landings and fishing effort in the SESSF for a) the CTS, 1985 to 2009 and b) the ScHS, 1998 to 2009

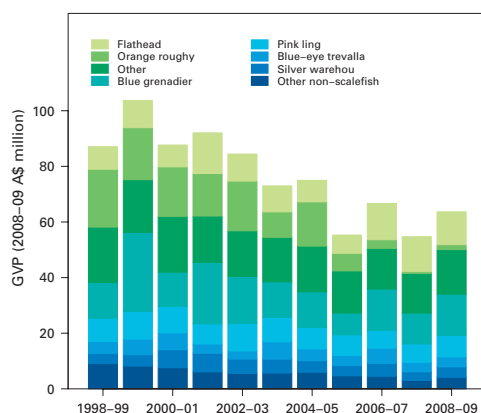


FIGURE 9.3 Real gross value of production (GVP), by key species, of the CTS and ScHS, 1998–99 to 2008–09 financial years

NOTE: Other non-scalefish does not include shark species reported in the Shark Gillnet and Shark Hook sectors but includes other shark species (Chapter 12).

Minor byproduct species

Landings of byproduct (non-TAC) species in the CTS (excluding those of small pelagic species) were 2700 t in 2009–10, a 12% increase from 2400 t in 2008–09. A further 79 t of non-quota species was landed in 2009–10 from the SchS, compared with 103 t in 2008. These non-quota catches included some byproduct from the Shark Gillnet and Shark Hook sectors (Chapter 12), because a common logbook is used (Table 9.5).



Trawl catch PHOTO: MIKE GERNER, AFMA

TABLE 9.5 Minor byproduct stocks–TACs/triggers, catches/landings and discards in the CTS and SchS of the SESSF

Species	TAC/ trigger	2008–09 catch (tonnes)	2008–09 discards (tonnes)	2009–10 catch (tonnes)	2009–10 discards (tonnes)
King dory (<i>Cyttus traversi</i>)	None	137	0.0	137	0.0
Southern frostfish (<i>Lepidopus caudatus</i>)	None	117	60.1	142	34.0
Latchet (<i>Pterygotrigla polyommata</i>)	None	71	0.0	98	0.1
Pink snapper (<i>Pagrus auratus</i>)	None	63	0.0	104	0.0
Red gurnard (<i>Chelidonichthys kumu</i>)	None	90	7.5	72	8.4
Saw sharks (Pristiophoridae)	See Chapter 12	77	0.3	78	0.3
Gummy shark (<i>Mustelus antarcticus</i>)	See Chapter 12	82	0.0	71	0.6
Alfonsino (<i>Beryx splendens</i>)	See Chapter 10	50	0.0	89	0.0
Hapuku (<i>Polypriion oxygeneios</i>)	None	74	0.0	48	0.0
Stargazer (Uranoscopidae)	None	68	0.0	54	0.0
Boarfish (Pentacerotidae)	None	6	0.0	115	0.0
Barracouta (<i>Thyrstites atun</i>)	None	58	22.7	57	32.7
Australian angel shark (<i>Squatina australis</i>)	None	46	0.0	50	0.0
Silver dory (<i>Cyttus australis</i>)	None	37	0.4	30	0.0

Table 9.5 continues over the page

TABLE 9.5 Minor byproduct stocks—TACs/triggers, catches/landings and discards in the CTS and ScHS of the SESSF CONTINUED

Species	TAC/ trigger	2008–09 catch (tonnes)	2008–09 discards (tonnes)	2009–10 catch (tonnes)	2009–10 discards (tonnes)
Cuttlefishes (Sepiidae)	None	31	0.0	32	0.0
Grey morwong (<i>Nemadactylus douglasi</i>)	None	27	0.0	31	0.0
Sharkfin guitarfishes—Sand sharks (Rhynchobatidae)	None	28	0.0	25	0.0
Elephantfish (<i>Callorhinchus milii</i>)	See Chapter 12	16	0.0	22	0.2
School shark (<i>Galeorhinus galeus</i>)	See Chapter 12	13	0.6	19	3.1
Skates (<i>Rajidae</i>)	None	17	1.7	14	2.5
Mackerel (<i>Scomber scombrus</i>)	None	14	7.0	16	3.0
Bugs—Shovel nosed and slipper lobsters (Scyllaridae)	None	16	0.0	12	0.0
Skates and rays	None	15	2.6	13	2.6
Octopuses (Octopoda)	None	11	0.0	14	0.0
Rudderfish (<i>Centrolophus niger</i>)	None	16	0.4	9	0.0
Jack mackerel (<i>Trachurus declivis</i>)	None	13	4.7	10	5.2
White trevalla (<i>Seriola caerulea</i>)	None	14	0.0	6	0.0

CTS = Commonwealth Trawl Sector; ScHS = Scalefish Hook Sector; SESSF = Southern and Eastern Scalefish and Shark Fishery;
TAC = total allowable catch



Sorting the catch PHOTO: MIKE GERNER, AFMA



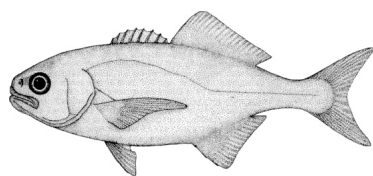
Trawler, Eden PHOTO: FIONA SALMON, DAFF

9.3 BIOLOGICAL STATUS

Copies of assessment reports and background documents are available on the Australian Fisheries Management Authority (AFMA) website (www.afma.gov.au).

BLUE-EYE TREVALLA

(*Hyperglyphe antarctica*)



LINE DRAWING: FAO

TABLE 9.6 Biology of blue-eye trevalla

Parameter	Description
Range	Species: In Australia, known from southern Queensland to south-western Western Australia, including Tasmania; also found in South Africa and New Zealand. Stock: No evidence of structuring within the area of the SESSF; regarded as one stock across the SESSF (including the GABTS). Some New South Wales catch is included in assessments, primarily from dropline methods.
Depth	400–600 m
Longevity	39–42 years
Maturity (50%)	Age: 8–12 years Size: 62–72 cm TL
Spawning season	March–April (Tasmania) and April–June (New South Wales)
Size	Maximum: ~140 cm TL; weight: ~40 kg Recruitment into the fishery: ~50 cm FL; age: 2–3 years; weight: not determined

GABTS = Great Australian Bight Trawl Sector; SESSF = Southern and Eastern Scalefish and Shark Fishery; TL = total length

SOURCES: Gomon et al. (2008); Robinson et al. (2008).

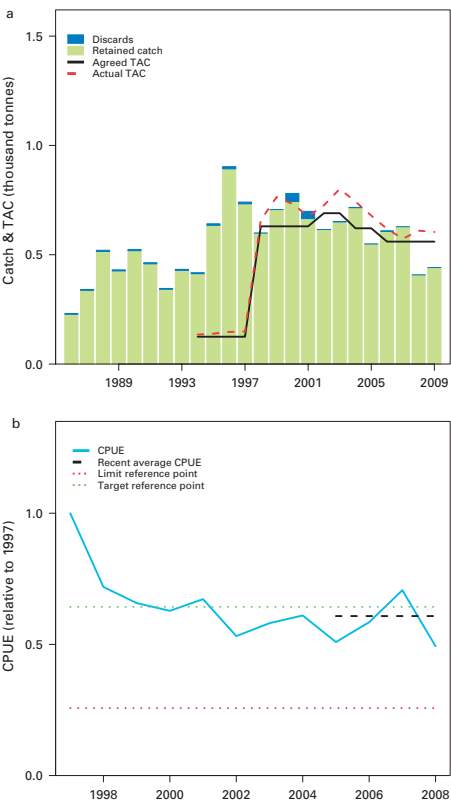


FIGURE 9.4 Blue-eye trevalla a) catch history from the CTS and ScHS, 1986 to 2009 and b) catch per unit effort (CPUE) for the CTS only, 1997 to 2008.

NOTE: that discards and state catch are not included for 2009

Stock status determination

The RBC (global) estimated by the Slope Resource Assessment Group (SlopeRAG) was 612 t for the 2009–10 fishing season, before discards and state catches were taken into account (SlopeRAG 2010). The 2009–10 agreed TAC (global) set by the AFMA Commission was the same as the 2008–09 TAC (560 t) (Table 9.2); however, the actual TAC (global), once carryover of uncaught quota was applied, was 604 t (Fig. 9.4a). A total of 421 t was landed by the CTS and ScHS in the 2009–10 fishing season, with the latter taking most of the catch (381 t). Trawl and dropline catches are mostly of young, immature fish; larger, mature fish become vulnerable to auto-longline fishing when they form seasonal spawning aggregations (Table 9.6).

The 2009 Tier 4 assessment was based on standardised catch rates from the dropline and auto-longline sectors (Fig. 9.4b) (Haddon 2010a). Since 2008, the two time series have been combined with a common unit of catch per shot to provide a longer time series (1997 to 2008). The catch per unit effort (CPUE) series from the trawl sector was not considered to be informative because blue-eye trevalla is a byproduct species and this sector accounts for only a small proportion (<10%) of the total catch (SlopeRAG 2010).

The CPUE standardisation included only shots at depths of 200–600 m and where blue-eye trevalla were caught. The GABTS catches and CPUE are included. Data from the Cascade Plateau and seamounts on the east coast were excluded because they were particularly variable. Discarding is minimal in both sectors. The significant factors in the standardisation model were year, vessel, month, zone, day/night, depth and an interaction between month and zone (Haddon 2010a).

Similar to the 2008 assessment, the 2009 Tier 4 assessment suggests that the stock is **not overfished** (Table 9.1). The standardised CPUE is close to, but slightly below, the target CPUE, based on a reference period of 1997 to 2006, when the stocks were considered to be fully fished (Fig. 9.4b) (Haddon 2010b). The stock is also assessed as **not subject to overfishing** based on the fact that the 2009–10 catch was less than the RBC. However, there are concerns about the potential for localised depletion, so the spatial distribution of the catch should be closely monitored.

Reliability of the assessment/s

The Tier 4 assessment relies solely on CPUE from the hook sector being a reliable index of abundance. There is no incorporation of potential changes in fishing efficiency of vessels over the period. The extent to which changes in area fished—including the expansion to the Great Australian Bight and movements in response to the presence of killer whales—are addressed by the standardisation is not clear.

Previous assessment/s

Tier 3 assessments were applied to blue-eye trevalla in 2006 and 2007. However, a detailed examination of the data in 2008 (Fay 2008) confirmed that the size and age composition of the catch varied annually, seasonally and spatially. Variation in the timing and location of sampling, seasonal movement of fish and differences in the depth distribution of fish of different sizes all contributed to this variation. Variability, combined with reduced selectivity for larger fish, results in more variable and higher estimates of total mortality than would be expected given the biology of the species. Therefore, in 2008, the SlopeRAG rejected the Tier 3 assessment and moved to a Tier 4 assessment as the basis for calculating the RBC.

Several attempts to use conventional stock assessment models have proven unsuccessful, mainly because the available data are inadequate to represent the spatial and temporal structuring evident in the population and the fishery.

Future assessment needs

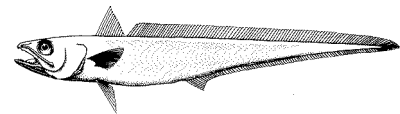
The potential for localised depletion and increased fishing efficiency should be examined, particularly given the current reliance on the Tier 4 assessment. Although the trawl sector CPUE has not been used in the assessment, it may still provide an indicator of biomass if the standardisation is appropriate, and could also be considered. Preliminary results from the fishery-independent survey suggest that it may provide a useful index of abundance for blue-eye trevalla in the longer term.



Trawl catch PHOTO: MIKE GERNER, AFMA

BLUE GRENADIER

(Macruronus novaezelandiae)



LINE DRAWING: ROSALIND POOLE

TABLE 9.7 Biology of blue grenadier

Parameter	Description
Range	Species: Occurs in temperate southern waters, including New Zealand. In Australia, it is found from central New South Wales to south-western Western Australia. Stock: Separate stocks are fished by the GABTS and CTS, and there may also be separate stocks between western Tasmania and eastern Bass Strait.
Depth	450–800 m
Longevity	25 years
Maturity (50%)	Age: 4–5 years Size: females 64 cm; males 57 cm TL
Spawning season	May–September (off western Tasmania); spawning aggregation off eastern Tasmania (observed 2007–2009)
Size	Maximum: ~110 cm TL; weight 6 kg Recruitment into the fishery: ~55–60 cm TL; age: 3–4 years (non-spawning fishery); weight: not determined

CTS = Commonwealth Trawl Sector; GABTS = Great Australian Bight Trawl Sector; TL = total length

SOURCES: Gomon et al. (2008); Hamer et al. (2009).



Trawl catch PHOTO: MIKE GERNER, AFMA

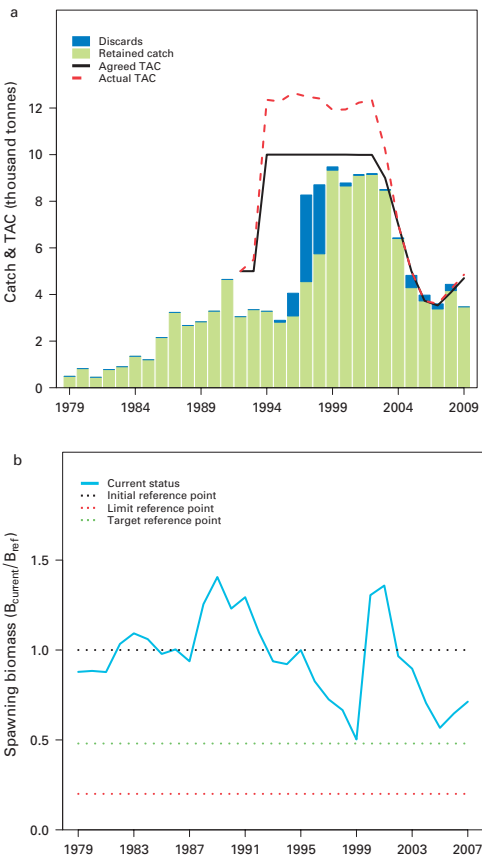


FIGURE 9.5 Blue grenadier a) catch history 1979 to 2009 and b) estimated biomass for the CTS and SchS, 1979 to 2007.

NOTE: that discards and state catch are not included for 2009

Stock status determination

The long-term RBC estimated by SlopeRAG was 4700 t (SlopeRAG 2010). The 2009–10 fishing season agreed TAC (global) set by the AFMA Commission was 4700 t (Table 9.2); however, the actual TAC (global) was 4851 t once carryover of uncaught quota was taken into account. The 2009–10 total catch from the CTS and SchS was 3281 t, with 3270 t reported by the CTS. There are two distinct blue grenadier fisheries: a spawning fishery targeting spawning aggregations off western Tasmania between late May and early September and a non-spawning fishery where the catch is caught during general

CTS trawling. In 2008–09 the spawning fishery caught 70% of the CTS catch.

An age-structured, integrated assessment model was last updated in 2008, with data up to 2007. The model focused on the stock in the CTS and incorporated the standardised CPUE from the spawner and non-spawner fisheries, estimates of spawner biomass from acoustic surveys (2003 to 2007) and egg survey estimates of female spawning biomass (1994 to 1995). The model was not updated in 2009, as a three-year TAC of 4700 t had been set (2009–10 to 2011–12 fishing years).

The 2008 model estimated that female spawning biomass was at $0.71B_0$ (71% of the unfished biomass) in 2007 (Fig. 9.5b). This was projected to decline to $0.5B_0$ in 2009 if catches followed the RBC, as the abundance of strong cohorts from the mid-1990s declined and most catch was taken from the relatively less abundant recent cohorts. The model suggested that the long-term RBC would be around 4700 t.

SlopeRAG examined standardised CPUE from the non-spawning fishery (Haddon 2010a), the results of the 2008 acoustic biomass survey (SlopeRAG 2010) and the size and age composition data (Hobsbawn 2009). The standardised CPUE from the non-spawning fishery showed a slight increase back to 2006 levels. The spawning fishery CPUE was regarded as less informative because the fishery targets spawning aggregations and the size of catches is limited by the vessel processing capacity (SlopeRAG 2010). The estimate of biomass from the 2008 acoustic survey was lower than from the 2006 and 2007 surveys, but similar in magnitude to the 2003 survey. This is regarded as a lower bound of the biomass, as it does not account for fish outside the schools or movement of fish into and out of the spawning grounds (SlopeRAG 2010). The size and age composition indicate that a new, relatively strong cohort is starting to enter the fishery. Taken together, these indicators and the projection from the 2008 assessment do not raise concerns. The stock remains assessed as **not overfished** in 2009, and current catch levels (Fig. 9.5a) indicate that the stock is **not subject to overfishing** (Table 9.1).

Reliability of the assessment/s

The greatest uncertainty in the Tier 1 assessment is the potential impact of the stock structure. Hamer et al. (2009) suggest that the GABTS is a separate stock, in line with the current assessment approach, but indicates that separate stocks east and west of Bass Strait may need to be considered. The 2008 assessment had difficulty fitting some of the trends in the two CPUE time series, with the fit to the CPUE for the non-spawning CPUE appearing to be one to two years out of phase with the observed CPUE. The estimated target strength of blue grenadier is an important parameter and source of potential error in acoustic surveys. Experiments were conducted in 2008 to measure target strength of individual blue grenadier, with concurrent optical images giving estimates of length, orientation and species identity. Initial results support the estimates of target strength that had previously been used in the assessment (SlopeRAG 2010).

Previous assessment/s

The spawning biomass (Fig. 9.5b) is estimated to have peaked in 2001, when the strong 1994 and 1995 year classes matured. It declined from 2001 onwards, as the abundance of the two strong cohorts diminished, until 2007 when new strong cohorts began maturing. These new cohorts are estimated to be approximately equal to (in 2003) or twice (in 2004) those predicted by the stock–recruitment relationship, but are not as strong as those of the mid-1990s. The variations in spawning biomass mainly reflect these variations in the strength of recruitment, since fishing mortality levels are estimated to have generally been below 10%.

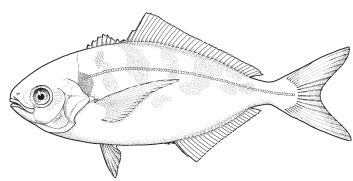
Future assessment needs

The implications of the potential stock structure within the SESSF need to be understood, particularly in terms of the non-spawning and spawning catch rates and integration in the model. Reducing the uncertainty in acoustic biomass estimates

is important to improve their usefulness to the assessment. There is a potential need for a separate assessment of the stock targeted by the GABTS, as the status is unknown.

BLUE WAREHOU

(*Seriolella brama*)



LINE DRAWING: ROSALIND POOLE

TABLE 9.8 Biology of blue warehou

Parameter	Description
Range	Species: Typically found in south-eastern Australia (New South Wales, Victoria, Tasmania and South Australia); also New Zealand. Stock: There are two stocks targeted in the SESSF, east and west of Bass Strait. Significant catches have been made by Tasmanian fishers, but these have been lower in recent years.
Depth	50–500 m, but most catches from <300 m
Longevity	10–15 years
Maturity (50%)	Age: 2–3 years Size: 32 cm FL
Spawning season	Winter in various locations
Size	Maximum: 76–90 cm TL; weight: 7 kg Recruitment into the fishery: 35–45 cm FL; age: not determined; weight: not determined

FL = fork length; SESSF = Southern and Eastern Scalefish and Shark Fishery

SOURCES: Talman et al. (2003); Gomon et al. (2008).



Blue warehou PHOTO: MIKE GERNER, AFMA

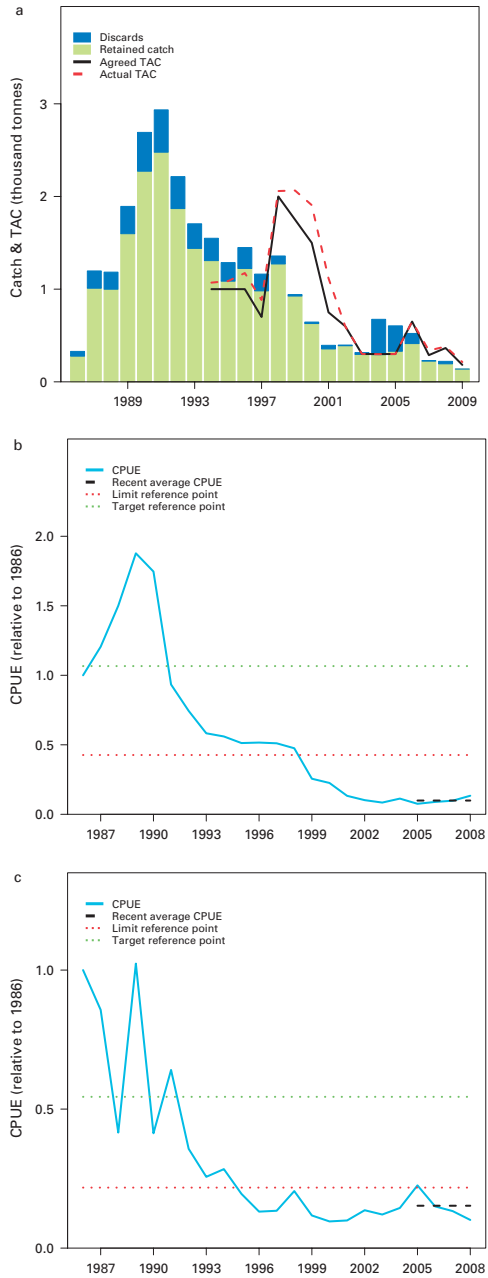


FIGURE 9.6 Blue warehou a) catch history from the CTS and SchS 1986 to 2009, b) standardised CPUE (east) for the CTS 1986 to 2008 and c) CPUE (west) for the CTS, 1986 to 2008.

NOTE: that discards and state catch are not included for 2009

Stock status determination

The integrated (Tier 1) assessment was updated in 2008, following a substantial effort to explore patterns in the catch and effort data (Punt 2008). In general, this did not lead to substantial changes in the CPUE series. The assessment was regarded as more data poor and less reliable than previous assessments because the sample sizes collected by observers for 2007 were very low, in comparison to previous years (Punt 2008). The lack of data for 2007 for blue warehou presents particular difficulties for the assessment because of the short lifespan of this species. SlopeRAG (2010) did not accept the Tier 1 assessment as a basis for determining the 2009–10 RBC.

The same data issues prevented a Tier 3 assessment being used (SlopeRAG 2010), so the RBC was calculated from a Tier 4 assessment, based on CPUE. The Tier 4 assessment was updated in 2009 (Haddon 2010b). Separate Tier 4 assessments are undertaken for the east and west stocks. The target reference point was the average CPUE from the reference period 1986 to 1995, and the limit reference point was 40% of this target. The recent standardised CPUE series for both east and west stocks was below the limit reference point (B_{LIM}) (Fig. 9.6b,c), indicating (as did the 2008 Tier 1 assessment) that both stocks remain assessed as **overfished** (Table 9.1). In the eastern stock, the standardised CPUE series is lower and has been below the limit reference point since 1998 (Fig. 9.6b). The western stock has been below the limit reference point since 1996, but was close to the limit reference point in 1998 and 2005, with a declining trend since 2005 (Fig. 9.6c).

The 2009–10 RBCs for both eastern and western stocks under the Tier 4 harvest control rules was zero (SlopeRAG 2010). AFMA released the stock rebuilding strategy in late 2008 (AFMA 2008b), with a 2009–10 ‘bycatch TAC’ (global) of 183 t (40 t in the east and 143 t in the west). The basis for the bycatch TAC is unclear; Klaer and Smith (2008) suggested that the TAC could be reduced by 67% (i.e. to ~120 t) without affecting the catch

of other species. Punt (2008) suggests that the 2008 exploitation rate was not predicted to lead to recovery for the western stock. There has been no modelling to demonstrate that the bycatch TAC levels will not inhibit rebuilding. The actual 2009–10 TAC (global) was set at 214 t, after carryover of uncaught quota.

The 2009–10 landed catch was reduced to 122 t, down from 160 t in 2008–09. This was made up of 25 t in the east and 97 t in the west (estimated from logbook and catch disposal records). These landed catches are substantially lower than historic values (Fig 9.6a). However, a key issue is the level of discarding. It is estimated that, between 2004 and 2006, 270–380 t were discarded annually, with discarding levels of 40–57% in the west and 13–46% in the east (SlopeRAG 2010). This level of discarding, in conjunction with landed catches, suggests that overfishing was occurring. The reported discard level decreased substantially in 2007, but this estimate is highly uncertain because of the low levels of observer coverage. The level of discarding in 2008 was estimated as 12% overall, but again there is uncertainty in the reliability of this estimate due to the low level of observer coverage and uncertainty whether fishers displayed normal discarding behaviour when observers were present (SlopeRAG 2010). The length frequency information from the discarded and landed catch suggests that high-grading was occurring (Hobsbawn 2009). Limited information is currently available on the level of discarding in 2009. The state catch in the east has been between 17 t and 26 t in recent years.

The reduction in landed catch in 2009–10 is a positive outcome. However, without a robust estimate of discards, it is uncertain whether total mortality has decreased to a level that would facilitate rebuilding. A voluntary closure took place for 10 weeks from mid-August, covering two full moons, to protect historical spawning grounds in the eastern stock. AFMA report that industry was generally compliant with the voluntary closure. The rebuilding strategy’s objective is to rebuild the stocks to B_{20} by 2015 and B_{48} by 2024–26. Given the declining CPUE trend in the western

stock (Haddon 2010b), the projection that the 2008 exploitation rate was unlikely to facilitate rebuilding of the western stock (Punt 2008), the indications of high-grading of the landed catch, and the lack of evidence of rebuilding in the more depleted eastern stock, the stock is assessed as **subject to overfishing** (Table 9.1).

Reliability of the assessment/s

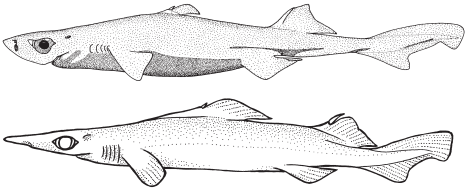
The Tier 1 integrated assessment was not used by SlopeRAG to set the 2009–10 TAC, due to the lack of observer data in 2007, which increased uncertainty; the Tier 4 assessment is also uncertain, given the nature of the approach. SlopeRAG expressed concern that the change to a ‘bycatch TAC’ may make the commercial CPUE less informative, due to the change in fishing practices (away from targeting). This is a critical issue, as the commercial CPUE is currently the only indicator of recovery. SlopeRAG also identified concerns about the accuracy of state catches, both recent and historical, which may also increase the uncertainty.

Future assessment needs

The assessment is limited by the lack of representative and recent data from the fishery, particularly in terms of discards. Adequate and representative observer data on the levels of discarding and sizes discarded needs to be collected, so that it can be incorporated into the assessment. The value of standardised CPUE as an index of biomass needs to be examined, including the use of a standardisation that includes the zero data points (Punt 2008). Consideration should also be given to updating the Tier 1 assessment (noting the data limitations in 2007 and 2008), as this would allow projections of recovery trajectories under different catch scenarios to be examined. A fishery-independent survey may provide an improved index of abundance, but this may be difficult given the schooling nature of the fish.

DEEPWATER SHARKS
(eastern and western zones)

(Various species)



LINE DRAWINGS: FAO, ANNE WAKEFIELD

TABLE 9.9 Biology of deepwater sharks (eastern and western)

Parameter	Description
General	Basket quota species: Portuguese dogfish (<i>Centroscymnus coelolepis</i>), golden dogfish (<i>C. crepidater</i>), bareskin dogfish (<i>Centroscyllium kamoharai</i>), Owston’s dogfish (<i>Centroscymnus owstoni</i>), Plunket’s dogfish (<i>Centroscymnus plunketi</i>), black shark (<i>Dalatias licha</i>), brier shark (<i>Deania calcea</i>), longsnout dogfish (<i>Deania quadrispinosa</i>), smooth lanternshark (<i>Etmopterus bigelowi</i>), short-tail lanternshark (<i>E. brachyurus</i>), pink lanternshark (<i>E. dianthus</i>), lined lanternshark (<i>E. dislineatus</i>), blackmouth lanternshark (<i>E. evansi</i>), pygmy lanternshark (<i>E. fusus</i>), southern lanternshark (<i>E. granulosus</i>), blackbelly lanternshark (<i>E. lucifer</i>), Moller’s lanternshark (<i>E. moller</i> i), slender lanternshark (<i>E. pusillus</i>)
Range	Species: Distribution is species dependent, but species are most commonly found within temperate southern Australian waters (Queensland, New South Wales, South Australia, Western Australia and Tasmania). Stock: The management assumes there are separate stocks east and west of Tasmania, within the bounds of the CTS.
Depth	50–1800 m
Longevity	Up to 50 years
Maturity (50%)	Age: 25–30 years Size: various
Spawning season	Unknown
Size	Maximum: ~150 cm TL; weight: various Recruitment into the fishery: all sizes; age: various; weight: not determined

CTS = Commonwealth Trawl Sector
SOURCES: Froese & Pauly (2009); Last & Stevens (2009).