

## Operational Interactions with Threatened, Endangered or Protected Species in South Australian Managed Fisheries Data Summary: 2007/08 – 2013/14



L. McLeay, A. Tsolos and M. K. Boyle

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Report to PIRSA Fisheries and Aquaculture

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The report was formally approved for release by Dr Stephen Mayfield (SARDI Aquatic Sciences).



## DEFINITIONS AND EXPLANATIONS

**Boat day:** Each time a licence holder operates their fishing gear it is considered an individual boat day. A morning trip and an evening trip on the same day are 2 boat days. Boat days also accumulate for a change in area, gear and/or target species for that day.

**EPBC Act:** The Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.

**FM Act:** The South Australian *Fisheries Management Act 2007*.

**NPWA:** The South Australian *National Parks and Wildlife Act 1972*.

**MFA:** A designated marine fishing area for reporting data. These may vary among fisheries.

**PIRSA:** Primary Industries and Regions South Australia.

**SARDI:** South Australian Research and Development Institute.

**TEPS:** A species classed as Threatened, Endangered or Protected under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC), *Fisheries Management Act 2001*, or the *National Parks and Wildlife Act 1972*.

**TEPS interaction:** any physical contact, collision or capture that a fisher, boat or fishing gear has with any Threatened, Endangered or Protected species.

**Interaction = “Other”:** This category includes depredation (e.g. bite offs), animals circling the boat or interacting with fishing gear, and/or discovering dead animals whilst in transit.

## EXECUTIVE SUMMARY

This is the fifth report on Threatened, Endangered and Protected Species (TEPS) interactions within South Australia's commercial fisheries and summarises data reported from commercial fishers between 1 July 2007 and 30 June 2014. The report builds on previous versions by synthesising information to analyse the key temporal and spatial trends in TEPS interactions as a function of taxonomic group, gear type and fishery but does not quantify the risk of commercial fishing operations to TEPS populations or quantify the factors influencing the trends in TEPS interaction rates recorded.

Multiple animals can be reported by commercial fishers in a single fishing interaction. Between 2007/08 and 2013/14, a total of 1,497 interactions comprising 7,831 animals listed as TEPS were reported. Of the 7,831 animals reported in this period, 27.6% (2,159) were recorded as 'caught, entangled or impact/collision' interactions, and 3.4% (269) were recorded as mortalities. Over 95% of the total interactions and total number of animals reported since 2007/08 were from net-fishing operations occurring in waters of central-western and southern Spencer Gulf, off the west coast of Eyre Peninsula (eastern Great Australian Bight), and the Coorong, Lower Lakes and Murray Mouth.

The number of TEPS interactions reported has increased steadily since reporting began, from 144 interactions in 2007/08 to 394 interactions in 2013/14. The total number of animals reported in interactions has remained relatively stable at approximately 515 per year between 2007/08 and 2012/13, but increased in 2013/14 to 4,736 animals. The relatively high number of interactions in 2013/14 are primarily associated with increased reporting of long-nosed fur seals *Arctocephalus forsteri* in gill net operations of the Lakes and Coorong Fishery.

The South Australian Sardine Fishery (SASF), Lakes and Coorong Fishery, Spencer Gulf Prawn Fishery (SGPF) and West Coast Prawn Fishery (WCPF) accounted for 94.1% of all TEPS interactions and 98.1% of all animals reported in TEPS interactions since 2007/08.

Purse seine operations of the South Australian Sardine Fishery (SASF) accounted for 40% of all TEPS interactions reported, and 19.8% of all animals listed as TEPS reported since 2007/08. The main TEPS recorded in purse seine interactions are cetaceans of which the short-beaked common dolphin *Delphinus delphis* comprise the species-majority. Cetaceans comprised between 66.8% (2008/09) to 99.2% (2013/14) of animals listed as TEPS reported in the SASF between 2007/08 and 2013/14. Reported interaction rates with cetaceans were lowest in 2010/11 at 0.120 cetaceans per net shot but have increased since, reaching 0.305 cetaceans per net shot in 2013/14. In contrast, cetacean mortality rates recorded between 2007/08 and 2013/14 have declined, from 0.017 to 0.001 cetaceans per net shot (total cetacean mortalities: 2007/08 (15); 2013/14: (1)). This response follows implementation of a Code of Practice developed by industry, fisheries managers

and scientists in 2005/06 that aimed to mitigate cetacean interactions, and highlights that collaborative industry, research and management approaches can help to reduce the impacts of fishing on TEPS populations.

Prawn trawl operations accounted for 27.1% of all TEPS interactions reported, and 9.2% of all animals listed as TEPS reported since 2007/08. The Gulf St Vincent Prawn Fishery (GSVVPF) has recorded only one TEPS interaction since reporting began in 2007/08. Interaction rates (per unit effort) are low compared to the SGPF and WCPF where a total of 718 animals have been reported. This indicates possible under-reporting of TEPS interactions in the GSVVPF. The main TEPS recorded as interactions in the SGPF and WCPF are fish from the Family Syngnathidae (seahorses, pipefishes, and seadragons). This taxonomic group comprised at least 98% of the 719 animals listed as TEPS and reported in prawn trawl fisheries since 2007/08. Reported syngnathid interaction rates in the SGPF and WCPF increased between 2009/10 and 2012/13 before declining in 2013/14, and were consistently higher in the WCPF than the SGPF (range WCPF: 0.002–0.049 fish per net shot; SGPF: 0.001–0.011 fish per net shot). Annual trends in syngnathid mortality rates in each fishery reflect the trends in interaction rates. Since 2009/10, an annual average of 11.2% and 63% of all syngnathids encountered in the SGPF and WCPF, respectively, have been reported dead.

Net operations within the Lakes and Coorong Fishery accounted for approximately 27.1% of all fishery interactions reported and 69.1% of all animals reported in fishing operations since 2007/08. The majority of interactions reported were with long-nosed fur seals. Reporting of long-nosed fur seal interactions has varied annually within this fishery. No long-nosed fur seals were reported in 2007/08, 2008/09 and 2011/12, however, recent reporting (2013/14) of long-nosed fur seal interactions has been high (4,298 animals). Although the number of interactions has increased, no interactions were recorded as 'caught, entangled or impact/collisions', and no long-nosed fur seal mortalities have ever been reported in this fishery.

Future reporting relating to TEPS interactions in South Australia's commercial fisheries could be improved by: 1) validating fishery-dependent reporting of TEPS interactions using fishery-independent observers; 2) improving fishery-dependent species identification for TEPS interacting with fisheries operations; and 3) reporting interaction/mortality rates of TEPS in relation to their local, national and international conservation and population status. These improvements would help identify the species most at risk from commercial fishing operations in South Australia, and inform possible strategies to help mitigate future impacts to TEPS populations and marine ecosystems.

## 1 INTRODUCTION

Wherever fishing overlaps with the distribution of an animal population, there exists the potential for operational interactions to occur. Operational interactions occur when a fishing vessel, fisher or fishing gear makes physical contact with a non-target species, and includes incidental capture in fishing gear (e.g. hooks, lines, nets, ropes) or vessel collisions that can potentially lead to injury or death. Such interactions may occur incidentally when the foraging or migratory behaviour of non-target species overlaps with areas targeted by fishing, or when non-target species are attracted to fishing operations that aggregate prey.

South Australia's State-managed commercial fisheries use a variety of fishing methods in marine, estuarine and freshwater habitats to target fish, crustacean and shellfish species valued at over \$210 million in 2013/14 (SARDI unpublished data) (Table 1). These fisheries are important to regional and State economies, however the fishing methods used have the potential to cause injury or death to non-target species.

**Table 1.** Species targeted in South Australia's main commercial fisheries, the gear types used and their production value in 2013/14 (\*data for the Charter Boat Fishery taken from EconSearch 2013).

<b>Fishery species</b>	<b>Gear type</b>	<b>2013/14 value (\$ million)</b>
Southern rock lobster	Pot	\$108.7
Western king prawn	Prawn trawl	\$30.2
Abalone	Dive	\$22.1
Marine Scalefish Fishery and Miscellaneous fisheries – various species	Various line and net	\$20.7
Sardine	Purse seine net	\$19.2
Inland Waters Fishery – various species	Various line and net	\$6.3
Blue crab	Pot	\$4.2
Charter Boat Fishery	Line	\$6.0 (GVP 2011/12)*

International and domestic environmental legislation now formally recognises the need to manage fisheries according to principles of ecologically sustainable development (Fletcher *et al.* 2002). This includes managing the potential negative impacts of fisheries on non-target species. From 1 July 2007, Primary Industries and Regions South Australia (PIRSA) Fisheries and Aquaculture implemented new arrangements for commercial fisheries to report interactions with Threatened, Endangered and Protected Species (TEPS). The TEPS listed under State and Commonwealth legislation include all seabirds, marine reptiles, and marine mammals and some protected marine fish species, including great white sharks and syngnathids (seahorses, sea dragons and pipefish) (Appendices 1-3; Commonwealth Department of Environment: [EPBC Act listed species](#)). These

reporting arrangements address requirements under 1) Section 71 of the *Fisheries Management Act 2007* (FM Act) to avoid capturing or harming any protected species encountered during fishing operations; 2) Part 5 Division 2 of the *National Parks and Wildlife Act 1972* of South Australia (NPWA) that places restrictions on the taking of protected animals; and 3) Part 13 of the EPBC Act which requires that commercial fishers report any action that results in the death, injury or movement of any individuals of a species to the Commonwealth Department of the Environment (DoE).

This is the fifth report on TEPS interactions within South Australia's commercial fisheries. While the format of previous data summaries of TEPS interactions voluntarily reported by South Australian commercial fishing operators has been retained (see Knight and Vainickis 2011a, b; Tsolos and Boyle 2012; 2013), this report builds on previous reports by synthesising information and presenting temporal and spatial trends in TEPS interactions for the main taxonomic groups, gear types and fisheries between 2007/08 and 2013/14.

## 2 METHODS

Commercial fishers record information relating to a TEPS interaction on a South Australian Managed Fisheries Wildlife Interaction Form (Appendix 4). Information includes the fisher's licence number, date and time that the interaction occurred, gear type used, number of animals involved in each interaction, nature of the reported TEPS interaction 'caught, entangled, impact/collision' or 'other', and observed status 'alive, injured, dead' and fate 'released, retained, discarded' of the TEPS involved (note, the 'other' category includes depredation (e.g. bite offs), animals circling the vessel or interacting with fishing gear, and/or discovering dead animals whilst in transit) (Appendix 4).

Wildlife Interaction Forms are then signed as accurate by the licence holder and posted to SARDI (Aquatic Sciences) each month where the data are entered into an Oracle database (SARDIP) established in 2007. Data are manually error-checked during the data-entry phase, and further validated via electronic look up tables and code-driven software that is activated during data entry and reporting operations. SARDI staff ring licence holders to correct any errors or information that is missing and identified in the quality assurance process. Except for the SASF (see Ward *et al.* 2015), no fishery-independent observer data are available to validate the accuracy of reporting of TEPS interactions in South Australian commercial fisheries.

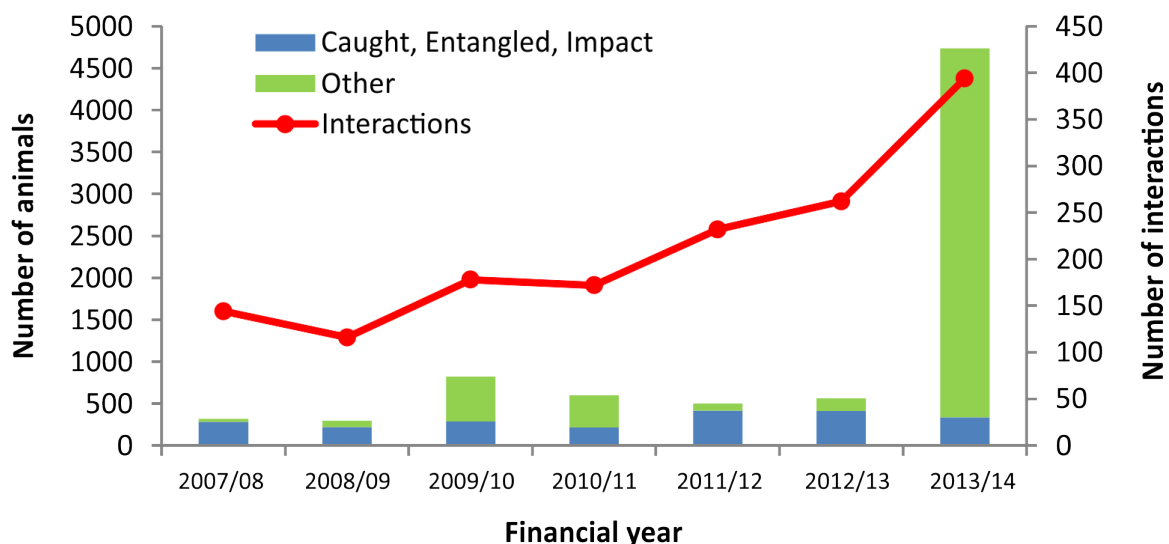
For this report, data queries were run from SARDIP and analysed to present temporal and spatial trends in the number of TEPS interactions and total number of animals encountered for the main taxonomic groups, gear types and fisheries. Temporal and spatial trends in the number of TEPS mortalities reported in fishing operations were also analysed. To help standardise temporal trends in the number of TEPS interactions and total number of animals reported in the main fisheries where interactions occur, we present estimates of encounter rates and mortality rates for key TEPS as a function of the amount of effort deployed within a fishery (e.g. number of animals per net set).

### 3 RESULTS

#### 3.1 Overview of TEPS interactions in South Australian fisheries

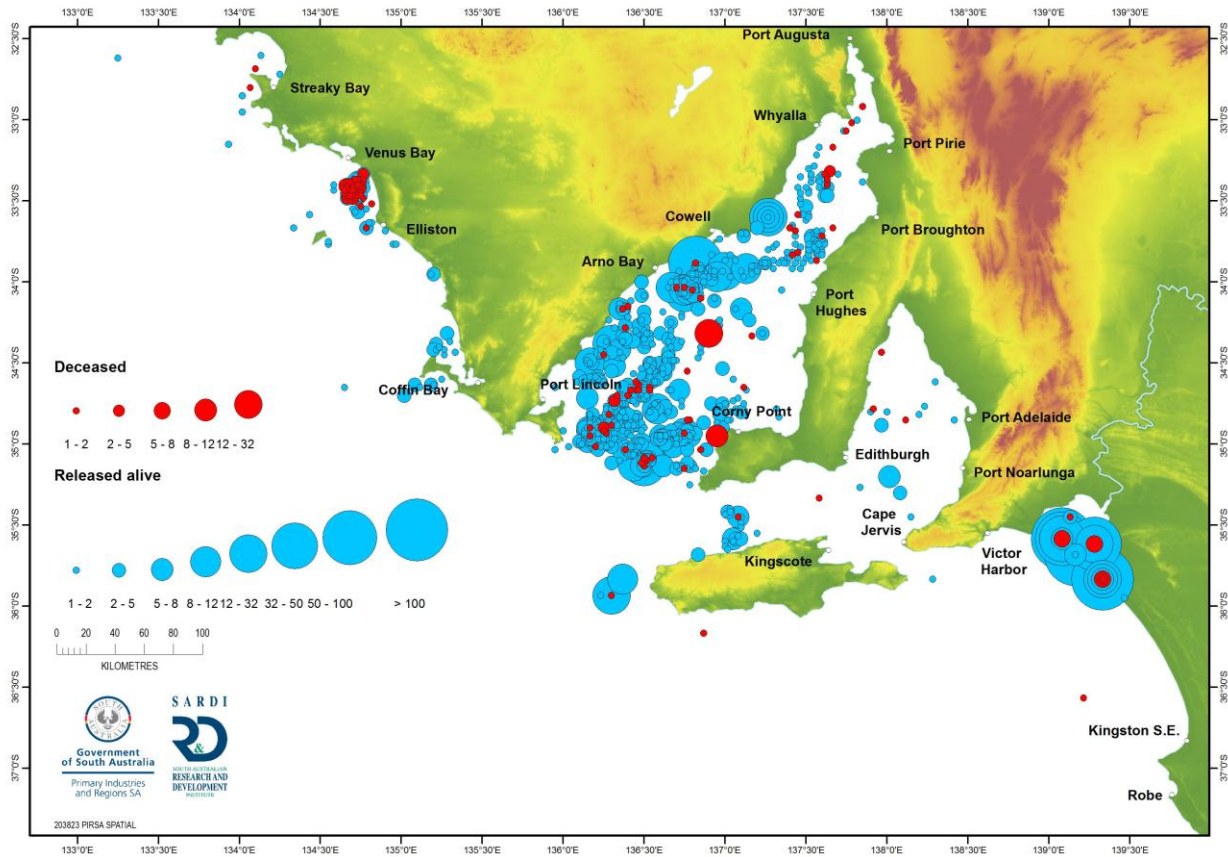
Figure 1 summarises the total number of interactions, number of animals involved, and nature of the reported TEPS interaction ('caught, entangled, impact' versus 'other') in all South Australian commercial fisheries in each year between 2007/08 and 2013/14. A total of 1,497 interactions comprising 7,831 individual animals listed as TEPS were reported by commercial fishers between July 2007 and June 2014. Of the 7,831 animals reported in this period, 27.6% (2,159) were recorded as 'caught, entangled or impact/collision' interactions, and 3.4% (269) were recorded as mortalities.

The number of reported TEPS interactions has increased steadily, from 144 interactions when reporting began in 2007/08 to 394 interactions reported in 2013/14. The number of animals reported has remained relatively constant between 2007/08 and 2012/13, averaging approximately 515 each year, but increased in 2013/14 to a total of 4,736 animals (Figure 1). The relatively high numbers of interactions and animals recorded in 2013/14 are primarily due to increased reports of long-nosed fur seals in gill net operations of the Lakes and Coorong Fishery. These interactions were recorded as 'other' interactions, i.e. they were not 'caught, entangled or impact/collision' interactions (Figure 1).



**Figure 1.** Numbers of interactions, the number of animals involved, and the nature of reported TEPS interactions ('caught, entangled, impact/collision' versus 'other') in South Australian commercial fisheries between 2007/08 and 2013/14.

Figure 2 shows the location of all interactions in South Australian fisheries between 2007/08 and 2013/14, and the fate (released alive or deceased) of those animals. The location of reported interactions reflects the total distribution of fishing effort primarily within the South Australian Sardine Fishery (SASF), Spencer Gulf Prawn Fishery (SGPF), West Coast Prawn Fishery (WCPF) and Lakes and Coorong Fishery.



**Figure 2.** Number and fate (alive/dead) of animals listed as TEPS interacting with all South Australian commercial fisheries between 2007/08 and 2013/14.



### 3.2 Gear specific interactions in SA fisheries

Table 2 summarises the number of interactions with TEPS and number of animals interacting with each gear type used in South Australian commercial fisheries between 2007/08 and 2013/14. A total of 19 fishing methods have been recorded. A total of 1,450 interactions (96.7%) and 7,768 animals (99.1%) reported in this period were recorded from net-fishing operations (Table 2).

Purse seine and prawn trawl net operations accounted for 67.1% of the total interactions reported (purse seine: 40%; prawn trawl nets: 27.1%; Table 2). Gill net operations (large and small mesh) accounted for 18.5% of the total interactions reported (gill nets–small mesh: 7.1%; gill nets–large mesh: 11.4%) and ring nets accounted for 8.2% of the total interactions reported (Table 2). Pot and line operations and 'other' methods contributed to 3.1% of the total interactions reported.

Gill net operations (large and small mesh) accounted for 57.1% of the total number of animals reported (gill nets–small mesh: 46.6%; gill nets–large mesh: 10.5%; Table 2). Purse seine and prawn trawl operations accounted for approximately 29% of the total number of animals reported (purse seine: 19.8%; prawn trawl nets: 9.2%; Table 2).

**Table 2.** The number of interactions with TEPS and the number of animals interacting with each gear type used in South Australian commercial fisheries between 2007/08 and 2013/14. Codes refer to gear types reported on the South Australian Managed Fisheries Wildlife Interaction Form (Appendix 4 and 8).

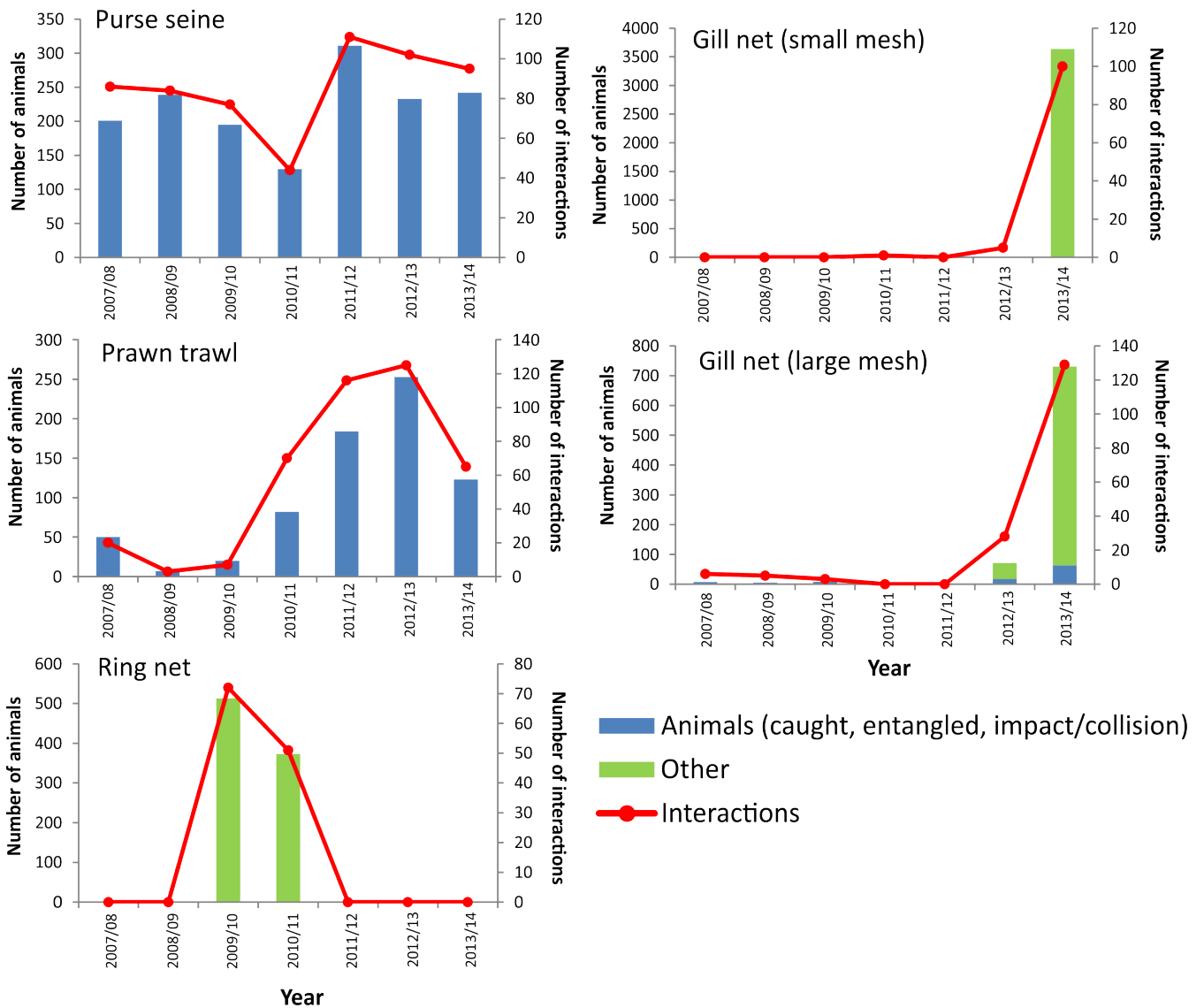
Gear		2007/08		2008/09		2009/10		2010/11		2011/12		2012/13		2013/14		TOTAL	
Type	Code	Interactions	Animals Involved	Interactions	Animals Involved	Interactions	Animals Involved	Interactions	Animals Involved	Interactions	Animals Involved	Interactions	Animals Involved	Interactions	Animals Involved	interactions	Animals involved
<b>Nets</b>																	
Drum Net	C	0	0	0	0	1	20	0	0	0	0	0	0	0	0	1	20
Gill Net (Small Mesh)	E	0	0	0	0	0	0	1	6	0	0	5	5	100	3,635	106	3,646
Gill Net (Large Mesh)	F	6	7	5	5	3	8	0	0	0	0	28	71	129	731	171	822
Hauling Net (Small Mesh)	H	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1	1
Haul Net (Floating Gar Net)	HNF	15	27	2	2	5	15	1	1	0	0	0	0	0	0	23	45
Haul Net (Sinking Mixed Net)	HNS	1	2	9	25	5	7	0	0	1	2	2	2	0	0	18	38
Hauling Net (Large Mesh)	I	0	0	0	0	3	40	0	0	0	0	0	0	0	0	3	40
Ring Net	K	0	0	0	0	72	513	51	373	0	0	0	0	0	0	123	886
Purse Seine	PS	86	201	84	239	76	195	44	130	111	311	102	233	95	242	598	1,551
Prawn Trawl Net	PTN	20	50	3	7	7	20	70	82	116	184	125	253	65	123	406	719
<b>Total</b>		<b>128</b>	<b>287</b>	<b>103</b>	<b>278</b>	<b>173</b>	<b>819</b>	<b>167</b>	<b>592</b>	<b>228</b>	<b>497</b>	<b>262</b>	<b>564</b>	<b>389</b>	<b>4731</b>	<b>1,450</b>	<b>7,768</b>
<b>Pots</b>																	
Crab Pot	CP	0	0	1	1	1	1	0	0	1	1	0	0	0	0	3	3
Lobster Pot	LP	2	2	0	0	0	0	0	0	0	0	0	0	0	0	2	2
<b>Total</b>		<b>2</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>5</b>	<b>5</b>
<b>Lines</b>																	
Handline	HL	4	4	1	1	2	2	1	1	0	0	0	0	0	0	8	8
Inshore Scale Fishing	IS	5	10	7	8	1	1	1	1	0	0	0	0	0	0	14	20
Offshore Scale Fishing	OS	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	1
Long Line	LL	1	1	0	0	0	0	2	2	1	1	0	0	3	3	7	7
Poles/Rod and Line	PO	2	2	0	0	0	0	0	0	0	0	0	0	0	0	2	2
<b>Total</b>		<b>12</b>	<b>17</b>	<b>9</b>	<b>10</b>	<b>3</b>	<b>3</b>	<b>4</b>	<b>4</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>3</b>	<b>32</b>	<b>38</b>
<b>Other</b>																	
Diving	D	0	0	2	3	0	0	1	1	2	2	0	0	1	1	6	7
Non Applicable	N/A	2	11	1	1	0	0	0	0	0	0	0	0	1	1	4	13
<b>Total</b>		<b>2</b>	<b>11</b>	<b>3</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>2</b>	<b>10</b>	<b>20</b>
<b>Grand Total</b>		<b>144</b>	<b>317</b>	<b>116</b>	<b>293</b>	<b>177</b>	<b>823</b>	<b>172</b>	<b>597</b>	<b>232</b>	<b>501</b>	<b>262</b>	<b>564</b>	<b>394</b>	<b>4,736</b>	<b>1,497</b>	<b>7,831</b>

Inter-annual trends in the numbers of TEPS interactions and animals reported for the key gear types are shown in Figure 3. Reported TEPS interactions in purse seine fishing operations relate to 'encirclements'. Each recorded encirclement includes all animals surrounded by the purse seine net. TEPS interactions with purse seine fishing operations remained relatively constant between 2007/08 and 2009/10 averaging approximately 82 per year before increasing to an average of 102 per year between 2011/12 and 2013/14. The number of animals reported in interactions reflect these trends with an average of 211 animals per year reported in purse seine operations between 2007/08 and 2009/10, and 262 animals per year reported between 2011/12 and 2013/14. The relatively high numbers of interactions and animals reported between 2011/12 and 2013/14 are associated with increased encirclements of the short-beaked common dolphin *Delphinus delphis*. More detail relating to interactions of the SASF with this species can be found in Section 3.4.2 and in Ward *et al.* (2015).

The majority (>99%) of TEPS interactions in prawn trawl operations involved animals being caught or entangled in prawn trawl nets. The main TEPS recorded are fish from the Family Syngnathidae (seahorses, pipefishes, and seadragons). This taxonomic group comprises at least 98% of all animals listed as TEPS reported since 2007/08. Between 2009/10 and 2012/13, the number of TEPS interactions reported in prawn trawl operations increased from seven to 125 interactions per year, but in 2013/14 declined to 65 interactions per year (Figure 3). The number of animals reported in prawn trawl operations increased tenfold between 2009/10 and 2012/13 from 20 to 253 animals per year, but in 2013/14, 123 animals were reported, representing a 50% decrease from 2012/13 (Figure 3). More details relating to interactions of South Australian prawn fisheries with TEPS can be found in Section 3.4.4.

The number of TEPS interactions and animals reported in gill net (large and small mesh) operations were relatively low between 2007/08 and 2011/12 ranging between one and six interactions per year, but increased to 229 interactions per year in 2013/14 due to increased reporting of long-nosed fur seals in gill net operations of the Lakes and Coorong Fishery (Figure 3). The numbers of animals reported in gill net operations (small mesh) in 2013/14 was the highest recorded from any gear type for all years of reporting (3,635 animals in 2013/14). Over 90% of the animals reported in gill net (both large and small mesh) operations in 2013/14 were recorded as 'other' interactions, i.e. animals were not 'caught, entangled or impact/collision' interactions (Figure 3).

Ring net operations also recorded relatively high numbers of interactions in 2009/10 (72) and 2010/11 (51) and the numbers of animals reported were also high in these years (2009/10: 513; 2010/11: 373). This was due to increased reporting of long-nosed fur seals by the Lakes and Coorong Fishery. Ring net operations did not record interactions in any other years indicating the irregular use of this gear type (Figure 3). All animals reported in ring net operations were recorded as 'other' interactions, i.e. animals were not 'caught, entangled or impact/collision' interactions (Figure 3).



**Figure 3.** Numbers of interactions, the number of animals involved, and the nature of reported TEPS interactions ('caught, entangled, impact/collision' versus 'other') reported for the main gear types used South Australian commercial fisheries between 2007/08 and 2013/14.

### 3.3 TEPS group-specific interactions

#### 3.3.1 Overview

Table 3 summarises the total numbers of animals, for broadly defined taxonomic groups, that were recorded interacting within commercial fishing operations between 2007/08 and 2013/14. It shows the nature of each interaction 'caught, entangled, impact/collision' and 'other', the health status of the animals involved 'alive, alive/injured, dead', and the fate 'released, retained, discarded' of the animals following completion of the fishing operation. The number of interactions, health status and fate of animals reported for different TEPS taxonomic groups and gear types in each year between 2007/08 and 2013/14 are detailed in Appendix 5.

Cetaceans and pinnipeds comprised 36.0% and 26.7% of all TEPS interactions, respectively, between 2007/08 and 2013/14 (Table 3). Of the 7,831 animals recorded between 2007/08 and 2013/14, 18.1% (1,415) were cetaceans (unidentified dolphin spp., common dolphins) and 68.9% (5,393) were pinnipeds (unidentified seal spp., long-nosed fur seals) (Table 3). A total of 3.0% of all cetaceans encountered during fishing operations were reported dead and <0.6% were reported as injured (Table 3). In the same period, <0.1% of the total pinnipeds recorded were reported as dead and <0.1% were reported as injured (Table 3).

Fish listed as TEPS comprised 29.7% of all interactions and 9.7% of the total animals recorded from fishing operations between 2007/08 and 2013/14. The majority (>90%) of interactions and numbers of fish reported were from the family Syngnathidae (seahorses, pipefishes, and seadragons). Of the 758 fish listed as TEPS reported as interactions during fishing operations between 2007/08 and 2013/14, 185 (24.4%) were reported dead. Fish listed as TEPS also comprised 68.8% (185) of the total (269) mortalities recorded from all taxonomic groups (Table 3).

Birds comprised 6.1% of all interactions and 2.3% of the total animals recorded from all taxonomic groups between 2007/08 and 2013/14. The majority (>75%) of interactions were with cormorants (Table 3). Of the 180 birds reported interacting with fishing operations between 2007/08 and 2013/14, 35 (19.4%) were reported dead (Table 3). The majority of mortalities (71.4%) were cormorants (Table 3).

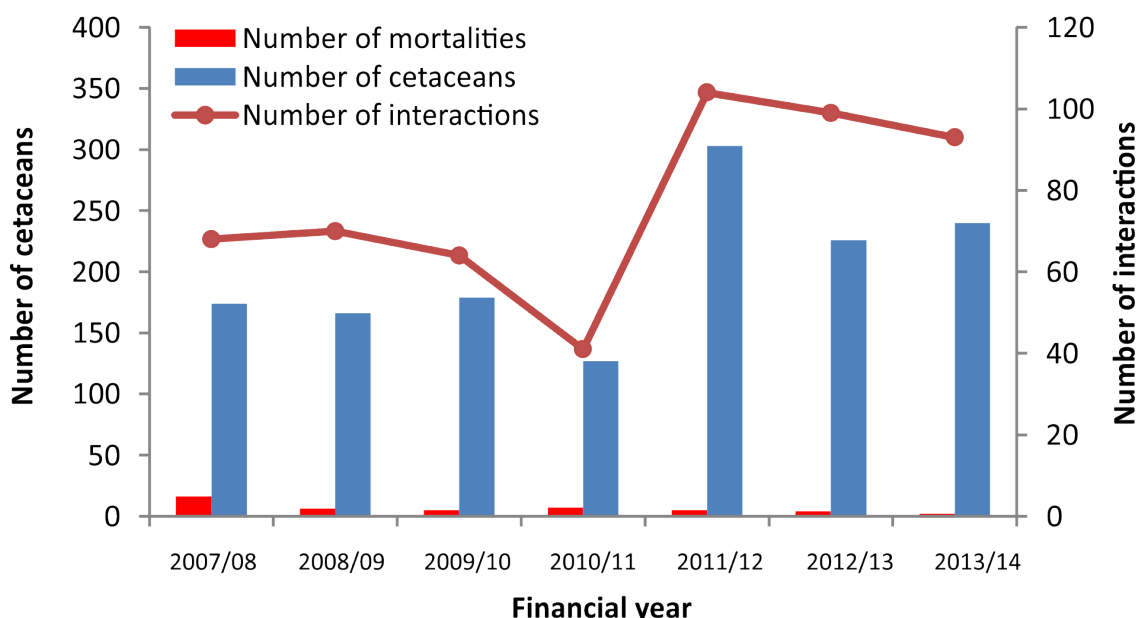
Low numbers of interactions (23) with reptiles and total numbers of reptiles (85) were recorded in South Australian commercial fisheries between 2007/08 and 2013/14 (Table 3). One freshwater turtle was reported as dead over this period. The low number of reptiles reported precludes further discussion of temporal variations in reptile interactions in the report. It should also be noted that species-specific mortality estimates are not possible due to the high proportion of mortalities that were not identified to species level. For example, 'unidentified seal species' comprised 60% of the total pinniped mortalities and 'unidentified dolphin species' comprised 93% of the total dolphin mortalities between 2007/08 and 2013/14 (Table 3).

**Table 3.** Total interactions of TEPS taxonomic groups in South Australian commercial fisheries from 2007/08 to 2013/14.

TEPS (taxonomic group)		# of Interactions	# of animals	Nature of Interaction				Status			Fate			
				Caught	Entanglement	Impact/collision	Other	Alive	Alive / Injured	Dead	Released	Retained	Discarded	Other
Birds	Albatross	1	1		1					1			1	
	Australasian gannett	1	1		1			1			1			
	Australian pelican	3	3	1	2			3			3			
	Blue billed duck	1	1	1				1			1			
	Cormorant	69	143	86	57			118		25	118		25	
	Dusky moorhen	1	2	2						2			2	
	Great crested grebe	1	1		1			1			1			
	Grebe	6	9	5	3		1	5		4	5		4	
	Little penguin	1	1				1							1
	Musk duck	2	2	2				2			2			
	Pacific gull	3	3	1	2			3			3			
	Petrel	1	10				10	10			10			
	Shearwater	1	2		2					2			2	
	Silver gull	1	1		1			1			1			
<b>Total</b>	<b>92</b>	<b>180</b>	<b>98</b>	<b>70</b>		<b>12</b>	<b>145</b>		<b>35</b>	<b>145</b>		<b>34</b>	<b>1</b>	
Reptiles	Freshwater turtle	11	73	68	5			72		1	72		1	
	Leatherback turtle	3	3	1	2			3			3			
	Loggerhead turtle	1	1	1				1			1			
	Turtle	8	8	7	1			7	1		8			
	<b>Total</b>	<b>23</b>	<b>85</b>	<b>77</b>	<b>8</b>			<b>83</b>	<b>1</b>	<b>1</b>	<b>84</b>		<b>1</b>	
Cetaceans	Unidentified dolphin spp.	390	1,037	734	41		262	990	7	40	991	33	5	8
	Common dolphin	149	378	325	6		47	373	1	4	374	4		
	<b>Total</b>	<b>539</b>	<b>1,415</b>	<b>1059</b>	<b>47</b>		<b>309</b>	<b>1,363</b>	<b>8</b>	<b>44</b>	<b>1,365</b>	<b>37</b>	<b>5</b>	<b>8</b>
Pinnipeds	Unidentified seal spp.	54	136	51	1	2	82	131	2	3	76	1	2	57
	Australian fur seal	2	2	1	1			1		1	1	1		
	Australian sea lion	3	4	1			3	4			1			3
	Long-nosed fur seal	340	5251	3			5,248	5,250		1	2	1		5,248
	<b>Total</b>	<b>399</b>	<b>5,393</b>	<b>56</b>	<b>2</b>	<b>2</b>	<b>5,333</b>	<b>5,386</b>	<b>2</b>	<b>5</b>	<b>80</b>	<b>3</b>	<b>2</b>	<b>5,308</b>
Fish	Great white shark	42	44	19	3	4	18	41	1	2	21	1	1	21
	Common seadragon	11	27	27				25	1	1	26		1	
	Leafy seadragon	3	3	3				3			3			
	Flutemouth	1	3	3				3			3			
	Pipefish	107	290	289	1			210	1	79	211		79	
	Pipehorse	43	57	57				33		24	33		24	
	Potbelly seahorse	1	1	1				1			1			
	Seahorse	236	333	332	1			254		79	254		79	
<b>Total</b>	<b>444</b>	<b>758</b>	<b>731</b>	<b>5</b>	<b>4</b>	<b>18</b>	<b>570</b>	<b>3</b>	<b>185</b>	<b>552</b>	<b>1</b>	<b>184</b>	<b>21</b>	
<b>Total</b>	<b>1,497</b>	<b>7,831</b>	<b>2021</b>	<b>132</b>	<b>6</b>	<b>5,672</b>	<b>7,548</b>	<b>14</b>	<b>269</b>	<b>2,226</b>	<b>41</b>	<b>226</b>	<b>5,338</b>	

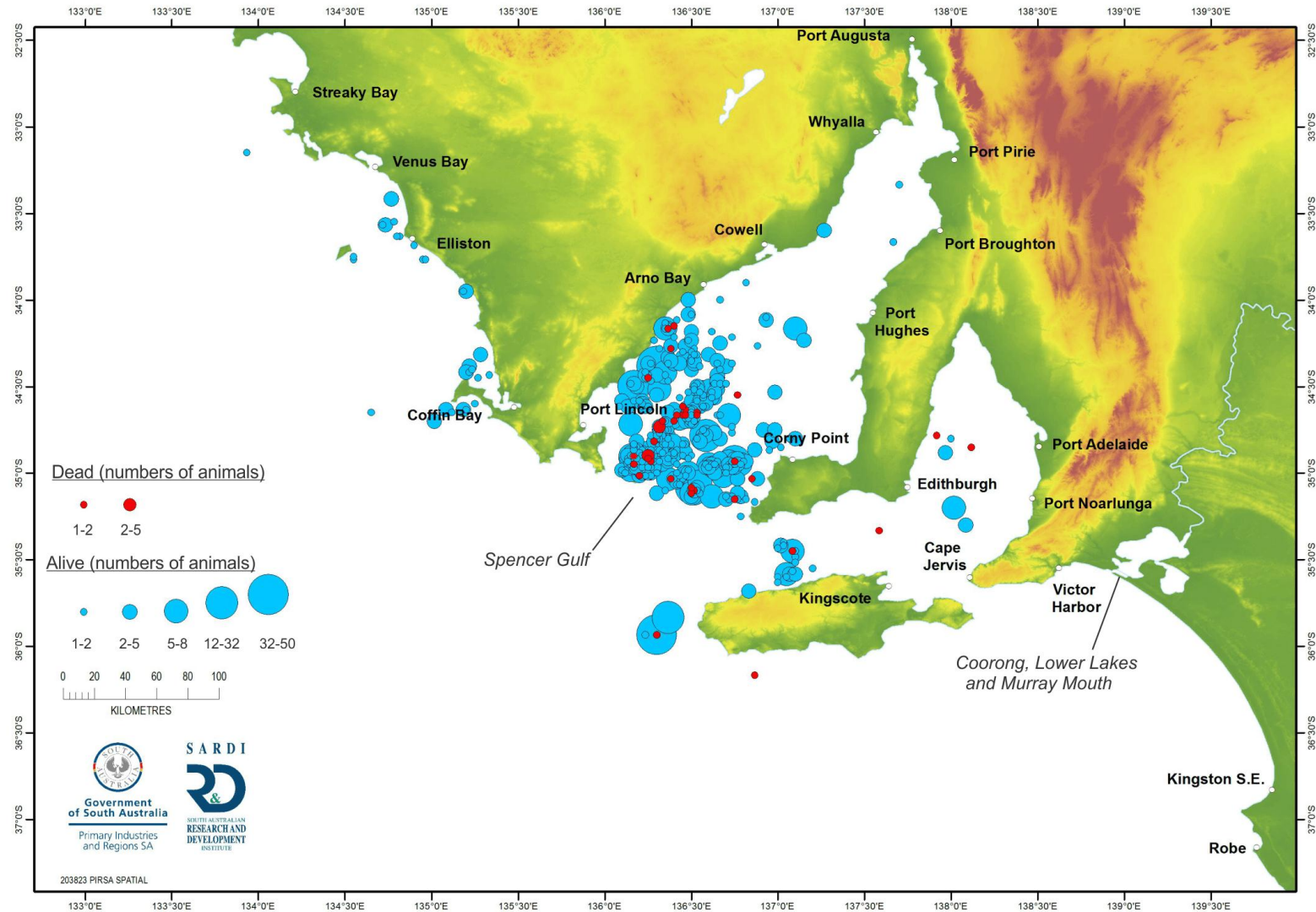
### 3.3.2 Temporal and spatial trends in cetacean interactions

The number of interactions with cetaceans averaged 60 between 2007/08 and 2010/11, before peaking at 104 interactions per year in 2011/12. Since 2011/12, the number of cetacean interactions has averaged 99 per year. Inter-annual trends in the number of cetaceans reported in fishing operations resemble trends in the number of interactions reported with the number of cetaceans recorded increasing from 174 in 2007/08 to 303 in 2011/12. Since 2011/12, the number of cetaceans reported has averaged 256 per year (Figure 4). In contrast, the number of cetacean mortalities reported has steadily declined from 16 in 2007/08 to one reported in 2013/14 (Figure 4). The number of cetacean mortalities recorded has decreased since inception of a Code of Practice to manage dolphin interactions in the SASF.



**Figure 4.** Numbers of cetacean interactions, cetaceans and cetacean mortalities recorded in South Australian commercial fishing operations between 2007/08 and 2013/14.

Figure 5 shows the location of all cetacean interactions in all South Australian fisheries between 2007/08 and 2013/14, and the fate (released alive or deceased) of animals encountered. Most reported interactions were from southern-central Spencer Gulf, reflecting interactions reported during purse seine operations conducted by the SASF (Section 3.4.2).

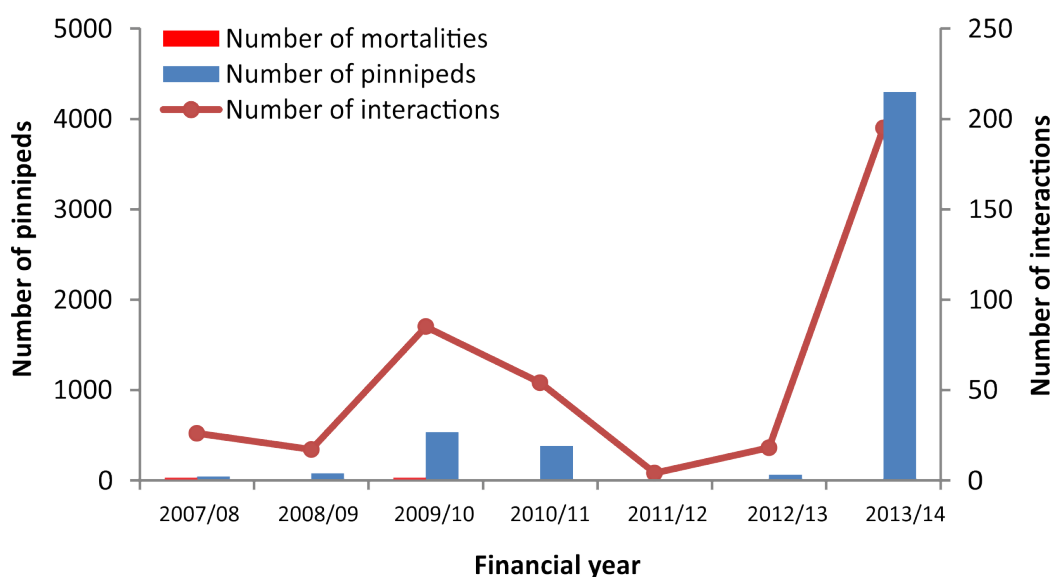


**Figure 5.** Cetacean interactions and their observed status (alive/dead) following fishing for all interactions recorded between 2007/08 and 2013/14.



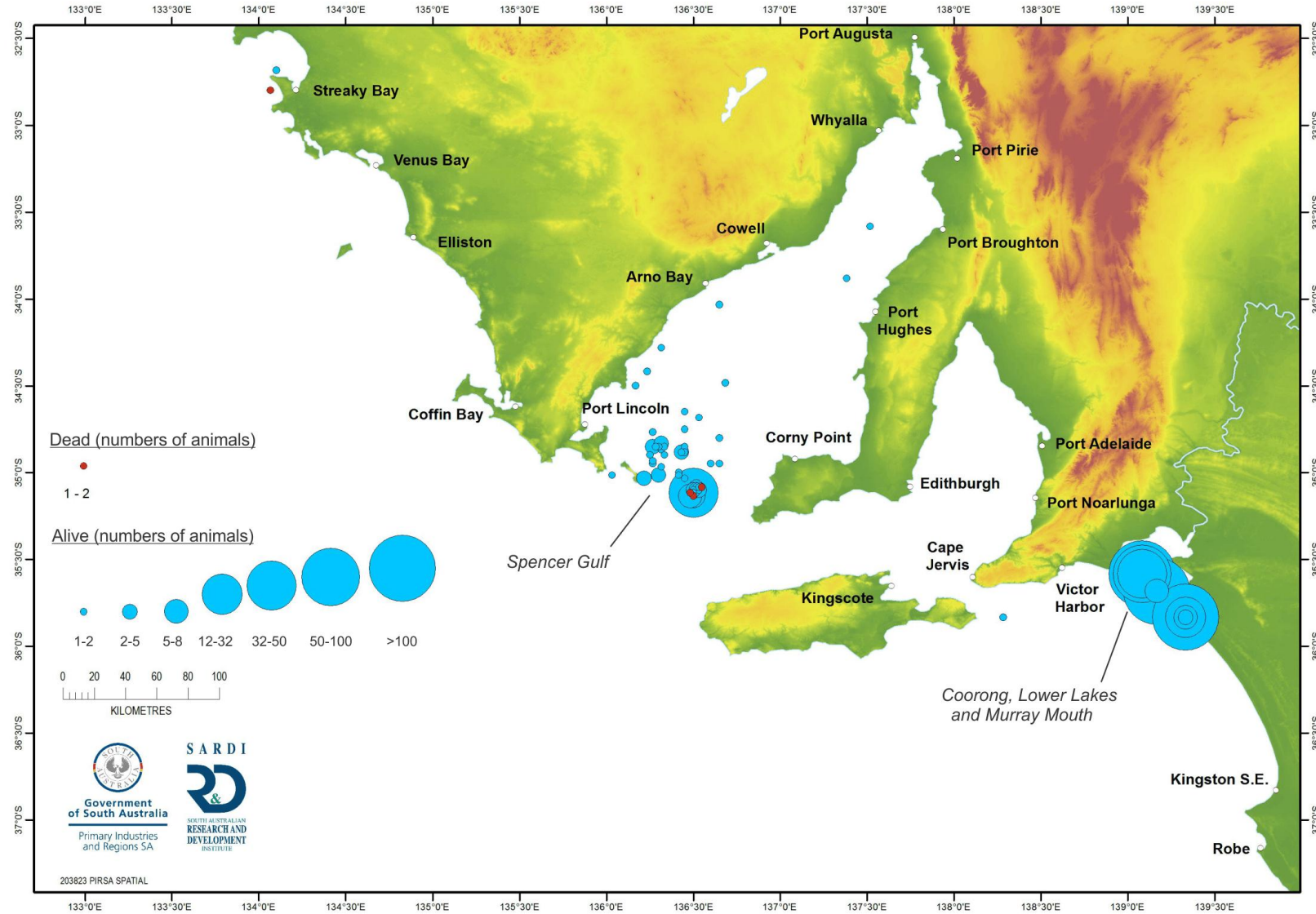
### 3.3.3 Temporal and spatial trends in pinniped interactions

In 2013/14 a total of 195 pinniped interactions were reported (Figure 6). This is six times the average number of interactions recorded between 2007/08 and 2012/13, and a ten-fold increase since 2012/13 (18 interactions in 2012/13) (Figure 6). The recent rise in the number of reported pinniped interactions reflects the increase in the total number of long-nosed fur seals reported in Lakes and Coorong Fishery operations from 56 in 2012/13 to 4,298 in 2013/14 (Figure 6; Section 3.4.3 and Appendix 6). Despite recent reported increases in the number of interactions in 2013/14, no long-nosed fur seals were recorded as ‘caught, entangled or impact/collisions’ and the number of reported pinniped mortalities has remained low since reporting began in 2007/08 (3 mortalities in 2007/08). No mortalities have been reported since 2009/10 (Figure 6).



**Figure 6.** Numbers of pinniped interactions, pinnipeds and pinniped mortalities recorded in South Australian commercial fishing operations between 2007/08 and 2013/14.

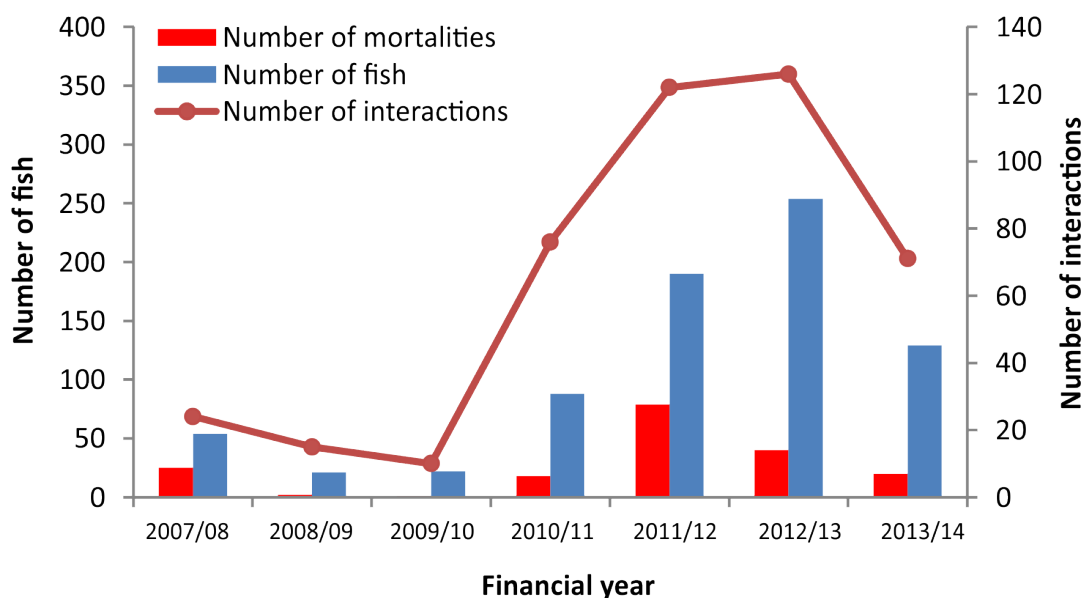
Figure 7 shows the location of all pinniped interactions in all South Australian fisheries between 2007/08 and 2013/14, and the fate (alive or deceased) of animals encountered. Most reported interactions were from southern-central Spencer Gulf and the Coorong, Lower Lakes and Murray Mouth, reflecting interactions reported during purse seine operations conducted by the SASF, and gill net operations conducted by the Lakes and Coorong Fishery, respectively (see Section 3.4).



**Figure 7.** Pinniped interactions and their observed status (alive/dead) following fishing for all interactions recorded between 2007/08 and 2013/14.

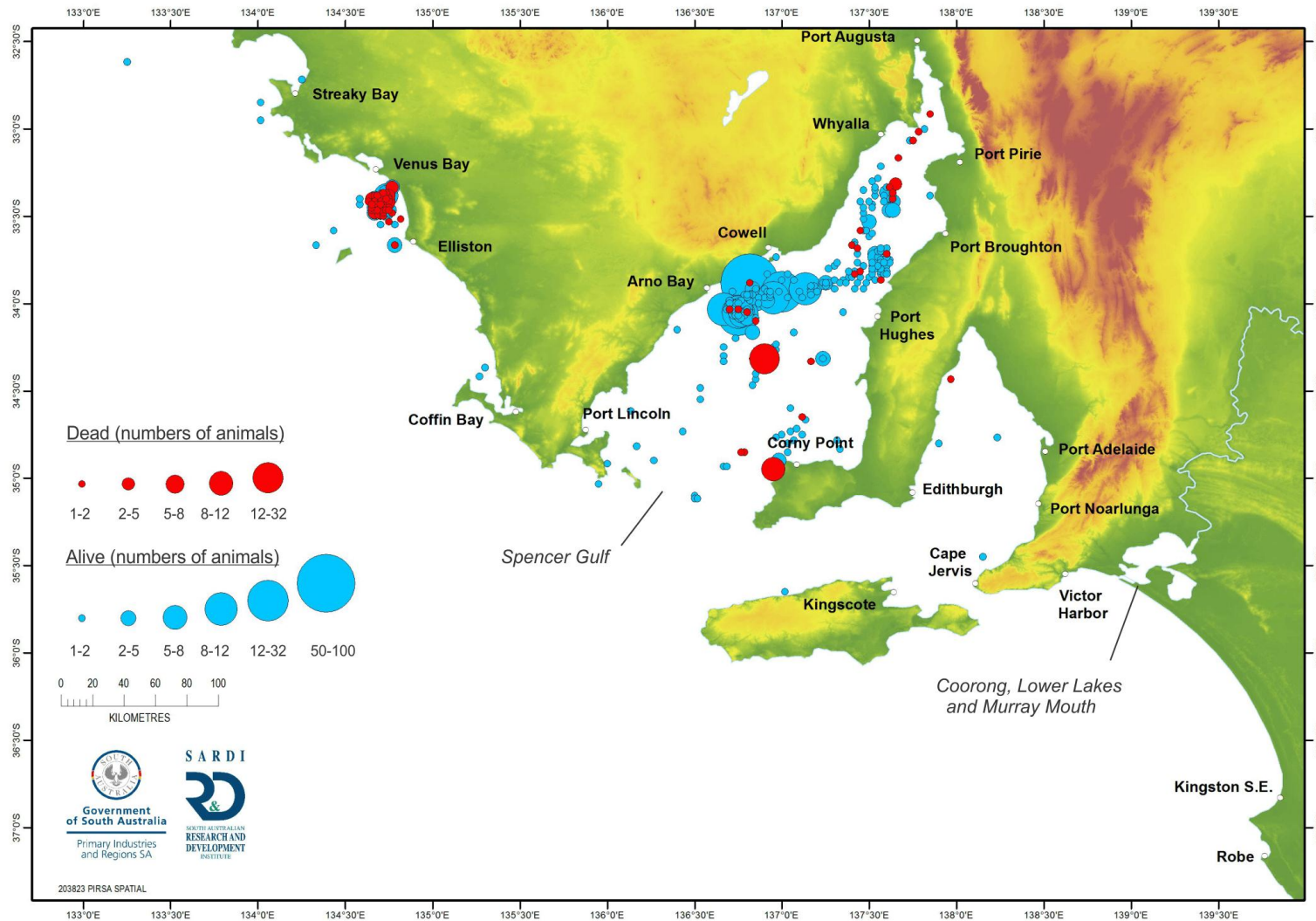
### 3.3.4 Temporal and spatial trends in interactions with fish listed as TEPS

The number of interactions with fish listed as TEPS was relatively low between 2007/08 and 2009/10 (Figure 8). Reported interactions increased from 76 to 126 interactions per year between 2010/11 and 2012/13 (Figure 8). In 2013/14, 71 interactions with fish were reported (Figure 11). These trends resembled inter-annual trends in the number of fish reported in fishing operations, which increased from 22 in 2009/10 to 254 in 2012/13 (Figure 8). In 2013/14, the number of fish reported decreased to 129 (Figure 8). Reported mortalities of fish decreased from a peak in 2011/12 of 79, to 20 mortalities recorded in 2013/14 (Figure 8). The majority (99%) of mortalities were from the Family Syngnathidae (seahorses, pipefishes, and seadragons) and reported from prawn trawling operations in the Spencer Gulf and West Coast prawn fisheries (see Section 3.4.4).



**Figure 8.** Numbers of fish interactions, fish and fish mortalities recorded in South Australian commercial fishing operations between 2007/08 and 2013/14.

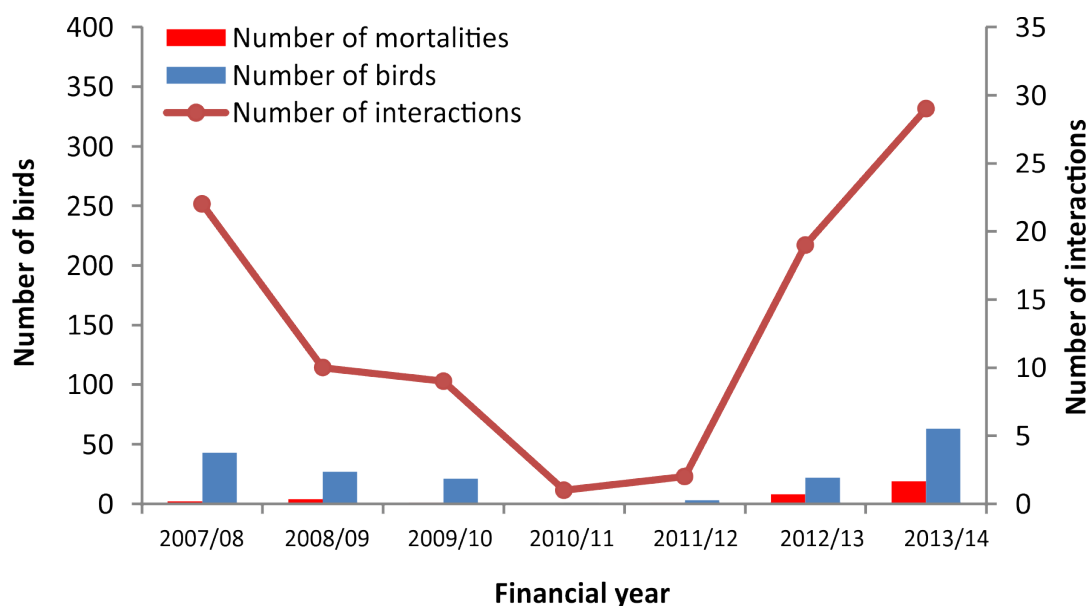
Figure 9 shows the location of all interactions with fish listed as TEPS in all South Australian fisheries between 2007/08 and 2013/14, and the fate (released alive or deceased) of fish encountered. Most reported interactions were from Spencer Gulf and off western Eyre Peninsula, reflecting interactions reported by the Spencer Gulf and West Coast prawn fisheries, respectively (see Section 3.4.4).



**Figure 9.** Interactions with fish listed as TEPS and their observed status (alive/dead) following fishing for all interactions recorded between 2007/08 and 2013/14.

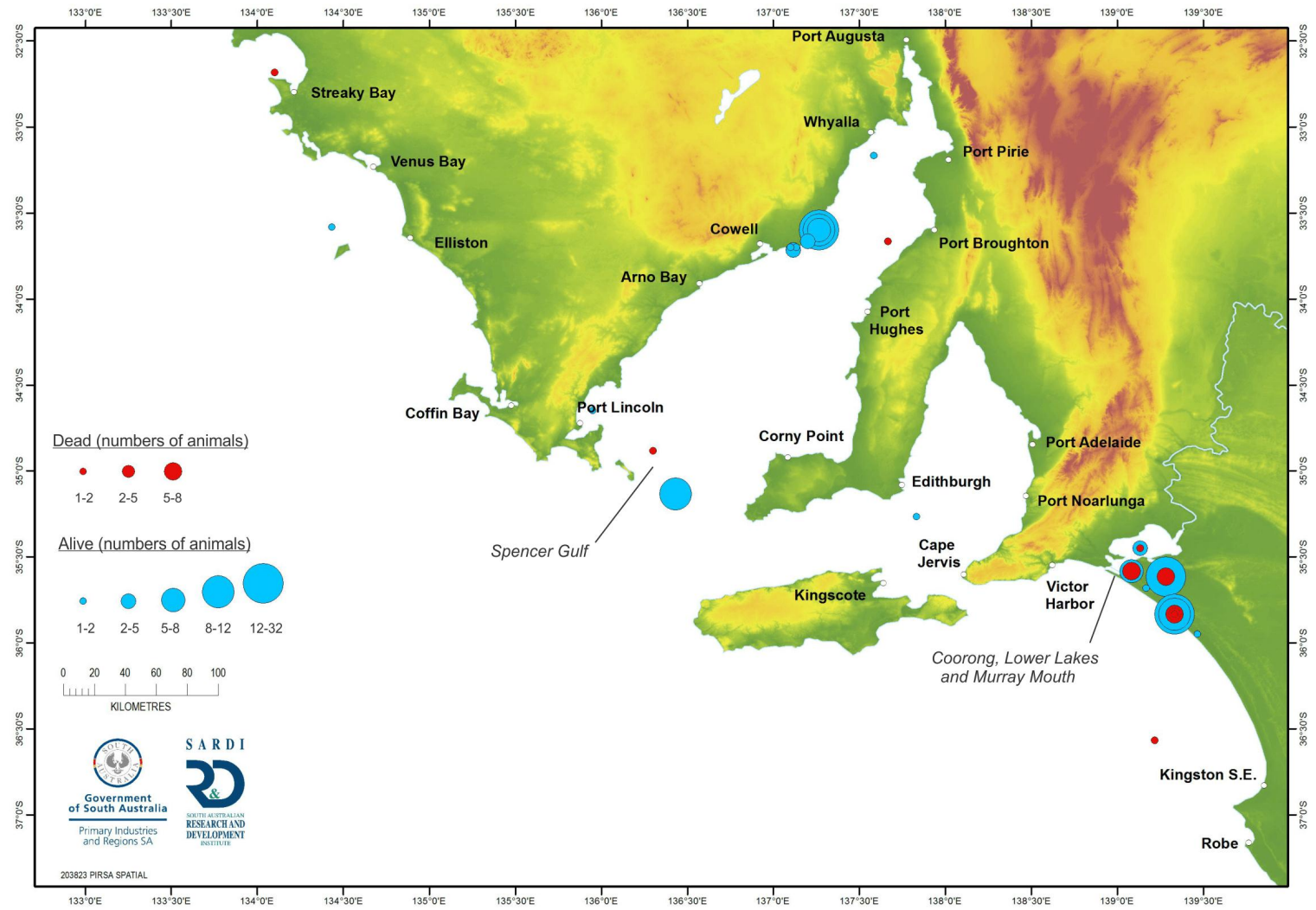
### 3.3.5 Temporal and spatial trends in interactions with birds listed as TEPS

The number of reported interactions with birds listed as TEPS decreased from 22 in 2007/08 to 1 in 2010/11 before increasing to 29 in 2013/14 (Figure 10). These trends resembled inter-annual trends in the number of birds reported in fishing operations, with a peak of 63 birds reported in fishing operations 2013/14 (Figure 10). Reported bird mortalities remained relatively constant between 2007/08 and 2012/13, averaging <3 birds per year over this period. Nineteen mortalities were reported in 2013/14 (Figure 10). The majority (71.4%) of mortalities between 2007/08 and 2013/14 were cormorants recorded from the Lakes and Coorong Fishery (see Section 3.4.3).



**Figure 10.** Numbers of interactions with birds listed as TEPS, and number of birds and bird mortalities recorded in South Australian commercial fishing operations between 2007/08 and 2013/14.

Figure 11 shows the location of all interactions with birds listed as TEPS in all South Australian fisheries between 2007/08 and 2013/14, and the fate (released alive or deceased) of birds encountered. Most reported interactions were from Spencer Gulf and in the Coorong, Lower Lakes and Murray Mouth, reflecting interactions reported by the Marine Scalefish Fishery and Lakes and Coorong Fishery, respectively (see Section 3.4).



**Figure 11.** Interactions with birds listed as TEPS and their observed status (alive/dead) following fishing for all interactions recorded between 2007/08 and 2013/14.

### **3.4 Fishery-specific interactions**

#### **3.4.1 Overview**

Table 4 summarises the total number of interactions and animals reported in South Australian commercial fishing operations between 2007/08 and 2013/14. The SASF accounted for the highest percentage of TEPS interactions (39.9%) and second highest percentage of animals (19.8%) reported from all fisheries in this period (Table 4). The Lakes and Coorong Fishery recorded the second highest percentage of TEPS interactions (27.1%) and highest percentage of animals (69.1%) of all commercial fisheries. This was largely due to increased interactions in 2013/14 (Table 4; Appendix 6. TEPS interactions within each commercial fishery in South Australia between 2007/08 and 2013/14.). The Spencer Gulf and West Coast prawn fisheries also accounted for a relatively high percentage of interactions (27.1%) and animals (9.2%) in this period.

The following sections provide detail for inter-annual patterns in effort and TEPS interactions in the main South Australian fisheries where TEPS interactions are reported. Full data summaries of the TEPS interactions occurring in all fisheries between 2007/08 and 2013/14 can be found in Appendix 6.

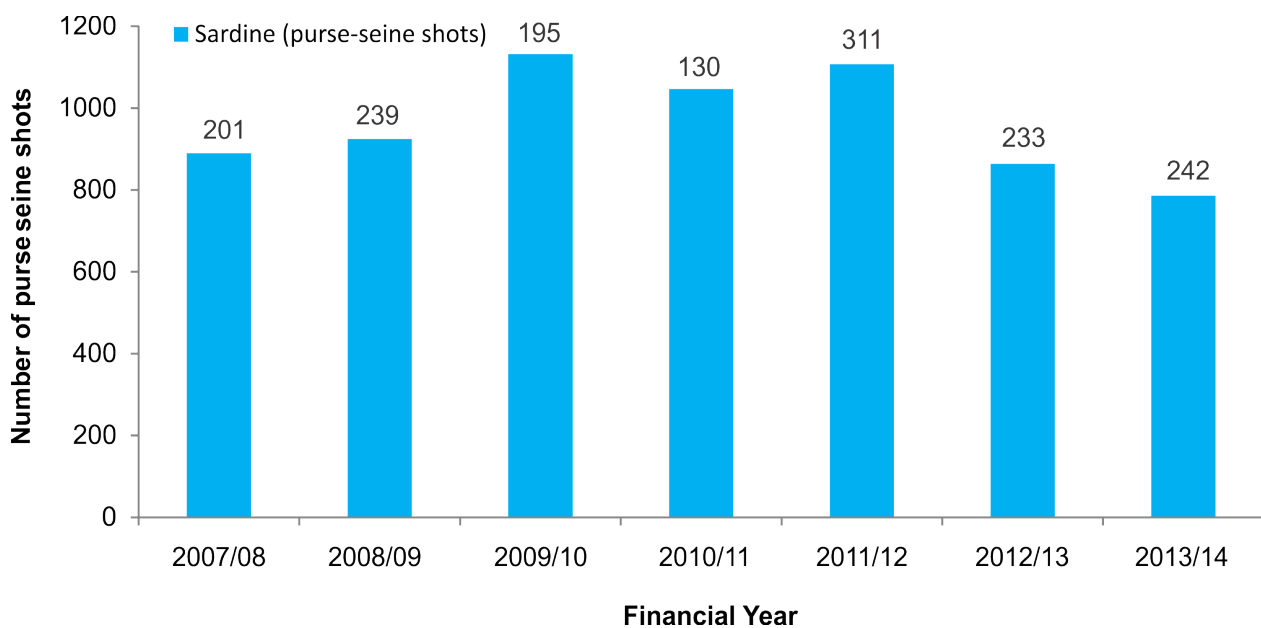
**Table 4.** The total number of interactions and animals listed as TEPS reported from South Australian commercial fisheries between 2007/08 and 2013/14.

	2007/08		2008/09		2009/10		2010/11		2011/12		2012/13		2013/14		TOTAL	
	Interactions	# of animals	Interactions	# of animals	Interactions	# of animals	Interactions	# of animals	Interactions	# of animals	Interactions	# of animals	Interactions	# of animals	Interactions	# of animals
Abalone Fisheries	0	0	2	3	0	0	1	1	2	2	0	0	1	1	6	7
Blue Crab Fishery	0	0	1	1	1	1	0	0	0	0	0	0	0	0	2	2
Charter Boat Fishery	5	10	8	9	1	1	1	1	0	0	0	0	0	0	15	21
Gulf St Vincent Prawn Fishery	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Lakes and Coorong Fishery	6	7	5	5	80	582	52	379	0	0	33	76	229	4,366	405	5,415
Marine Scalefish Fishery	24	37	13	29	12	24	4	4	3	4	2	2	4	4	62	104
Miscellaneous Fisheries	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
River Fishery	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
South Australian Sardine Fishery	86	201	84	239	76	195	44	130	111	311	102	233	95	242	598	1,551
Spencer Gulf Prawn Fishery	0	0	0	0	5	17	53	61	82	138	78	195	46	95	264	506
Rock Lobster Fisheries	3	12	0	0	0	0	0	0	0	0	0	0	0	0	3	12
West Coast Prawn Fishery	19	49	3	7	2	3	17	21	34	46	47	58	19	28	141	212
<b>Total</b>	<b>144</b>	<b>317</b>	<b>116</b>	<b>292</b>	<b>177</b>	<b>823</b>	<b>172</b>	<b>597</b>	<b>232</b>	<b>501</b>	<b>262</b>	<b>564</b>	<b>394</b>	<b>4,736</b>	<b>1,497</b>	<b>7,831</b>



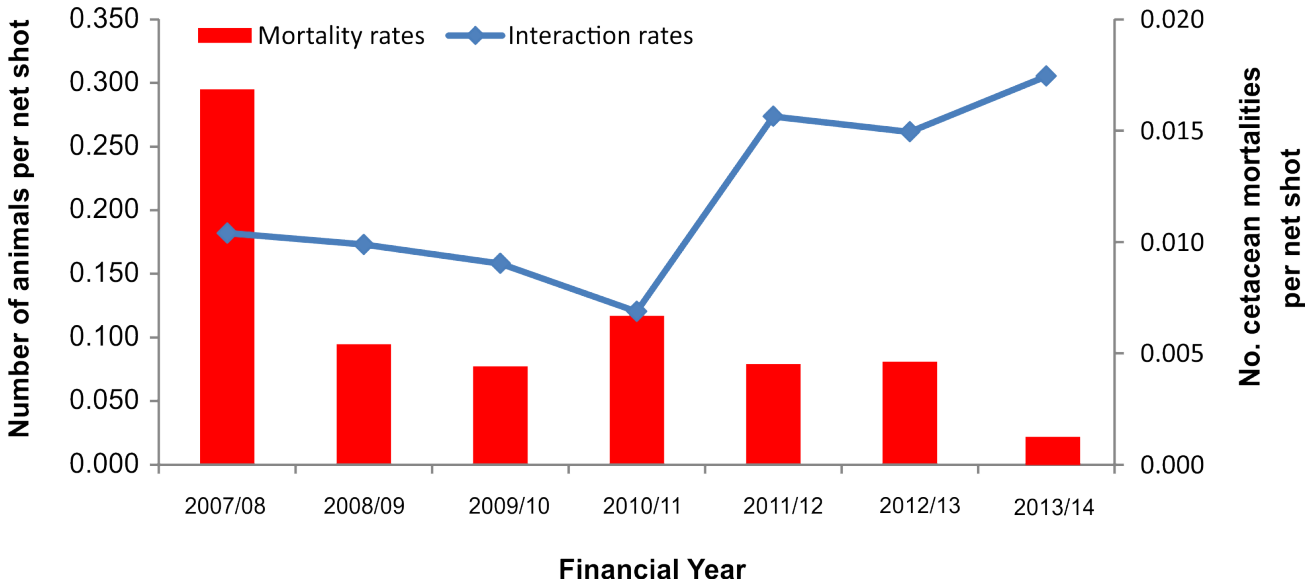
### 3.4.2 South Australian Sardine Fishery

Figure 12 shows the number of purse seine shots in the SASF in each year between 2007/08 and 2013/13, and the corresponding number of animals listed as TEPS that were reported as interactions in each year. Effort in the SASF decreased from a peak of 1,107 net shots in 2011/12 to 770 net shots in 2013/14. The highest number of animals reported in the SASF occurred in 2011/12 (311 animals Figure 17). The second highest number of animals listed as TEPS were recorded in 2013/14, despite effort during this time being the lowest recorded since 2007/08 (Figure 17).



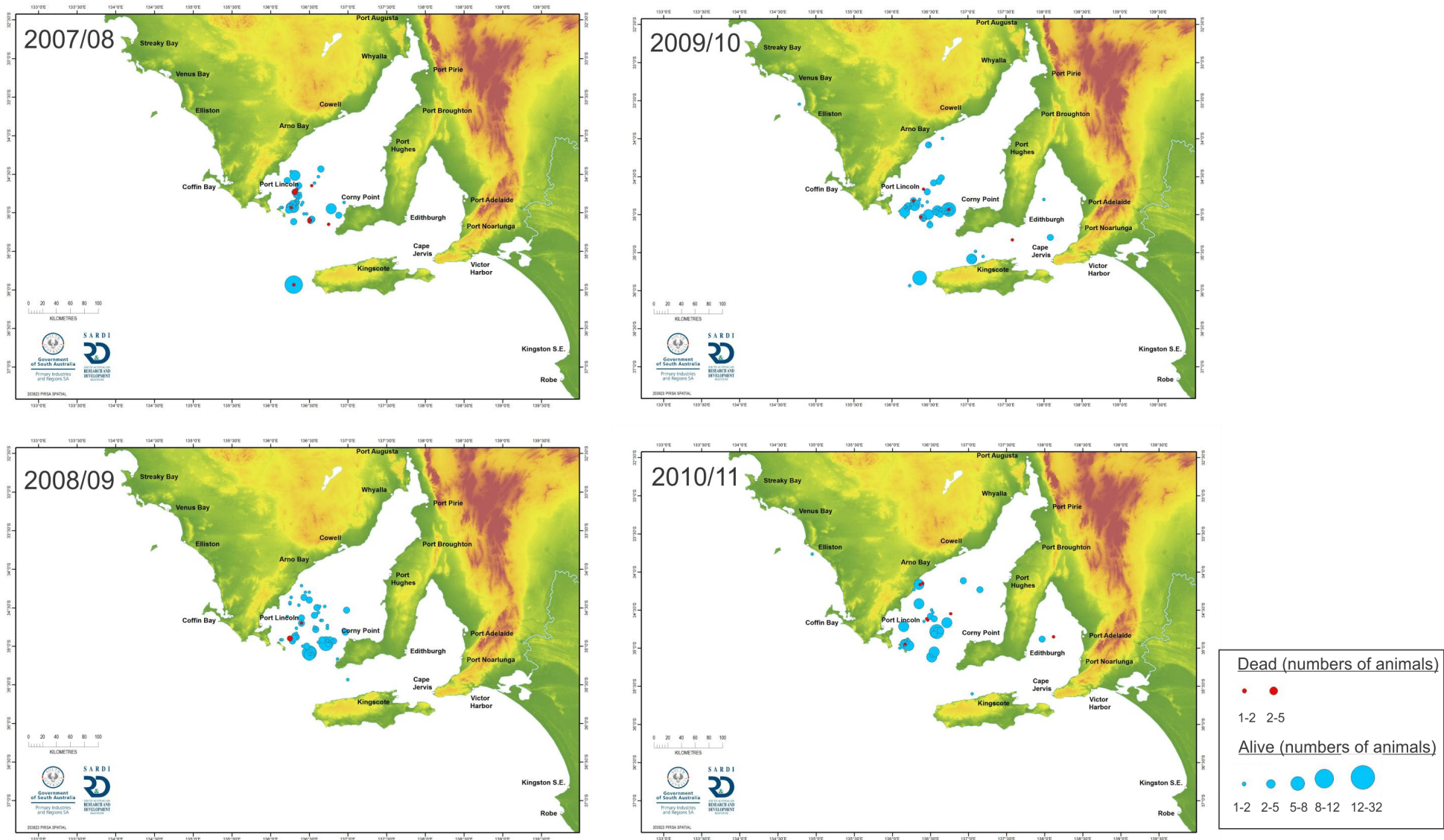
**Figure 12.** Purse seine effort recorded in the South Australian Sardine Fishery between 2007/08 and 2013/14 and corresponding numbers of animals listed as TEPS that were reported as interactions.

The main TEPS recorded as interactions in the SASF are cetaceans of which the short-beaked common dolphin *Delphinus delphis* comprise the species-majority (Ward *et al.* 2015). Cetaceans comprised 66.8% (2008/09) to 99.2% (2013/14) of animals listed as TEPS reported from SASF purse seine fishing operations between 2007/08 and 2013/14. Reported interaction rates with cetaceans were lowest in 2010/11 at 0.120 cetaceans per net shot and highest in 2013/14 at 0.305 cetaceans per net shot (Figure 13). Since reporting began, cetacean mortality rates have declined steadily from 0.017 cetaceans per net shot in 2007/08 to 0.001 cetaceans per net shot in 2013/14 (total cetacean mortalities: 2007/08 (15); 2013/14: (1)). See Appendix 6 for more details relating to the interactions of all taxonomic groups with the SASF between 2007/08 and 2013/14.

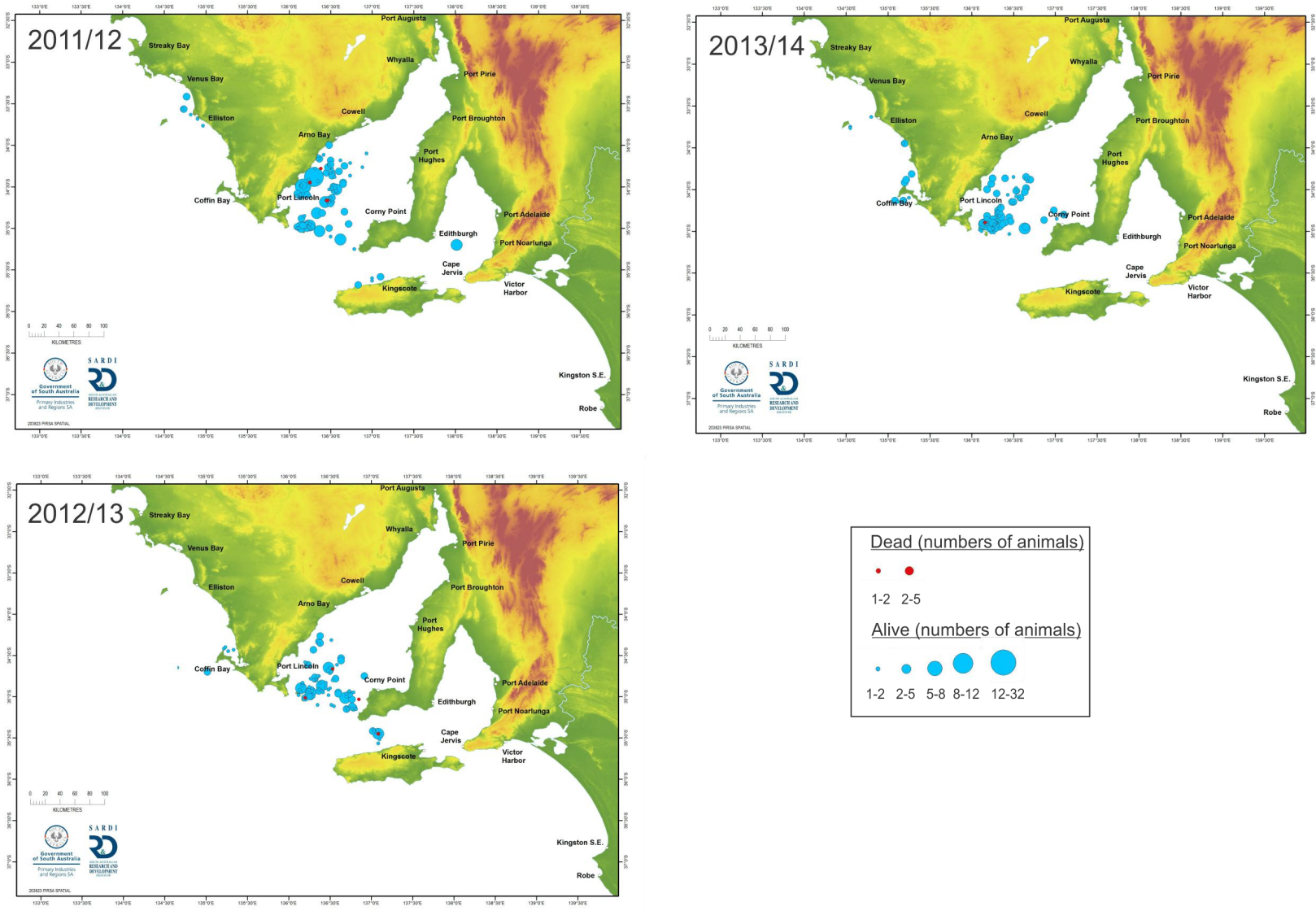


**Figure 13.** Interaction and mortality rates of cetaceans in the SASF between 2007/08 and 2013/14.

Figures 14 and 15 show the location of cetacean interactions in the SASF between 2007/08 and 2013/14, and the fate (alive or deceased) of those animals. Most reported interactions were from southern Spencer Gulf. Some interactions were also reported to the north of Kangaroo Island (Investigator Strait) between 2008/09 and 2011/12, in Gulf St Vincent (2009/10–2011/12) and off the west coast of Eyre Peninsula between 2011/12 and 2013/14.



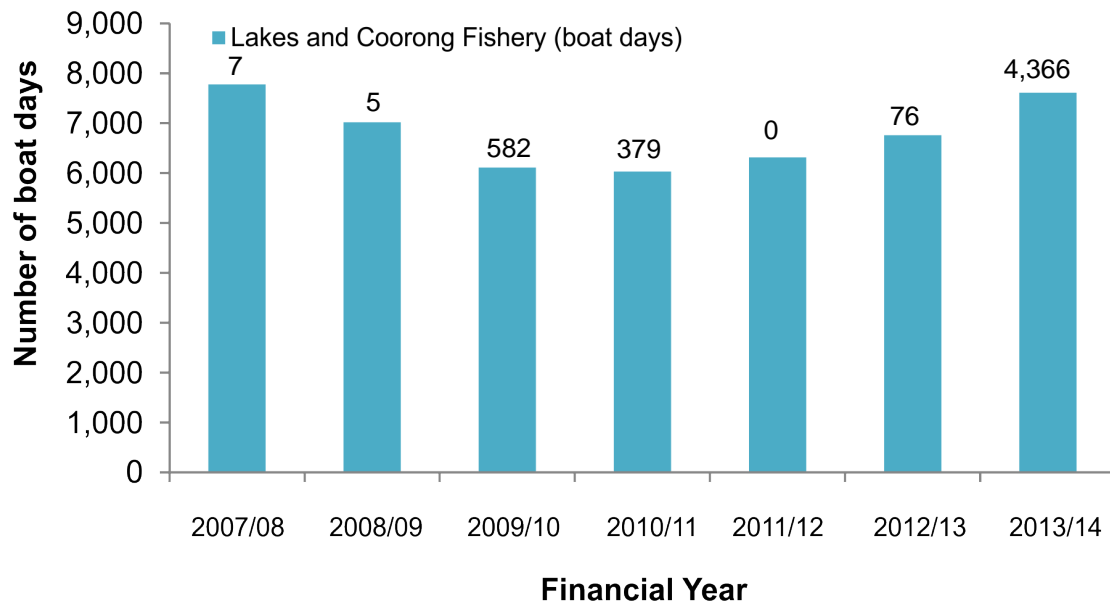
**Figure 14.** Location of cetacean interactions and their observed status (alive/dead) of cetaceans following fishing in the SASF between 2007/08 and 2010/11.



**Figure 15.** Location of cetacean interactions and the observed status (alive/dead) of cetaceans following fishing in the SASF between 2011/12 and 2013/14.

### 3.4.3 Lakes and Coorong Fishery

Figure 16 shows effort in boat days and the corresponding total numbers of animals listed as TEPS reported in Lakes and Coorong Fishery operations. Effort declined from 7,780 to 6,033 boat days between 2007/08 and 2010/11 before increasing to 7,611 boat days in 2013/14. The highest number of animals reported in the Lakes and Coorong Fishery occurred in 2013/14 (4,366 animals Figure 16).

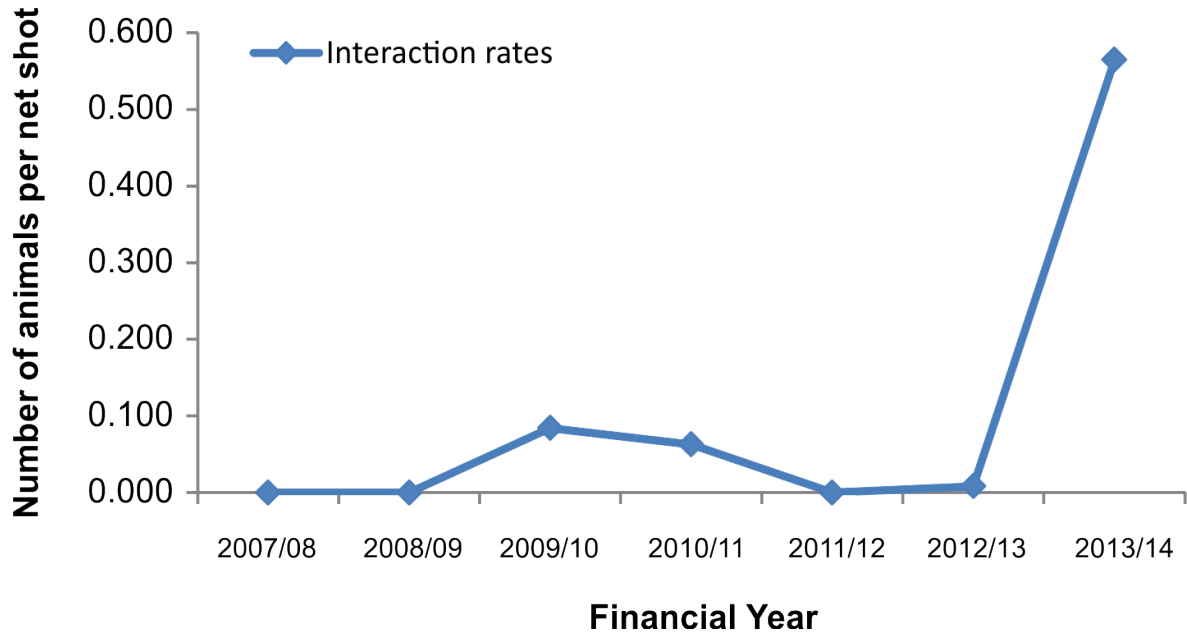


**Figure 16.** Effort in boat days recorded for the Lakes and Coorong Fishery between 2007/08 and 2013/14 and corresponding numbers of animals listed as TEPS that were reported as interactions.

The main TEPS recorded in interactions in the Lakes and Coorong Fishery are long-nosed fur seals (formerly New Zealand fur seals). Reporting of long-nosed fur seals has been varied within the fishery from 0 in 2007/098, 2008/09 and 2011/12, to 4,298 in 2013/14. In 2013/14, they comprised 98.4% of all animals reported. Long-nosed fur seal interaction rates were also highest in 2013/14 (0.565 seals per boat day) (Figure 17).

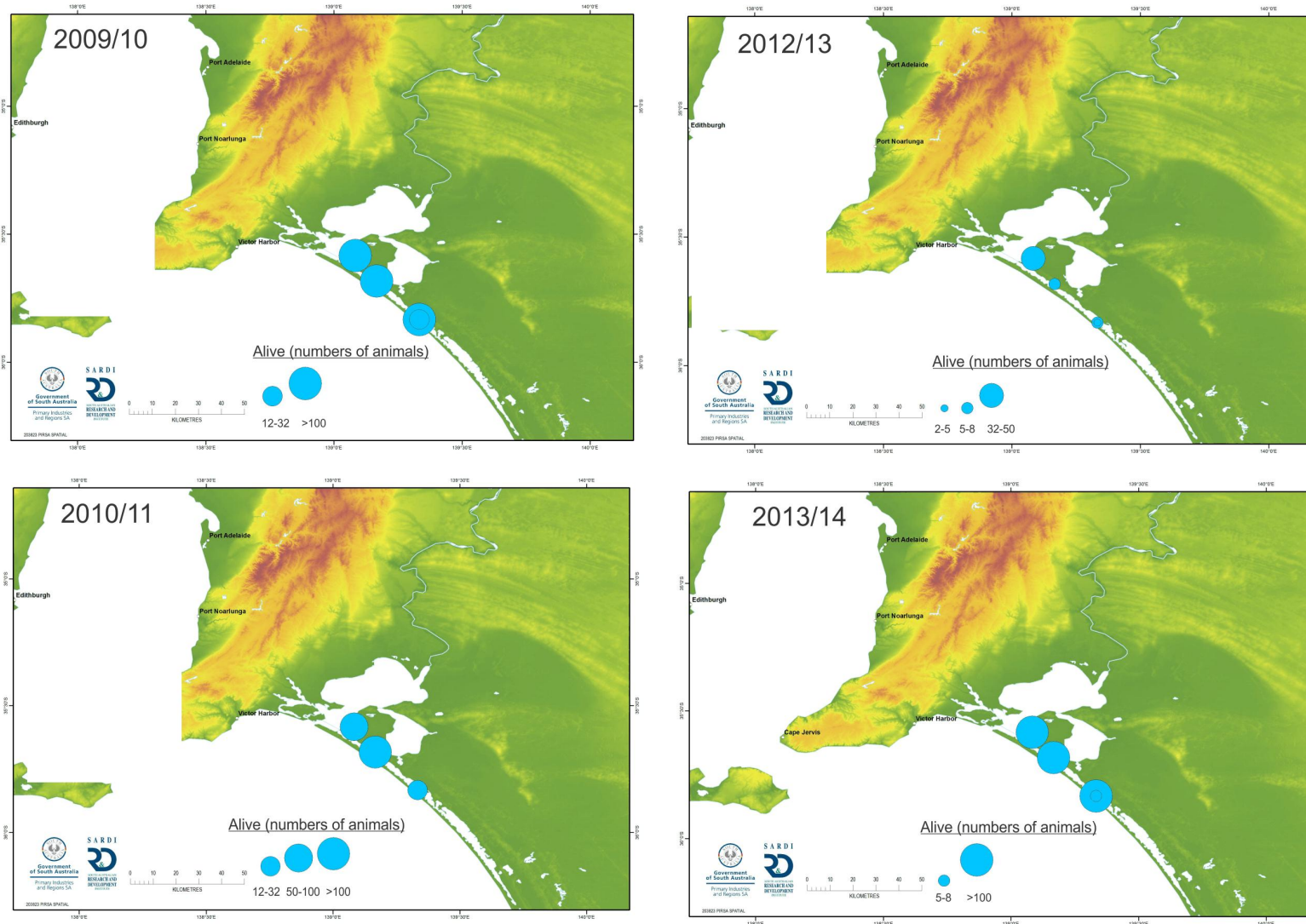
Although recent reporting (2013/14) of pinniped interactions has been high (4,298 animals), none of the interactions recorded were listed as ‘caught, entangled or impact/collisions’, and no long-nosed fur seal mortalities have ever been reported in this fishery. However, the fishery has recorded a total of 29 bird mortalities of which 26 (89.6%) were species of cormorant and grebe. Reported mortality rates for cormorants and grebes (combined) were  $\leq 0.001$  per boat day between 2007/08 and 2012/13, and increased to 0.002 animals per boat day in 2013/14. See Appendix 6. TEPS interactions within each commercial fishery in South Australia between 2007/08 and 2013/14. for

more detail on the interactions of all taxonomic groups with the Lakes and Coorong Fishery between 2007/08 and 2013/14.



**Figure 17.** Interaction rates of long-nosed fur seals in the Lakes and Coorong Fishery between 2007/08 and 2013/14. Note, no mortalities were reported in this period.

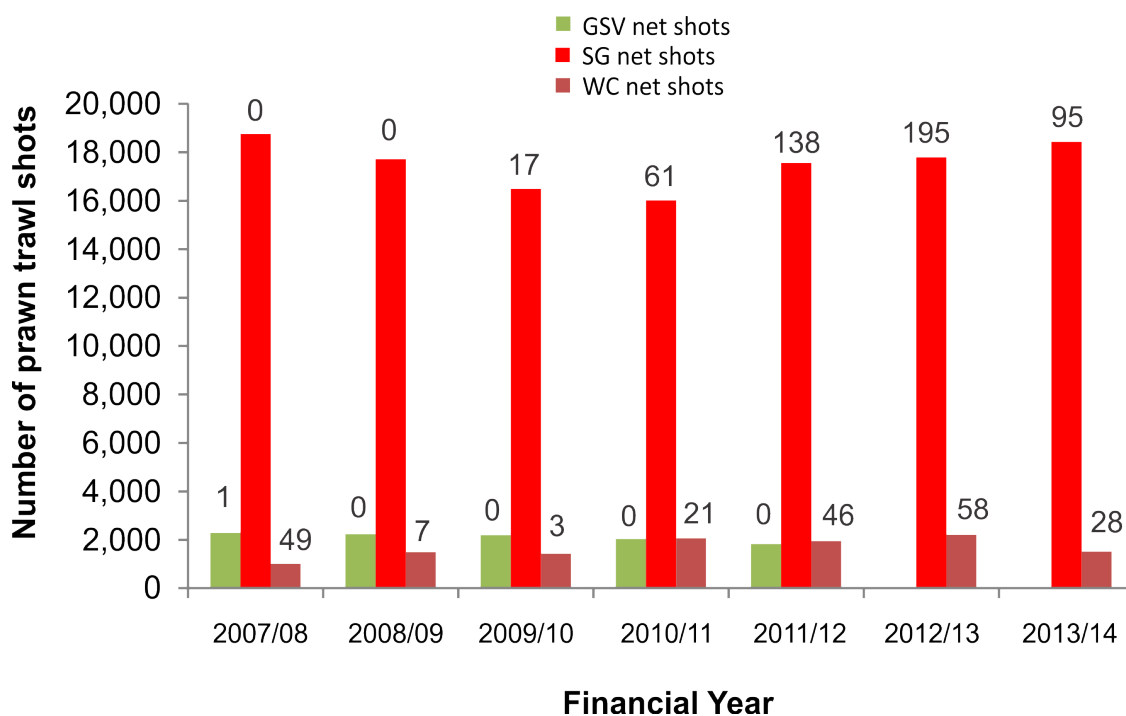
Figure 18 shows the location of long-nosed fur seal interactions in the Lakes and Coorong Fishery between 2007/08 and 2013/14, and the fate (alive only) of those animals. This fishery operates in inland waters of the Coorong, Lower Lakes and Murray Mouth.



**Figure 18.** Location of long-nosed fur seal interactions and the observed status (alive/dead) of long-nosed fur seals following fishing in the Lakes and Coorong Fishery between 2007/08 and 2012/13. Note, no interactions were recorded in 2007/08, 2008/09 and 2011/12.

### 3.4.4 Prawn Fisheries

Figure 19 shows effort in prawn trawl shots and the corresponding numbers of animals listed as TEPS in the GSVPF, SGPF and WCPF. Effort in each fishery remained relatively stable between 2007/08 and 2013/14. Effort in the SGPF was 7-10 times that recorded for the GSVPF and 8-18 times that recorded in the WCPF in this period. The GSVPF was closed in 2012/13 and 2013/14. The highest number of animals reported occurred in 2012/13 (SGPF: 195 animals; WCPF: 58 animals Figure 19). All interactions reported in South Australia’s prawn fisheries were recorded as ‘caught, entangled or impact/collisions’.



**Figure 19.** Effort in trawl shots recorded in the Gulf St Vincent, Spencer Gulf, and West Coast prawn fisheries between 2007/08 and 2013/14 and corresponding numbers of animals listed as TEPS that were reported as interactions.

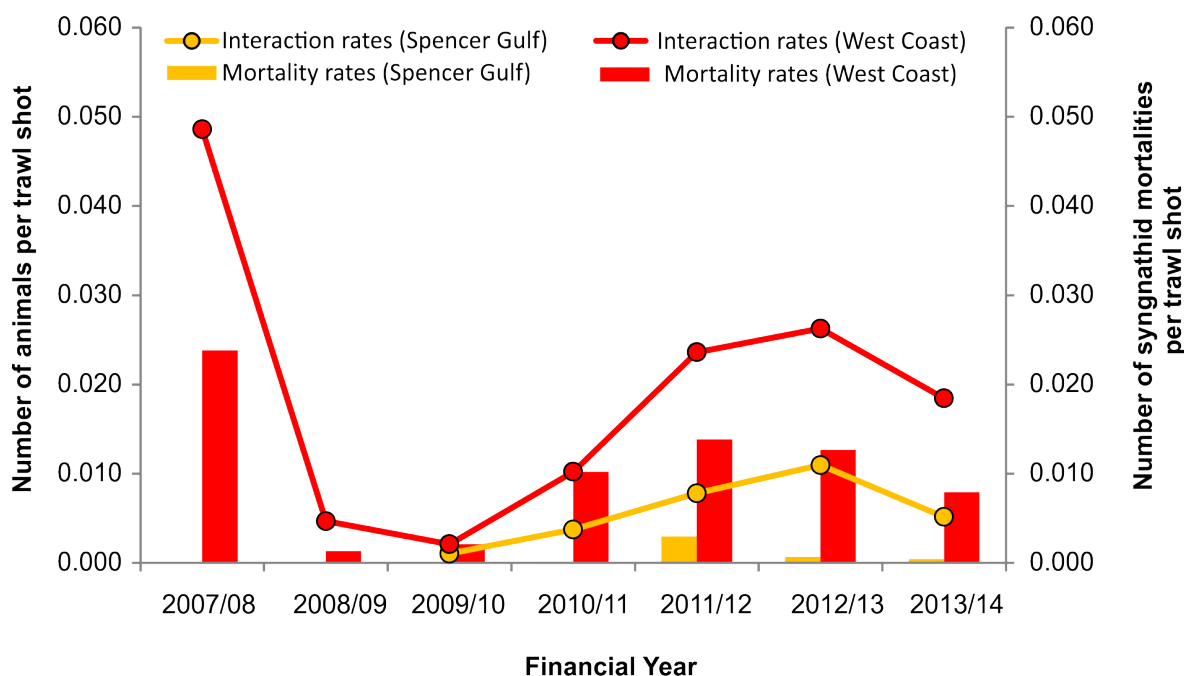
The GSVPF has recorded only one TEPS interaction since reporting began in 2007/08. The number of reported interactions in this fishery is low compared to the SGPF and WCPF where a total of 718 animals have been reported. The main TEPS recorded as interactions in the SGPF and WCPF are fish from the Family Syngnathidae (seahorses, pipefishes, and seadragons). This taxonomic group comprised at least 98% of all animals listed as TEPS and reported in these fisheries since 2007/08 (see Appendix 6).

Reported syngnathid interaction rates in the SGPF were lowest in 2009/10 (0.001 fish per net shot) and highest in 2012/13 (0.011 fish per trawl shot) (Figure 20). Reported syngnathid mortality rates have remained relatively constant in the SGPF at between 0 and 0.003 fish per trawl shot (Figure



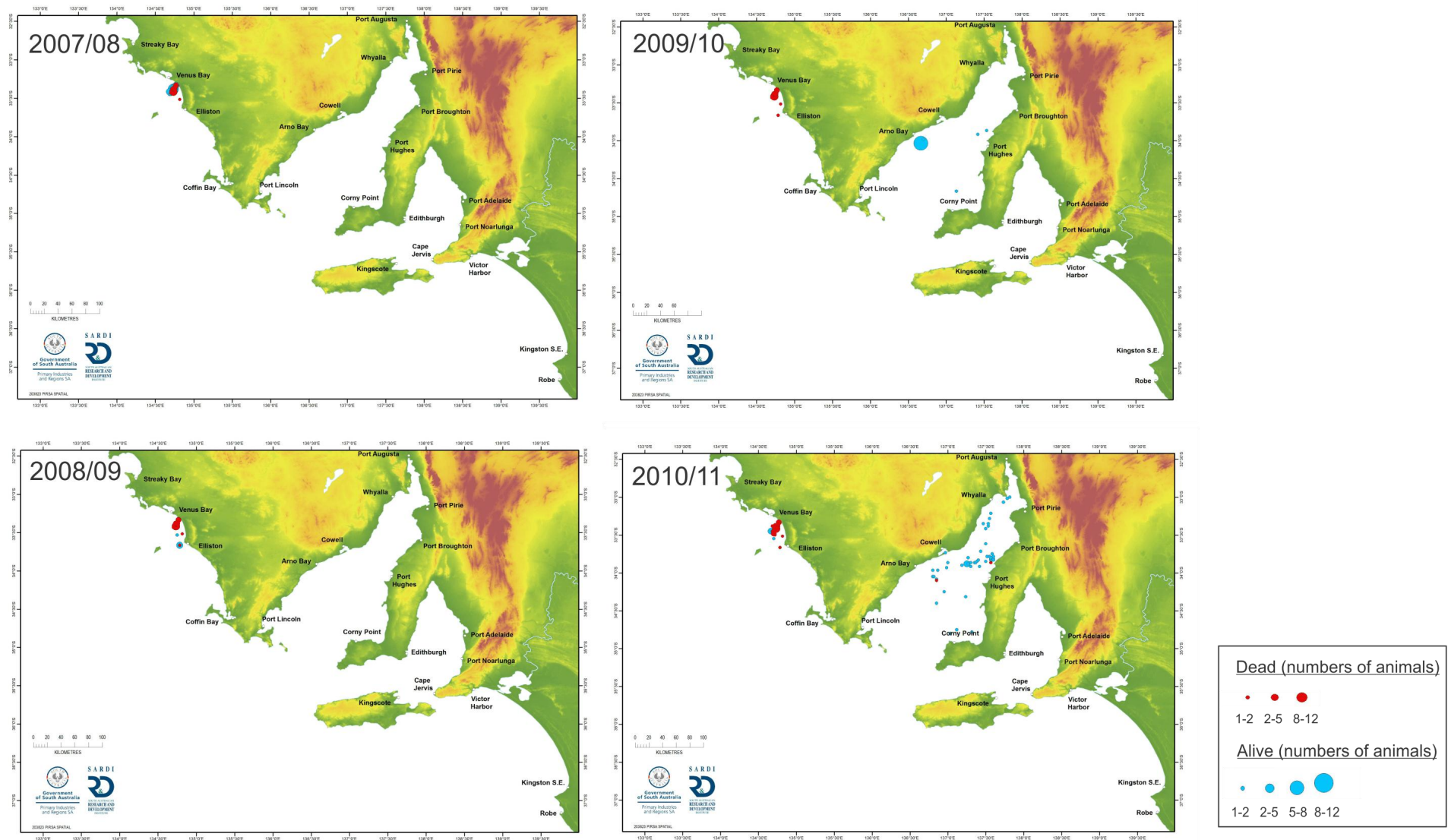
20). An average of 11.2% of all syngnathids encountered in the SGPF have been reported dead annually since 2009/10.

Reported syngnathid interaction rates and mortality rates were higher in the WCPF than the SGPF. In the WCPF, reported syngnathid interaction rates were at their highest when reporting began in 2007/08 (0.049 fish per net shot) before declining to 0.002 fish per trawl shot in 2009/10 (Figure 20). Syngnathid interaction rates have averaged 0.023 fish per trawl shot since 2011/12. Reported syngnathid mortality rates in the WCPF reflect the trends in syngnathid interaction rates (Figure 20). An average of 63% of all syngnathids encountered in the WCPF have been reported dead annually since 2008/09. See Appendix 6 for more details on the interactions of all taxonomic groups with prawn fisheries between 2007/08 and 2013/14.

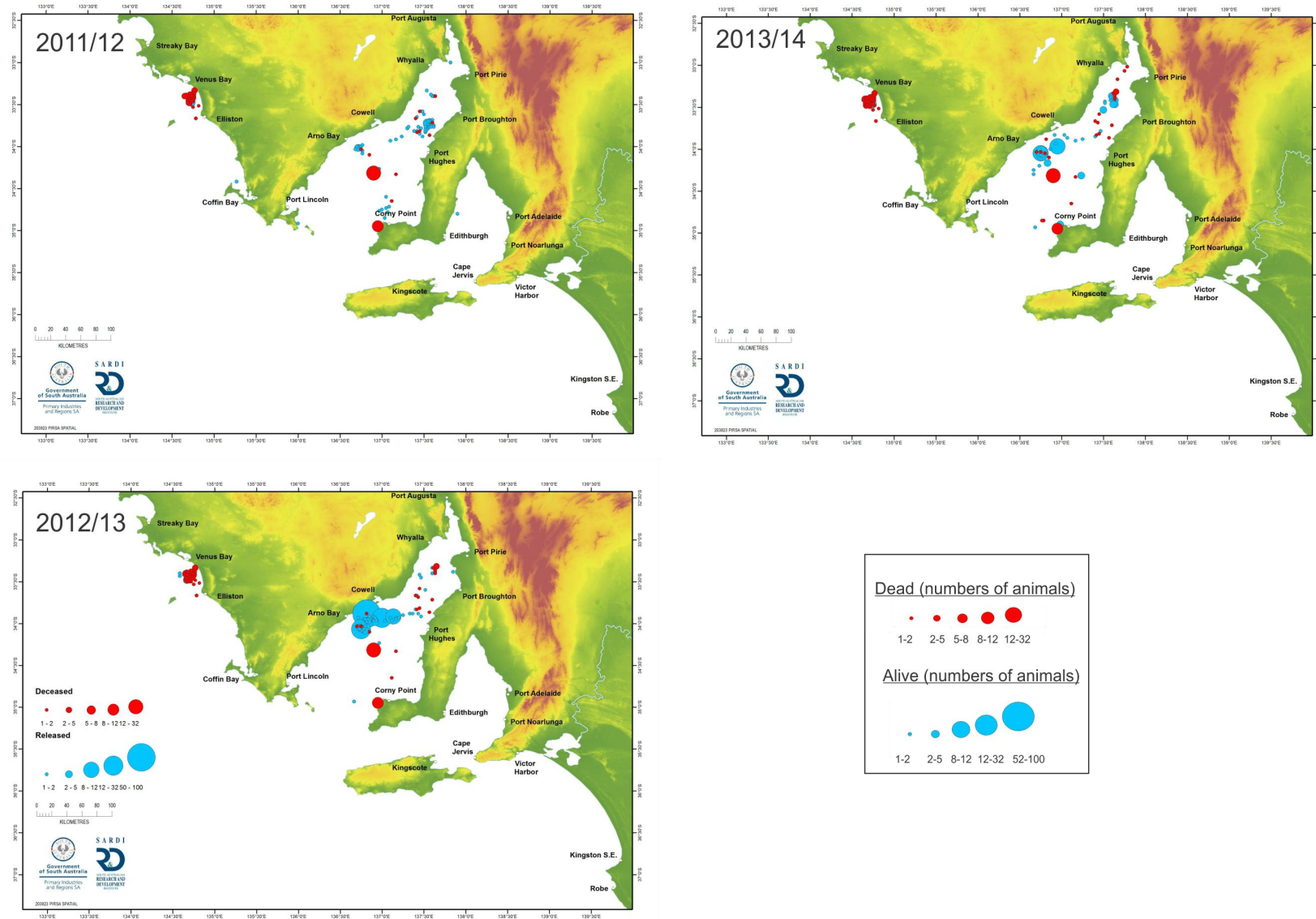


**Figure 20.** Interaction and mortality rates of syngnathid fish in the SGPF and WCPF between 2007/08 and 2013/14.

Figures 21 and 22 show the location of interactions with fish listed as TEPS in the SGPF and WCPF between 2007/08 and 2013/14, and the fate (released alive or deceased) of those animals. No interactions were reported in SGPF operations in Spencer Gulf in 2007/08 and 2008/09. Interactions in the WCPF between 2007/08 and 2013/14 were reported from waters between Elliston and Venus Bay off western Eyre Peninsula (eastern Great Australian Bight).



**Figure 21.** Location of interactions with fish listed as TEPS and their observed status (alive/dead) following fishing in the SGPF and WCPF between 2007/08 and 2010/11. Note, no interactions were recorded in the SGPF in 2007/08 and 2008/09.



**Figure 22.** Location of interactions with fish listed as TEPS and their observed status (alive/dead) following fishing in the SGPF and WCPF between 2011/12 and 2013/14.

### 3.4.5 Other Fisheries

Compared to the State-managed commercial fisheries identified above, the Marine Scalefish, Abalone, Blue Crab, Charter Boat, River and Miscellaneous fisheries reported relatively low numbers of interactions with animals listed as TEPS between 2007/08 and 2013/14 (Table 4). The Marine Scalefish Fishery (MSF) is the oldest fishery in the State and is a multi-gear, multi-species fishery using around 27 different devices and methods, harvesting 71 species. Between 2007/08 and 2013/14, the MSF recorded between 2 and 24 TEPS interactions that comprised between 2 and 37 animals per year (Table 4). Approximately 68.2% of the interactions recorded were with cormorants. Of the seven mortalities recorded in the MSF, 2 were great white sharks *Carcharodon carcharias* and 2 were cormorants (see Appendix 6).

The Charter Boat Fishery is comprised of 109 licence holders of which 75 actively participate. A total of 21 animals were reported between 2007/08 and 2013/14. Approximately 50% were great white sharks which were not harmed by charter operations. The River Fishery is a multi-species, multi-gear fishery that targets non-native fish species in the River Murray, its tributaries and wetlands. There are 6 licence holders within the River Fishery. The River Fishery did not report any interactions with a TEPS during the past seven financial years.

The South Australian Rock Lobster Fishery (SARLF) is a single species fishery that uses pots to target rock lobster *Jasus edwardsii* within two management units (fisheries): the Northern and Southern Zones. The Southern Zone has 181 licence holders and operates from October to May, whilst the Northern Zone has 68 licence holders and operates from November to May. The two zones are managed as separate fisheries. The Blue Crab Fishery is also single species crustacean fishery that targets blue swimmer crabs *Portunus armatus* with crab nets, hoop nets or drop nets in two zones (Spencer Gulf and Gulf St Vincent) (PIRSA 2012). These crustacean fisheries have low TEPS interaction rates due to the relatively high selectivity of gear used to capture target species, lower overall likelihood of non-target species becoming entangled relative to other gear types (e.g. gill net) and employment of exclusion devices (e.g. seal exclusion devices in rock lobster pots). In the SARLF, a total of 12 animals have been reported as interactions since reporting began in 2007/08, of which only 2 were entanglements. The fishery has not reported any TEPS interactions since 2008/09 (Appendix 6). In the Blue Crab Fishery two animals have been recorded as interactions. See Appendix 6 for more details on the interactions of all taxonomic groups with these fisheries between 2007/08 and 2013/14.

## 4 DISCUSSION

This report synthesises data relating to TEPS operational interactions in South Australia's commercial fisheries between 1 July 2007 and 30 June 2014. The data presented in this report provides a summary and overview of the key spatial and temporal trends in TEPS interactions as a function of taxonomic group, gear type and fishery and builds on previous versions by synthesising information to present trends in TEPS interactions for the main taxonomic groups, gear types and fisheries in South Australia. The report does not quantify the risk of commercial fishing operations to TEPS populations or analyse the causes influencing the trends in TEPS interaction rates recorded. Such analyses are gear-type, fishery and TEPS specific, and require additional data beyond the scope of this document.

However, we note that the risk of commercial fishing operations to TEPS is influenced by a variety of factors such as: 1) population sizes of TEPS and the proximity of TEPS populations to fishing operations; 2) overlap between fishing operations and TEPS foraging distributions or migratory paths; 3) habituation of TEPS to spatially and temporally-predictable patterns of fishing; 4) changes in patterns of fishing; 5) TEPS foraging or migratory behaviour; and 6) the accuracy of fishery-dependent TEPS reporting. This information is generally lacking for TEPS encountered in South Australian commercial fisheries because few data exist relating to TEPS population sizes, foraging distributions and migratory paths for many of the taxonomic groups listed, and there is no knowledge of how TEPS behaviour and fishing practices influence TEPS encounter and mortality rates in South Australian commercial fisheries. Importantly, except for the SASF (Ward *et al.* 2015), the accuracy of fishery-dependent reporting also remains unquantified.

Between 2007/08 and 2013/14, a total of 1,497 interactions comprising 7,831 animals listed as TEPS were reported. Of the 7,831 animals reported in this period, 27.6% (2,159) were recorded as 'caught, entangled or impact/collision' interactions, and 3.4% (269) were recorded as mortalities. Over 95% of the total interactions and total number of animals reported since 2007/08 were from net-fishing operations occurring in central-western and southern waters of Spencer Gulf, off the west coast of Eyre Peninsula (eastern Great Australian Bight), and from the Coorong, Lower Lakes and Murray Mouth.

Purse seine, prawn trawl and gill net operations (large and small mesh) accounted for 85.6% of all TEPS interactions and animals listed as TEPS reported in commercial fishing operations between 2007/08 and 2013/14. Cetaceans and pinnipeds comprised approximately 56.7% of all TEPS interactions, and 87% of all animals listed as TEPS, in the same period. It should be noted that over half of all animals listed as TEPS and reported between 2007/08 and 2013/14 came from reporting of long-nosed fur seals in gill net operations of the Lakes and Coorong Fishery in 2013/14. Fish comprised 29.7% of all TEPS interactions and 9.7% of all animals listed as TEPS between 2007/08

and 2013/14. The majority of fish reported were from the Family Syngnathidae (seahorses, pipefishes, and seadragons). A total of 3% of all cetaceans encountered during all fishing operations were reported dead while <0.1% of the total pinnipeds recorded were reported as dead. Fish listed as TEPS comprised 68.8% (185) of the total (269) mortalities recorded from all taxonomic groups.

The SASF, Lakes and Coorong Fishery, and SGPF and WCPF accounted for 94.1% of all TEPS interactions and 98.1% of the total animals reported. Cetaceans were the main group of animals recorded in the SASF comprising between 67% and 99% of the animals reported between 2007/08 and 2013/14. Cetaceans interaction rates were at their highest in 2013/14 and cetacean mortality rates have declined in the SASF since reporting began in 2007/08. An industry Code of Practice (COP) developed by industry, fisheries managers and scientists to mitigate operational interactions with TEPS has been in place since 2005/06. Despite the relatively high interaction rates recorded since 2010/11, a decline in cetacean mortality rates has been recorded since the COP was introduced. This result highlights how management approaches developed through science and industry collaborations can help to reduce any potential impacts of fishing on TEPS populations.

The Lakes and Coorong Fishery recorded a total of 29 bird mortalities of which 26 (89.6%) comprised species of cormorant and grebe. Interaction rates with long-nosed fur seals have been variable since 2007/08, but increased in 2013/14. The high number of recent interactions with long-nosed fur seals are likely due to increases in the abundance of this species since colonial sealing ceased around 1830 (Shaughnessy *et al.* 2015). Although, the recent increases in interactions with long-nosed fur seal have not resulted in any mortalities, the numbers of seals reported have been a major cause of concern for industry due to depredation of catch. Depredation rates currently remain unquantified for any South Australian commercial fishery.

In the SGPF and WCPF, fish from the Family Syngnathidae (seahorses, pipefishes, and seadragons) comprised at least 98% of the animals listed as TEPS reported in these fisheries since 2007/08. Reported interaction and mortality rates were higher for syngnathids in the WCPF than the SGPF. An average of 11.2% of all syngnathids encountered in the SGPF have been reported dead annually since 2009/10. An average of 63% of all syngnathids encountered in the WCPF have been reported dead annually since 2008/09. The GSVPF has recorded only one TEPS interaction since reporting began in 2007/08 indicating possible under-reporting of TEPS interactions in this fishery.

Future reporting relating to TEPS interactions in South Australia's commercial fisheries would be improved by: 1) validating fishery-dependent reporting of TEPS interactions using fishery-independent observers; 2) improving fishery-dependent species identification for TEPS interacting with fisheries operations; and 3) reporting interaction/mortality rates of TEPS as a function of their local, national and international conservation and/or population status (e.g. Australian Sea Lion:

International Union for the Conservation of Nature (IUCN) – Endangered; EPBC Act – Vulnerable/Marine; NPWA – Vulnerable; population status – 14,700 individuals; 86% in SA (Shaughnessy *et al.* 2011)). These improvements would help identify the species most at risk from commercial fishing operations in South Australia, and inform possible strategies to help mitigate future impacts to TEPS populations and marine ecosystems.

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## APPENDICES

## Appendix 1. National Parks and Wildlife Act 1972 - Schedule 7–Endangered Species

## Part 1 - Animals

Common name	Species	Common name	Species	Common name	Species
<b>Mammals</b>			<b>PETAURIDAE</b>		<b>LARIDAE</b>
	<b>ACROBATIDAE</b>	Yellow-bellied Glider	<i>Petaurus australis</i>	Little Tern	<i>Sterna albifrons</i>
Feathertail Glider	<i>Acrobates pygmaeus</i>	Squirrel Glider	<i>Petaurus norfolcensis</i>	Fairy Tern	<i>Sterna nereis</i>
	<b>BALAEOPTERIDAE</b>		<b>POTORIDAE</b>		<b>MALURIDAE</b>
Blue Whale	<i>Balaenoptera musculus</i>	Burrowing Bettong	<i>Bettongia lesueur</i>	Southern Emu-wren (Mount Lofty Ranges subspecies)	<i>Stipiturus malachurus intermedius</i>
	<b>DASYURIDAE</b>	Brush-tailed Bettong (eastern subspecies)	<i>Bettongia penicillata penicillata</i>	Southern Emu-wren (Eyre Peninsula subspecies)	<i>Stipiturus malachurus parimeda</i>
Agile Antechinus	<i>Antechinus agilis</i>	Desert Rat-kangaroo	<i>Caloprymnus campestris</i>	Mallee Emu-wren	<i>Stipiturus mallee</i>
Swamp Antechinus	<i>Antechinus minimus</i>	Long-nosed Potoroo	<i>Potorous tridactylus</i>		<b>MELIPHAGIDAE</b>
Mulgara	<i>Dasyercus cristicauda cristicauda</i>		<b>VESPERTILIONIDAE</b>	Yellow Chat	<i>Epthianura crocea</i>
Western Quoll	<i>Dasyurus geoffroi</i>	Little Pied Bat	<i>Chalinobius picatus</i>	Yellow-throated Miner (Black-eared subspecies)	<i>Manorina flavigula melanotis</i>
Spotted-tailed Quoll	<i>Dasyurus maculatus</i>	Eastern Falsistrelle	<i>Falsistrellus tasmaniensis</i>	Regent Honeyeater	<i>Xanthomyza phrygia</i>
Eastern Quoll	<i>Dasyurus viverrinus</i>	Large Bent-wing Bat (southern subspecies)	<i>Miniopterus schreibersii bassanii</i>		<b>PACHYCEPHALIDAE</b>
Red-tailed Phascogale	<i>Phascogale calura</i>	Southern Myotis	<i>Myotis macropus</i>	Olive Whistler (westernmost subspecies)	<i>Pachycephala olivacea hesperus</i>
Brush-tailed Phascogale	<i>Phascogale tapoatafa</i>	Gould's Long-eared Bat	<i>Nyctophilus gouldi</i>		<b>PEDIONOMIDAE</b>
Kangaroo Island Dunnart	<i>Sminthopsis aitkeni</i>			Plains-wanderer	<i>Pedionomus torquatus</i>
	<b>MACROPODIDAE</b>		<b>Birds</b>		<b>PHASIANIDAE</b>
Rufous Hare-wallaby	<i>Lagorchestes hirsutus</i>		<b>ACANTHIZIDAE</b>	King Quail	<i>Coturnix chinensis</i>
Eastern Hare-wallaby	<i>Lagorchestes leporides</i>	Chestnut-rumped Heathwren (Mount Lofty Ranges subspecies)	<i>Calamanthus pyrrhopygius parkeri</i>		<b>POMATOSTOMIDAE</b>
Tamar Wallaby (mainland South Australia Subspecies)	<i>Macropus eugenii eugenii</i>		<b>ACCIPITRIDAE</b>	Grey-crowned Babbler (south east subspecies)	<i>Pomatostomus temporalis temporalis</i>
Toolache Wallaby	<i>Macropus greyi</i>	Grey Goshawk	<i>Accipiter novaehollandiae</i>	Little Lorikeet	<i>Glossopsitta pusilla</i>
Crescent Nailtail Wallaby	<i>Onychogalea lunata</i>	White-bellied Sea-Eagle	<i>Haliaeetus leucogaster</i>	Swift Parrot	<i>Lathamus discolor</i>
Black-footed Rock-wallaby (MacDonnell Ranges race)	<i>Petrogale lateralis</i>	Square-tailed Kite	<i>Lophoictinia isura</i>	Orange-bellied Parrot	<i>Neophema chrysogaster</i>
Tasmanian Pademelon	<i>Thylogale billardieri</i>	Osprey	<i>Pandion haliaetus</i>	Night Parrot	<i>Pezoporus occidentalis</i>
	<b>MEGADERMATIDAE</b>		<b>ALCEDINIDAE</b>	Ground Parrot	<i>Pezoporus wallicus</i>
Ghost Bat	<i>Macroderma gigas</i>	Azure Kingfisher	<i>Alcedo azurea</i>		<b>PTILONORHYNCHIDAE</b>
	<b>MURIDAE</b>		<b>ANSERANATIDAE</b>	Spotted Bowerbird	<i>Chlamydera maculata</i>
White-footed Tree-rat	<i>Coniurus albipes</i>	Magpie Goose	<i>Anseranas semipalmata</i>		<b>STRIGIDAE</b>
Lesser Stick-nest Rat	<i>Leporillus apicalis</i>		<b>ARDEIDAE</b>	Powerful Owl	<i>Ninox strenua</i>
Short-tailed Hopping-mouse	<i>Notomys amplus</i>	Little Bittern	<i>Ixobrychus minutus</i>		<b>SYLVIIDAE</b>
Long-tailed Hopping-mouse	<i>Notomys longicaudatus</i>		<b>ARTAMIDAE</b>	Spinifexbird	<i>Eremiornis carteri</i>
Shark Bay Mouse	<i>Pseudomys fieldi</i>	Pied Currawong (south east subspecies)	<i>Strepera graculina ashbyi</i>		<b>TYTONIDAE</b>
Gould's Mouse	<i>Pseudomys gouldii</i>	Grey Currawong (north western subspecies)	<i>Strepera versicolor plumbea</i>	Masked Owl	<i>Tyto novaehollandiae</i>
Heath Rat	<i>Pseudomys shortridgei</i>		<b>CACATUIDAE</b>		<b>Reptiles</b>
Pale Field-rat	<i>Rattus tunneyi</i>	Red-tailed Black-Cockatoo (south east subspecies)	<i>Calyptorhynchus banksii graptogyne</i>		<b>CHELONIIDAE</b>
	<b>MYRMECOBIDAE</b>	Glossy Black-Cockatoo (Kangaroo Island subspecies)	<i>Calyptorhynchus lathami halmaturinus</i>	Loggerhead Turtle	<i>Caretta caretta</i>
Numbat	<i>Myrmecobius fasciatus</i>		<b>CASUARIIDAE</b>		<b>GEKKONIDAE</b>
	<b>ORNITHORHYNCHIDAE</b>	Kangaroo Island Emu	<i>Dromaius baudinianus</i>	Mallee Worm-lizard	<i>Aprasia aurita</i>
Platypus	<i>Ornithorhynchus anatinus</i>		<b>DICRURIDAE</b>	Striped Snake-lizard	<i>Delma impar</i>
	<b>OTARIIDAE</b>	Satin Flycatcher	<i>Myiagra cyanoleuca</i>		<b>SCINCIDAE</b>
Subantarctic Fur-seal	<i>Arctocephalus tropicalis</i>		<b>DIOMEDEIDAE</b>	Swamp Skink	<i>Egernia coventryi</i>
	<b>PERAMELIDAE</b>	Yellow-nosed Albatross (Indian Ocean subspecies)	<i>Diomedea chlororhynchus carteri</i>	Cunningham's Skink	<i>Egernia cunninghami</i>
Pig-footed Bandicoot	<i>Chaeropus ecaudatus</i>	Yellow-nosed Albatross (Atlantic Ocean subspecies)	<i>Diomedea chlororhynchus chlororhynchus</i>	Tjakura	<i>Egernia kintorei</i>
Golden Bandicoot	<i>Isodon auratus</i>	Royal Albatross (northern subspecies)	<i>Diomedea epomophora sanfordi</i>	Black-striped Desert Skink	<i>Egernia slateri</i>
Lesser Bilby	<i>Macrotis leucura</i>	Sooty Albatross	<i>Diomedea fusca</i>	Salamander Skink	<i>Nannoscincus maccoyi</i>
Western Barred Bandicoot	<i>Perameles bougainville</i>		<b>EUPETIDAE</b>	Pygmy Bluetongue	<i>Tiliqua adelaidensis</i>
Desert Bandicoot	<i>Perameles eremiana</i>	Spotted Quail-thrush (Mount Lofty Ranges subspecies)	<i>Cinclosoma punctatum anachoreta</i>		
Eastern Barred Bandicoot	<i>Perameles gunnii</i>	Spotted Quail-thrush (south east subspecies)	<i>Cinclosoma punctatum punctatum</i>		
		Western Whipbird (eastern subspecies)	<i>Psophodes nigrogularis leucogaster</i>		

**Appendix 2. National Parks and Wildlife Act 1972 - Schedule 8–Vulnerable species**

**Part 1—Animals**

Common name	Species	Common name	Species	Common name	Species
<b>Mammals</b>		Chestnut-rumped Heathwren (Flinders Ranges subspecies)	<i>Calamanthus pyrrhopygius pedleri</i>		<b>PROCELLARIIDAE</b>
	<b>BALAENIDAE</b>			Southern Giant-Petrel	<i>Macronectes giganteus</i>
Southern Right Whale	<i>Eubalaena australis</i>	Chestnut-rumped Heathwren (south east subspecies)	<i>Calamanthus pyrrhopygius pyrrhopygius</i>		<b>PSITTACIDAE</b>
	<b>BALAENOPTERIDAE</b>		<b>ANATIDAE</b>	Blue-winged Parrot	<i>Neophema chrysostoma</i>
Sei Whale	<i>Balaenoptera borealis</i>	Freckled Duck	<i>Stictonetta naevosa</i>	Princess Parrot	<i>Polytelis alexandrae</i>
Fin Whale	<i>Balaenoptera physalus</i>		<b>ARDEIDAE</b>	Regent Parrot (eastern subspecies)	<i>Polytelis anthopeplus monarchoides</i>
Humpback Whale	<i>Megaptera novaeangliae</i>	Australasian Bittern	<i>Botaurus poiciloptilus</i>		<b>RALLIDAE</b>
	<b>BURRAMYIDAE</b>		<b>CACATUIDAE</b>	Lewin's Rail	<i>Rallus pectoralis</i>
Eastern Pygmy-possum	<i>Cercartetus nanus</i>	Yellow-tailed Black-Cockatoo	<i>Calyptorhynchus funereus</i>		<b>RECURVIROSTRIDAE</b>
	<b>DASYURIDAE</b>		<b>CHARADRIIDAE</b>	Banded Stilt	<i>Cladorhynchus leucocephalus</i>
Yellow-footed Antechinus	<i>Antechinus flavipes</i>	Hooded Plover	<i>Thinornis rubricollis</i>		<b>ROSTRATULIDAE</b>
Kowari	<i>Dasyercus byrnei</i>		<b>DIOMEDEIDAE</b>	Painted Snipe	<i>Rostratula benghalensis</i>
Sandhill Dunnart	<i>Sminthopsis psammophila</i>	Buller's Albatross	<i>Diomedea bulleri</i>		<b>SCOLOPACIDAE</b>
	<b>MACROPODIDAE</b>	Shy Albatross	<i>Diomedea cauta cauta</i>	Eastern Curlew	<i>Numenius madagascariensis</i>
Yellow-footed Rock-wallaby	<i>Petrogale xanthopus</i>	Salvin's Albatross	<i>Diomedea cauta salvini</i>		<b>Reptiles</b>
Swamp Wallaby	<i>Wallabia bicolor</i>	Grey-headed Albatross	<i>Diomedea chrysostoma</i>		<b>CHELIDAE</b>
	<b>MOLOSSIDAE</b>	Royal Albatross (southern subspecies)	<i>Diomedea epomophora epomophora</i>	Broad-shelled Tortoise	<i>Chelodina expansa</i>
Hairy-rostrum Freetail-bat ("hairy rostrum")	<i>Mormopterus species 6</i>	Wandering Albatross	<i>Diomedea exulans</i>	Macquarie Tortoise	<i>Emydura macquarii</i>
	<b>MURIDAE</b>	Black-browed Albatross (Campbell Island subspecies)	<i>Diomedea melanophrys impavida</i>		<b>CHELONIIDAE</b>
Greater Stick-nest Rat	<i>Leporillus conditor</i>	Light-mantled Sooty Albatross	<i>Diomedea palpebrata</i>	Green Turtle	<i>Chelonia mydas</i>
Fawn Hopping-mouse	<i>Notomys cervinus</i>		<b>ESTRILDIDAE</b>		<b>DERMOCHELYIDAE</b>
Dusky Hopping-mouse	<i>Notomys fuscus</i>	Diamond Firetail	<i>Stagonopleura guttata</i>	Leathery Turtle	<i>Dermochelys coriacea</i>
Plains Mouse	<i>Pseudomys australis</i>		<b>GRUIDAE</b>		<b>ELAPIDAE</b>
	<b>NOTORYCTIDAE</b>	Brolga	<i>Grus rubicunda</i>	Desert Death Adder	<i>Acanthopis pyrrhus</i>
Southern Marsupial Mole (Itjari-itjari)	<i>Notoryctes typhlops</i>		<b>LARIDAE</b>		<b>SCINCIDAE</b>
	<b>OTARIIDAE</b>	Great Skua (Macquarie and Heard Island subspecies)	<i>Catharacta skua lonnbergi</i>	Yellow-bellied Water Skink	<i>Eulamprus heatwolei</i>
Australian Sea-lion	<i>Neophoca cinerea</i>		<b>MEGALOPIDIDAE</b>	Musgrave Slider	<i>Lerista speciosa</i>
	<b>PERAMELIDAE</b>	Malleefowl	<i>Leipoa ocellata</i>	Glossy Grass Skink	<i>Pseudemoia rawlinsoni</i>
Southern Brown Bandicoot (Nuyts Archipelago subspecies)	<i>Isodon obesulus nauticus</i>		<b>MELIPHAGIDAE</b>		<b>VARANIDAE</b>
Southern Brown Bandicoot (SA mainland and Kangaroo Island subspecies)	<i>Isodon obesulus obesulus</i>	Black-chinned Honeyeater (south eastern subspecies)	<i>Melithreptus gularis gularis</i>	Heath Goanna	<i>Varanus rosenbergi</i>
		Australian Bustard	<b>OTIDIDAE</b>		<b>Amphibians</b>
Greater Bilby	<i>Macrotis lagotis</i>		<i>Ardeotis australis</i>		<b>HYLIDAE</b>
	<b>VESPERTILIONIDAE</b>	Scarlet Robin (western subspecies)	<i>Petroica multicolor campbelli</i>	Golden Bell Frog	<i>Litoria raniformis</i>
Greater Long-eared Bat (south eastern form)	<i>Nyctophilus timoriensis</i>	Flame Robin	<i>Petroica phoenicea</i>	Shoemaker Frog	<i>Neobatrachus sutor</i>
<b>Birds</b>			<b>PHASIANIDAE</b>	Orange-crowned Toadlet	<i>Pseudophryne occidentalis</i>
	<b>ACANTHIZIDAE</b>	Brown Quail	<i>Coturnix ypsilophora</i>	Marbled Toadlet	<i>Pseudophryne semimarmorata</i>
Slender-billed Thornbill (St Vincent Gulf subspecies)	<i>Acanthiza iredalei rosinae</i>				

### Appendix 3. National Parks and Wildlife Act 1972 - Schedule 9–Rare species

#### Part 1—Animals

Common name	Species	Common name	Species	Common name	Species	Common name	Species
<b>Mammals</b>		Rufous Bristlebird (south east SA subspecies)	<i>Dasyornis broadbenti broadbenti</i>	Southern Emu-wren (south east SA subspecies)	<i>Stipiturus malachurus polionotum</i>		<b>THRESKIORNITHIDAE</b>
	<b>BALAEOPTERIDAE</b>					Glossy Ibis	<i>Plegadis falcinellus</i>
Minke Whale	<i>Balaenoptera acutorostrata</i>	Western Gerygone	<i>Gerygone fusca</i>	Rufous-crowned Emu-wren	<i>Stipiturus ruficeps</i>		<b>TURNICIDAE</b>
Bryde's Whale	<i>Balaenoptera edeni</i>	White-throated Gerygone	<i>Gerygone olivacea</i>		<b>MELIPHAGIDAE</b>	Red-chested Button-quail	<i>Turnix pyrrhorthorax</i>
	<b>DASYURIDAE</b>			Grey Honeyeater	<i>Conopophila whitei</i>	Painted Button-quail	<i>Turnix varia</i>
Lesser Hairy-footed Dunnart	<i>Sminthopsis youngsoni</i>	Letter-winged Kite	<i>Elanus scriptus</i>	Blue-faced Honeyeater	<i>Entomyzon cyanotis</i>		<b>TYTONIDAE</b>
	<b>DELPHINIDAE</b>	Black-breasted Buzzard	<i>Hamirostra melanosternon</i>	Painted Honeyeater	<i>Grantiella picta</i>	Grass Owl	<i>Tyto capensis</i>
Short-finned Pilot Whale	<i>Globicephala macrorhynchus</i>		<b>ANATIDAE</b>	Purple-gaped Honeyeater (mainland subspecies)	<i>Lichenostomus cratitius occidentalis</i>	<b>Reptiles</b>	
Risso's Dolphin	<i>Grampus griseus</i>	Australasian Shoveler	<i>Anas rhynchotis</i>				<b>AGAMIDAE</b>
False Killer Whale	<i>Pseudorca crassidens</i>	Musk Duck	<i>Biziura lobata</i>	Brown Honeyeater	<i>Lichmera indistincta</i>	Jacky Lizard	<i>Amphibolurus muricatus</i>
	<b>EMBALLONURIDAE</b>	Cape Barren Goose	<i>Cereopsis novaehollandiae</i>	Black-chinned Honeyeater (northern subspecies)	<i>Melithreptus gularis laetior</i>	Spotted Dragon	<i>Ctenophorus maculatus</i>
Yellow-bellied Sheath-tail Bat	<i>Saccolaimus flaviventris</i>	Blue-billed Duck	<i>Oxyura australis</i>			McKenzie's Dragon	<i>Ctenophorus mckenziei</i>
Hill's Sheath-tail Bat	<i>Taphozous hilli</i>		<b>ANHINGIDAE</b>	Little Friarbird	<i>Philemon citreogularis</i>	Claypan Dragon	<i>Ctenophorus salinarum</i>
	<b>KOGIIDAE</b>	Darter	<i>Anhinga melanogaster</i>	Striped Honeyeater	<i>Plectorhyncha lanceolata</i>		<b>BOIDAE</b>
Pygmy Sperm Whale	<i>Kogia breviceps</i>		<b>ARDEIDAE</b>	Bassian Thrush	<i>Zoothera lunulata</i>	Woma	<i>Aspidites ramsayi</i>
Dwarf Sperm Whale	<i>Kogia simas</i>	Cattle Egret	<i>Ardea ibis</i>			Carpet Python	<i>Morelia spilota</i>
	<b>MACROPODIDAE</b>	Intermediate Egret	<i>Ardea intermedia</i>	Olive-backed Oriole	<i>Oriolus sagittatus</i>		<b>ELAPIDAE</b>
Eastern Grey Kangaroo	<i>Macropus giganteus</i>	Little Egret	<i>Egretta garzetta</i>			Channel Country Whipsnake	<i>Demansia</i> sp. ' Channel Country '
Red-necked Wallaby	<i>Macropus rufogriseus</i>	Eastern Reef Egret	<i>Egretta sacra</i>	Crested Shrike-tit	<i>Falculculus frontatus</i>		<i>Whipsnake</i>
Black-footed Rock Wallaby	<i>Petrogale lateralis pearsoni</i>		<b>BURHINIDAE</b>	Gilbert's Whistler	<i>Pachycephala inornata</i>	White-lipped Snake	<i>Drysdalia coronoides</i>
	<b>MURIDAE</b>	Bush Stone-curlew	<i>Burhinus grallarius</i>	Red-lored Whistler	<i>Pachycephala rufogularis</i>	Bardick	<i>Echiopsis curta</i>
Swamp Rat	<i>Rattus lutreolus</i>		<b>CACATUIDAE</b>			Spotted Brown Snake	<i>Pseudonaja guttata</i>
	<b>NEOBALAENIDAE</b>	Major Mitchell's Cockatoo	<i>Cacatua leadbeateri</i>	Hooded Robin (south east subspecies)	<i>Melanodryas cucullata cucullata</i>	Western Black-naped Snake	<i>Simoselaps bimaculatus</i>
Pygmy Right Whale	<i>Caperea marginata</i>		<b>CAMPEPHAGIDAE</b>	Jacky Winter (south east subspecies)	<i>Microeca fascians fascians</i>	Common Bandy-Bandy	<i>Vermicella annulata</i>
	<b>OTARIIDAE</b>	White-bellied Cuckoo-shrike	<i>Coracina papuensis</i>	Scarlet Robin (eastern subspecies)	<i>Petroica multicolor boodang</i>		<b>GEKKONIDAE</b>
Australian Fur-seal	<i>Arctocephalus pusillus</i>		<b>CHARADRIIDAE</b>			Northern Snake-lizard	<i>Delma borea</i>
	<b>PETAURIDAE</b>	Great Sand Plover	<i>Charadrius leschenaultii</i>	Great Crested Grebe	<i>Podiceps cristatus</i>	Patchwork Gecko	<i>Diplodactylus pulcher</i>
Sugar Glider	<i>Petaurus breviceps</i>	Lesser Sand Plover	<i>Charadrius mongolus</i>			Map Gecko	<i>Diplodactylus steindachneri</i>
	<b>PHALANGERIDAE</b>	Pacific Golden Plover	<i>Pluvialis fulva</i>	Grey-crowned Babbler (northern subspecies)	<i>Pomatostomus temporalisrubeolus</i>	Pernatty Knob-tailed Gecko	<i>Nephurus deleani</i>
Common Brushtail Possum	<i>Trichosurus vulpecula</i>		<b>CLIMACTERIDAE</b>			Marbled Velvet Gecko	<i>Oedura marmorata</i>
	<b>PHOCIDAE</b>	White-browed Treecreeper	<i>Climacteris affinis</i>			Bronzeback Legless Lizard	<i>Ophidiocephalus taeniatus</i>
Leopard Seal	<i>Hydrurga leptonyx</i>		<b>COLUMBIDAE</b>	Fleshy-footed Shearwater	<i>Puffinus carneipes</i>		<b>SCINCIDAE</b>
Southern Elephant Seal	<i>Mirounga leonina</i>	Spinifex Pigeon	<i>Geophaps plumifera</i>			Western Three-lined Skink	<i>Bassiana trilineata</i>
	<b>PHYSETERIDAE</b>	Flock Bronzewing	<i>Phaps histrionica</i>	Red-winged Parrot	<i>Neophema erythropterus</i>	Ashy-downs Ctenotus	<i>Ctenotus astarte</i>
Sperm Whale	<i>Physeter macrocephalus</i>		<b>CORCORACIDAE</b>	Elegant Parrot	<i>Neophema elegans</i>	Giant Desert Ctenotus	<i>Ctenotus grandis</i>
	<b>POTORIDAE</b>	White-winged Chough	<i>Corcorax melanorhamphos</i>	Rock Parrot	<i>Neophema petrophila</i>	Greer's Ctenotus	<i>Ctenotus greeri</i>
Brush-tailed Bettong (western subspecies)	<i>Bettongia penicillata ogilbyi</i>		<b>DICRURIDAE</b>	Scarlet-chested Parrot	<i>Neophema splendida</i>	Blacksoil Ctenotus	<i>Ctenotus joanae</i>
	<b>PTEROPODIDAE</b>	Restless Flycatcher	<i>Myiagra inquieta</i>	Blue Bonnet (western subspecies)	<i>Northiella haematogaster narethae</i>	Paleface Ctenotus	<i>Ctenotus piankai</i>
Grey-headed Flying-fox	<i>Pteropus poliocephalus</i>	Painted Finch	<i>Emblema pictum</i>	Western Bowerbird		Southern Water Skink	<i>Eulamprus tympanum</i>
Little Red Flying-fox	<i>Pteropus scapulatus</i>	Beautiful Firetail	<i>Stagonopleura bella</i>			Beach Slider	<i>Lerista arenicola</i>
	<b>VOMBATIDAE</b>		<b>EUPETIDAE</b>	Spotless Crake	<i>Porzana tabuensis</i>	Speckled Slider	<i>Lerista baynesi</i>
Common Wombat	<i>Vombatus ursinus</i>	Chestnut Quail-thrush (eastern subspecies)	<i>Cincoloma castanotus castanotus</i>			Dwarf four-toed Slider	<i>Lerista distinguenda</i>
	<b>ZIPHIIDAE</b>			Common Sandpiper	<i>Actitis hypoleucos</i>	Long-legged Slider	<i>Lerista microtis</i>
Arnoux's Beaked Whale	<i>Berardius arnouxii</i>	Western Whipbird (Kangaroo Island subspecies)	<i>Psophodes nigrogularis lashmari</i>	Ruddy Turnstone	<i>Arenaria interpres</i>	Desert Glossy Skink	<i>Notoscincus ornatus</i>
Southern Bottlenose Whale	<i>Hyperoodon planifrons</i>			Sanderling	<i>Calidris alba</i>	Blacksoil Skink	<i>Proablepharus kinghorni</i>
Andrew's Beaked Whale	<i>Mesoplodon bowdoini</i>		<b>FALCONIDAE</b>	Pectoral Sandpiper	<i>Calidris melanotos</i>	Bight Coast Skink	<i>Pseudemoia baudini</i>
Gray's Beaked Whale	<i>Mesoplodon grayi</i>	Grey Falcon	<i>Falco hypoleucos</i>	Long-toed Stint	<i>Calidris subminuta</i>	Tussock Skink	<i>Pseudemoia pagenstecheri</i>
Hector's Beaked Whale	<i>Mesoplodon hectori</i>	Peregrine Falcon	<i>Falco peregrinus</i>	Great Knot	<i>Calidris tenuirostris</i>		<b>VARANIDAE</b>
Shepherd's Beaked Whale	<i>Tasmacetus shepherdi</i>		<b>HAEMATOPODIDAE</b>	Latham's Snipe	<i>Gallinago hardwickii</i>	Short-tailed Pygmy Goanna	<i>Varanus breviceuda</i>
Cuvier's Beaked Whale	<i>Ziphius cavirostris</i>	Sooty Oystercatcher	<i>Haematopus fuliginosus</i>	Grey-tailed Tattler	<i>Heteroscelus brevipes</i>	Tree Goanna	<i>Varanus varius</i>
		Pied Oystercatcher	<i>Haematopus longirostris</i>	Bar-tailed Godwit	<i>Limosa lapponica</i>		<b>Amphibians</b>
<b>Birds</b>			<b>LARIDAE</b>	Black-tailed Godwit	<i>Limosa limosa</i>	Knife-footed Frog	<i>Cyclorana cultripes</i>
	<b>ACANTHIZIDAE</b>	Kelp Gull	<i>Larus dominicanus</i>	Whimbrel	<i>Numenius phaeopus</i>	Smooth Frog	<i>Geocrinia laevis</i>
Slender-billed Thornbill (eastern subspecies)	<i>Acanthiza iredalei hedleyi</i>	Common Tern	<i>Sterna hirundo</i>	Ruff	<i>Philomachus pugnax</i>	Brown Toadlet	<i>Pseudophryne bibroni</i>
			<b>MALURIDAE</b>	Wood Sandpiper	<i>Tringa glareola</i>	Small-headed Toadlet	<i>Uperoleia capitulata</i>
Slender-billed Thornbill (western subspecies)	<i>Acanthiza iredalei iredalei</i>	Grey Grasswren	<i>Amytornis barbatus</i>	Terek Sandpiper	<i>Xenus cinereus</i>		
Chestnut-breasted Whiteface	<i>Aphelocephala pectoralis</i>	Striated Grasswren	<i>Amytornis striatus</i>		<b>STRIGIDAE</b>		
Shy Heathwren (Shy Hylacola)	<i>Calamanthus cautus</i>	Southern Emu-wren (Kangaroo Island subspecies)	<i>Stipiturus malachurus halmaturinus</i>	Barking Owl	<i>Ninox connivens</i>		

# Wildlife interaction

## Identification and log book



Government of South Australia  
Primary Industries and Regions SA



# REPORTING WILDLIFE INTERACTIONS IN SOUTH AUSTRALIAN MANAGED FISHERIES

*All wildlife, including threatened, endangered and protected species provide an integral part of the ecosystems that support fisheries. Activities within these ecosystems, which include commercial fisheries, need to be managed to support all aquatic species.*

*As part of the requirement under the Environmental Protection and Biodiversity Conservation (EPBC) Act 1999 (EPBC Act), fishers must report any wildlife interactions encountered within any of the assessed South Australian managed fisheries to PIRSA Fisheries and the Commonwealth Department of Environment and Heritage (DEH).*

## **What is a wildlife interaction?**

An "interaction" is any physical contact a fisher, boat or fishing gear has with wildlife and protected species. This includes any collision or capture (hooked, netted or entangled) of individuals of a species. All interactions that occur off the vessel (eg. a collision with a whale) as well as those that relate to a species actually being landed onboard a vessel during a fishing operation must also be reported.

## **Why should wildlife interactions be reported?**

All interactions between commercial fishers and wildlife should be reported in order to:

- Gain a better understanding of the nature and extent of wildlife interactions in commercial fishing activity.
- Help industry develop effective measures and management policies to reduce or avoid interactions.
- Ensure that industry meets the data collection and reporting standards required under the *EPBC Act, 1999* through increased reporting and validation of the industry-based monitoring program.
- Assist in improving the perceptions of the community relating to this issue. It is in the interest of all SA managed fisheries that the general public are made aware that the industry is concerned and is addressing the problem of wildlife interactions.

## **What is a protected species?**

There are many species of animals that are classified as protected. It should be remembered that all seabirds are protected and even though some may be considered common like gulls and cormorants, any interaction with a seabird species must be reported.

## How does the law relate to wildlife interactions and reporting?

The main law relating to interactions with wildlife is the *EPBC Act, 1999* under which it is an offence to kill, injure, take, keep or move a protected species in a State or Commonwealth area. Sometimes wildlife protected under the *EPBC Act, 1999* may be killed or injured accidentally during fishing activity. This is not an offence, but it is a legal requirement that the interaction be reported. If the animal is still alive it should be returned to the water immediately.

## Identifying wildlife and protected species

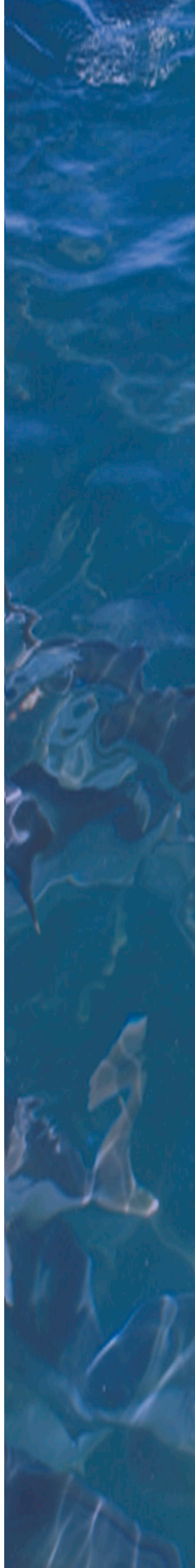
Following is a list of currently protected species likely to be encountered by commercial marine and inland waters fishers. If you have an interaction with any of these species it must be reported.

- **All species of seabirds**
- **All species of marine and freshwater reptiles** (turtles)
- **All species of seals and sea lions**
- **All species of cetaceans** (dolphins and whales)
- **Marine fish species** Great White Shark, Whale Shark, and all Syngnathids (Pipefish, Sea Horses and Sea Dragons).

When identifying a species being reported as a result of a wildlife interaction, be as specific as possible. If positive species identification cannot be made, the family or a description of the animal should be recorded.

As an example, if a fisher had an interaction with a bird that had become entangled in a net, they should record the name most commonly used for that bird. If the fisher does not know the common name, then a family or broad group name (ie. a type of shag, cormorant, gull, duck, etc) should be recorded. If the family group is unknown, provide a written description of the animal including details of colour and size.

Abalone divers should report all sightings of great white sharks while under and above the water.



## FISH SPECIES (MARINE)



**Great White Shark, *Carcharodon carcharias*:** A massive shark that can attain a length of 6.4 m. Has a high first dorsal fin and very small second dorsal and anal fins. Very large mouth, teeth are broad, triangular and serrated. It has a pointed nose, blue-grey upper body, which changes abruptly to white on the underside.



**All Syngnathids:** Leafy sea dragon, common sea dragon, pipefish and seahorses.



**Whale Shark *Rhincodon typus*:** The world's largest fish growing to over 15 m in length. Easily recognisable due to its broad, flattened head, large mouth and pattern of light spots and stripes on a dark background. The ventral surface is typically whitish.

## ALL SEABIRDS



**Albatrosses:** 10 species found in Australian waters. Medium to very large, long-winged, gliding, oceanic seabirds with webbed feet, small tubular nostrils at the side of large, hook-tipped bills.





## ALL SEABIRDS

**Australasian Gannet, *Morus serrator*:** the only gannet species found in South Australia. Medium, pointed winged seabird with fully webbed black feet that indulges in spectacular plunge-diving. Has a grey bill, a short black stripe in centre of the throat, dark blue eye-ring, head is buff yellow, rest of the body white, white tail with a black centre.



**Australian Pelican, *Pelecanus conspicillatus*:** the only pelican species found in Australia. A very large (wingspan over 2 metres) white aquatic bird, with a long pink bill with a loose distensible throat pouch.



**Cormorants (Shags):** 5 species found in Australian waters. Medium aquatic bird that swims and dives for fish. Generally black, some have white fronts, black legs. Their feet are fully webbed and they often perch with outstretched wings.



**Gulls:** 2 species found in South Australian waters.

- **Silver Gull, *Larus novaehollandiae*:** red bill, body white and grey wing and back plumage, heavy bills and red legs, webbed feet. Juveniles mottled brown spots across back and wings, dark brown legs.
- **Pacific Gull, *Larus pacificus*:** larger than a silver gull, thick yellow bill with red tip, body white, wings and back black, black tipped white tail, yellow legs. Juvenile is brown all over, brown legs.



**Little Penguin, *Eudyptula minor*:** the only penguin species found in South Australia. A small (32 – 34 cm long) plump seabird with an upright stance and dense waterproof plumage. It has a white front, dark blue back and a greyish face. Wings modified as flippers for sustained swimming and diving.



## ALL SEABIRDS



**White-bellied Sea Eagle, *Haliaeetus leucogaster*:** a fishing bird of prey with broad wings, strong legs and talons. White, with grey back, rump, wings and base of tail. Bare whitish legs. Juvenile generally brownish all over.



**Osprey, *Pandion haliaetus*:** a fishing bird of prey, smaller than a sea eagle, dark brown upper parts; white head and underparts. Band of brown mottling across the chest. Barring on underwings and tail. Juvenile generally mottled brown all over.



**Petrels and Shearwaters:** 41 species found in Australia. Small to medium, long-winged, gliding, oceanic seabirds with webbed feet, tubular nostrils on top of stout hooked bills.



**Plovers:** 2 species of this group are beach-nesting shorebirds and listed as threatened. Their breeding success is extremely low due to human activities on ocean beaches.

- **Hooded Plover, *Thinornis (Charadrius) rubricollis*:** round black head, short red bill with a black tip, red eye-ring, white collar, pale orange legs, favours wide sandy beaches with beach-cast seaweed.

- **Red-capped Plover, *Charadrius ruficapillus*:** a small bird with a rufous crown, white forehead, nape and collar partly edged black, black eye-stripe, black bill and legs, brown upper body parts and wings, runs in short bursts.

## ALL SEABIRDS

**Terns:** Approximately 7 species found in South Australian waters. Similar in size to gulls but have slender thin yellow-orange bills and narrow pointed wings. Some are crested. They dive into water for food or pick it off the surface. Generally white with grey wing and back plumage, black capped head, short legs.



## ALL SEALS

**Seals:** 10 species of seals are found in Australian waters, of these only 3 are likely to interact with fishing operation;

- **Australian Fur Seal**, *Arctocephalus pusillus doriferus*
- **Australian Sea Lion**, *Neophoca cinerea*
- **New Zealand Fur Seal**, *Arctocephalus forsteri*.

It is difficult to differentiate between these species.



## ALL MARINE REPTILES (TURTLES)

**Leatherback Turtle**, *Dermochelys coriacea*: The largest and most widely distributed turtle in the world, growing to a length of 2.8 metres. The adult shell is a thick, smooth, leathery skin, which is a uniform dark brown with white or pink splotches. Shell is elongated with 7 prominent narrow ridges running along the length.



## ALL WHALES AND DOLPHINS



# WILDLIFE INTERACTION REPORTING RETURNS FOR ALL SA MANAGED FISHERIES

## INSTRUCTIONS FOR USE

These forms are only required to be filled out on the day an interaction with your fishing operations occurred.

The logs do not require carbon paper. The cardboard sheet should be placed under the following page to avoid entries onto the next set of forms. The yellow copy should be retained in the log book as a personal record and proof of completion.

Please send the completed form with your other catch and effort forms for the month to SARDI Aquatic Sciences.

## EXPLANATORY NOTES

**Managed Fishery:** As this same form is being filled out by all licence holders in all SA Managed Fisheries, please record the Managed Fishery that you are licenced.

**Date of interaction:** Please record the date (day/month/year) that the interaction occurred.

**Observer on board:** Please tick the box Yes or No. If on board, the scientific observer can assist you in identifying the protected species, and collecting valuable biological information on the species.

**Licence Number:** Please record your licence number.

**Corresponding Logbook No:** To assist scientists in determining whether wildlife interactions have any effect on the catch rate of your target species, please record the corresponding catch and effort log book number.

### Interaction Details

**Gear Code:** Please record the gear code (as listed in your catch & effort log book) that you were using when the interaction occurred.

**Activity / Shot number:** For all trawl and net fisheries, please record the shot number for that day/night. For the charter boat fishery please record your activity code. For all other fisheries, please record the pot, line, trap etc number. There may be occasions when an interaction occurred during different shots on the same day. Please record these separately on the one form.

**Time (24:00 hr):** The approx. time (eg 14:00 hrs) when the interaction occurred.

**Location Lat & Long:** Please record as accurately as possible, the lat. & long. where the interaction occurred. If details on lat. & long. are not available, please record the fishing block where the interaction occurred, as per your catch and effort log book.

**Common Species Name:** See the species list and Identification guide in this log book.

**Number of animals:** Please record the number of animals of that species which were involved in the interaction.

**Nature of Interaction:** Please tick one of the 4 boxes in this section.

**Caught:** Please tick if the wildlife species was caught in your fishing gear. (eg hooked, caught in net, pot, trap etc).

**Entanglement:** This relates to any part of the body of the protected species (eg flipper, tail, fins, wings or trunk) becoming entangled in fishing gear.

**Impact / collision:** The protected species may collide with the hull of the vessel, or a seabird may collide with the above-deck structures. Just a simple landing on the deck by the seabird is not regarded as an interaction.

**Other:** Please tick if there was product loss due to the interaction, eg loss of snapper on lines from white shark or killer whale “bite-offs”).

**Status:** Please tick one of the 3 boxes in this section.

**Fate:** Please tick one of the 2 boxes in this section. If the wildlife species was kept, please record in the comments section, where the protected species was transported, and its current location (eg SA Museum, SARDI, Local Processor etc).

**Band or Tag No:** Often protected wildlife are banded or tagged for the purposes of scientific research on their migratory habits. If the wildlife species which interacted with your fishing operations had a tag or band attached, please record the band / tag number in this section, and any other details (eg size, sex of the species) in the comments section.

**Signature of Licence holder:** This form must be signed by the licence holder.

**Finally to assist you in completing these forms, an example sheet is included in the log book. If you require further assistance, please call 08 82075400.**

# South Australian Managed Fisheries Wildlife Interaction Form

Managed Fishery

Date of Interaction

24/02/07

Observer On Board

Yes  No  
Tick Yes or No

Licence Number

X043

Corresponding Logbook No.

G6051

## Interaction Details

Gear Code	Activity/ Shot Number	Time (24:00 hr)	Location		Common Species Name (see species list and identification guide)	Number of Animals	Nature of Interaction			Status			Fate		Band or Tag #	
			Latitude	Longitude			Caught	Entangle ment	Impact/ collision	Other	Alive	Dead	Injured	Released		Kept / Retained
LL	3rd SET	1400	35°30'S	137°45'E	White shark	1	<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>		
HN	Shur No. 2	0700	32°59'S	137°45'E	Cormorants	3		<input checked="" type="checkbox"/>					<input checked="" type="checkbox"/>			
RL	Pot No. 8	0630	36°10'S	136°40'E	Leatherback turtle	1			<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>			
TN	Shur No. 5	2215	34°05'S	136°48'E	Sea Horses	10	<input checked="" type="checkbox"/>						<input checked="" type="checkbox"/>			

**Comments:** Is there any other information you believe to be important? For example:

Where was the animal entangled (flipper, mouth, wing, tail, etc)?

Where in the gear was the animal entangled (pot, pot-rope, cod-end/net pocket, net wing, mainline of long or drop line, hook)?

How was the animal released (lowered by hand, lowered by net into water, cut out of net, line cut)?

If the animal was kept/retained, where was the animal transported? Who has the animal now?

Cut trace on longline to release white shark. Approx. 1.8m long, male.

Wings of cormorants entangled in cork-line. Released by hand.

Vessel collided with a leatherback turtle when retrieving pot No. 8. Un-injured.

Sea-horses retained for research. Sent to SABON West Beach

Example Sheet

for 4 different fisheries

I certify this form to be complete and accurate:

A. Fisher  
(Signature of Licence Holder / Master)

# South Australian Managed Fisheries Wildlife Interaction Form

Managed Fishery

Date of Interaction

Observer On Board  Yes  No

Licence Number

Corresponding Logbook No.

Yes  No  
Tick Yes or No

## Interaction Details

Gear Code	Activity/ Shot Number	Time (24:00 hr)	Location		Common Species Name (see species list and identification guide)	Number of Animals	Nature of Interaction				Status		Fate		Band or Tag #		
			Latitude	Longitude			Caught	Entanglement	Impact/collision	Other	Alive	Dead	Injured	Released		Kept / Retained	

**Comments:** Is there any other information you believe to be important? For example:  
 Where was the animal entangled (flipper, mouth, wing, tail, etc)?  
 Where in the gear was the animal entangled (pot, pot-rope, cod-end/net pocket, net wing, mainline of long or drop line, hook)?  
 How was the animal released (lowered by hand, lowered by net into water, cut out of net, line cut)?  
 If the animal was kept/retained, where was the animal transported? Who has the animal now?

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I certify this form to be complete and accurate: .....  
 (Signature of Licence Holder)

## Appendix 5. TEPS interactions by taxonomic group and fishing method (gear type) in South Australian commercial fisheries (all fisheries combined) between 2007/08 and 2013/14.

**Table 5.** TEPS interactions by taxonomic group and fishing method in South Australian commercial fisheries (all fisheries combined) 2007/08.

Taxonomic Group	TEPS	# of Interactions	# of Animals	Gear Code	Nature of Interaction				Status			Fate			
					Caught	Entanglement	Impact/collision	Other	Alive	Alive / Injured	Dead	Released	Retained	Discarded	Other
Birds	Cormorant	1	2	HNS		2			2			2			
	Cormorant	12	23	HNF	23				23			23			
	Cormorant	4	4	F		4			3		1	3		1	
	Little Penguin	1	1	N/A				1			1				1
	Pacific Gull	1	1	HL		1			1			1			
	Pacific Gull	1	1	IS		1			1			1			
	Silver Gull	1	1	PO		1			1			1			
	Petrel	1	10	N/A				10	10			10			
	<b>Total</b>	<b>22</b>	<b>43</b>		<b>23</b>	<b>9</b>		<b>11</b>	<b>41</b>		<b>2</b>	<b>41</b>		<b>1</b>	<b>1</b>
Reptiles	Freshwater Turtle	2	3	F		3			2		1	2		1	
	Leatherback Turtle	1	1	PTN	1				1			1			
	Turtle	1	1	LP		1				1		1			
		<b>Total</b>	<b>4</b>	<b>5</b>		<b>1</b>	<b>4</b>		<b>3</b>	<b>1</b>	<b>1</b>	<b>4</b>		<b>1</b>	
Cetaceans	Dolphin	2	7	IS	1			6	7			1			6
	Dolphin	3	4	HNF	4				4			4			
	Dolphin	1	1	LP		1					1			1	
	Dolphin	51	132	PS	118	13		1	117		15	117	13		2
	Common Dolphin	11	30	PS	30				30			30			
		<b>Total</b>	<b>68</b>	<b>174</b>		<b>153</b>	<b>14</b>		<b>7</b>	<b>158</b>		<b>16</b>	<b>152</b>	<b>13</b>	<b>1</b>
Pinnipeds	Common Seal	1	1	HL				1	1						1
	Common Seal	22	37	PS	23	1		13	35	1	1	32	1		4
	Australian Fur Seal	1	1	PS		1					1		1		
	Long-nosed Fur Seal	1	1	PS	1						1		1		
	Long-nosed Fur Seal	1	1	IS				1	1						1



Taxonomic Group	TEPS	# of Interactions	# of Animals	Gear Code	Nature of Interaction				Status			Fate			
					Caught	Entanglement	Impact/collision	Other	Alive	Alive / Injured	Dead	Released	Retained	Discarded	Other
	<b>Total</b>	<b>26</b>	<b>41</b>		<b>24</b>	<b>2</b>		<b>15</b>	<b>37</b>	<b>1</b>	<b>3</b>	<b>32</b>	<b>3</b>		<b>6</b>
<b>Fish</b>	Great White Shark	2	2	HL	1		1		2			1			1
	Great White Shark	1	1	LL		1					1		1		
	Great White Shark	1	1	IS	1				1			1			
	Great White Shark	1	1	PO	1				1			1			
	Pipefish	7	20	PTN	20				7		13	7		13	
	Seahorse	12	29	PTN	29				18		11	18		11	
	<b>Total</b>	<b>24</b>	<b>54</b>		<b>52</b>	<b>1</b>	<b>1</b>		<b>29</b>		<b>25</b>	<b>28</b>	<b>1</b>	<b>24</b>	<b>1</b>
<b>Total</b>		<b>144</b>	<b>317</b>	<b>0</b>	<b>253</b>	<b>30</b>	<b>1</b>	<b>33</b>	<b>271</b>	<b>2</b>	<b>44</b>	<b>260</b>	<b>14</b>	<b>27</b>	<b>16</b>

**Table 6.** TEPS interactions by taxonomic group and fishing method in South Australian commercial fisheries (all fisheries combined) 2008/09.

Taxonomic Group	TEPS	# of Interactions	# of Animals	Gear Code	Nature of Interaction				Status			Fate			
					Caught	Entanglement	Impact/collision	Other	Alive	Alive / Injured	Dead	Released	Retained	Discarded	Other
Birds	Cormorant	6	22	HNS	19	3			22			22			
	Cormorant	2	2	F		2					2			2	
	Great Crested Grebe	1	1	F		1			1			1			
	Shearwater	1	2	PS		2					2			2	
	<b>Total</b>	<b>10</b>	<b>27</b>		<b>19</b>	<b>8</b>			<b>23</b>		<b>4</b>	<b>23</b>		<b>4</b>	
Reptiles	Freshwater Turtle	2	2	F		2			2			2			
	Leatherback Turtle	1	1	CP		1			1			1			
	Turtle	1	1	HNF	1				1			1			
	<b>Total</b>	<b>4</b>	<b>4</b>		<b>1</b>	<b>3</b>			<b>4</b>			<b>4</b>			
Cetaceans	Dolphin	1	1	HNF	1				1			1			
	Dolphin	3	3	HNS	3				3			3			
	Dolphin	1	1	N/A				1			1		1		
	Common Dolphin	1	1	OS		1			1			1			
	Dolphin	46	118	PS	111	7			112	1	5	113	5		
	Common Dolphin	18	42	PS	39	1		2	42			42			
	<b>Total</b>	<b>70</b>	<b>166</b>		<b>154</b>	<b>9</b>		<b>3</b>	<b>159</b>	<b>1</b>	<b>6</b>	<b>160</b>	<b>6</b>		
Pinnipeds	Common Seal	13	70	PS	9			61	70			19		51	
	Australian Sea Lion	3	4	PS	1			3	4			1		3	
	Long-nosed Fur Seal	1	1	PS	1				1			1			
	<b>Total</b>	<b>17</b>	<b>75</b>		<b>11</b>			<b>64</b>	<b>75</b>			<b>21</b>		<b>54</b>	
Fish	Great White Shark	2	3	D				3	3					3	
	Great White Shark	2	2	PS				2	2			1		1	
	Great White Shark	7	8	IS	5		1	2	8			5		3	
	Great White Shark	1	1	HL				1	1					1	
	Pipefish	1	2	PTN	2						2			2	
	Seahorse	2	5	PTN	5				5			5			
	<b>Total</b>	<b>15</b>	<b>21</b>		<b>12</b>		<b>1</b>	<b>8</b>	<b>19</b>		<b>2</b>	<b>11</b>		<b>2</b>	<b>8</b>
<b>Total</b>		<b>116</b>	<b>293</b>		<b>197</b>	<b>20</b>	<b>1</b>	<b>75</b>	<b>280</b>	<b>1</b>	<b>12</b>	<b>219</b>	<b>6</b>	<b>6</b>	<b>62</b>

**Table 7.** TEPS interactions by taxonomic group and fishing method in South Australian commercial fisheries (all fisheries combined) 2009/10.

Taxonomic Group	TEPS	# of Interactions	# of Animals	Gear Code	Nature of Interaction				Status			Fate			
					Caught	Entanglement	Impact/collision	Other	Alive	Alive / Injured	Dead	Released	Retained	Discarded	Other
Birds	Cormorant	4	14	HNF	14				13		1	13			1
	Cormorant	4	6	HNS	6				6			6			
	Pacific Gull	1	1	HL	1				1			1			
	<b>Total</b>	<b>9</b>	<b>21</b>		<b>21</b>				<b>20</b>		<b>1</b>	<b>20</b>			<b>1</b>
Reptiles	Freshwater Turtle	1	20	C	20				20			20			
	Freshwater Turtle	3	8	F	8				8			8			
	Freshwater Turtle	3	40	I	40				40			40			
	Leatherback Turtle	1	1	CP		1			1			1			
	Turtle	1	1	HNS	1				1			1			
	<b>Total</b>	<b>9</b>	<b>70</b>		<b>69</b>	<b>1</b>			<b>70</b>			<b>70</b>			
Cetaceans	Dolphin	46	136	PS	111	2		23	132	1	3	133	1	2	
	Common Dolphin	18	43	PS	43				41		2	41	2		
	<b>Total</b>	<b>64</b>	<b>179</b>		<b>154</b>	<b>2</b>		<b>23</b>	<b>173</b>	<b>1</b>	<b>5</b>	<b>174</b>	<b>3</b>	<b>2</b>	
Pinnipeds	Common Seal	1	2	PTN			2				2			2	
	Common Seal	10	14	PS	14				14			14			
	Long-nosed Fur Seal	1	1	HNF	1				1			1			
	Long-nosed Fur Seal	1	1	H				1	1					1	
	Long-nosed Fur Seal	72	513	K				513	513					513	
	<b>Total</b>	<b>85</b>	<b>531</b>		<b>15</b>		<b>2</b>	<b>514</b>	<b>529</b>		<b>2</b>	<b>15</b>		<b>2</b>	<b>514</b>
Fish	Great White Shark	1	1	IS			1		1					1	
	Pipefish	4	5	PTN	5				4		1	4		1	
	Sea Dragon	2	13	PTN	13				13			13			
	Great White Shark	2	2	PS	2				2			2			
	Great White Shark	1	1	HL				1	1					1	
	<b>Total</b>	<b>10</b>	<b>22</b>		<b>20</b>		<b>1</b>	<b>1</b>	<b>21</b>		<b>1</b>	<b>19</b>		<b>1</b>	<b>2</b>
<b>Total</b>		<b>177</b>	<b>823</b>		<b>279</b>	<b>3</b>	<b>3</b>	<b>538</b>	<b>813</b>	<b>1</b>	<b>9</b>	<b>298</b>	<b>3</b>	<b>6</b>	<b>516</b>

**Table 8.** TEPS interactions by taxonomic group and fishing method in South Australian commercial fisheries (all fisheries combined) 2010/11.

Taxonomic Group	TEPS	# of Interactions	# of Animals	Gear Code	Nature of Interaction				Status			Fate				
					Caught	Entanglement	Impact/collision	Other	Alive	Alive / Injured	Dead	Released	Retained	Discarded	Other	
<b>Birds</b>	Australasian Gannet	1	1	IS		1			1			1				
	<b>Total</b>	<b>1</b>	<b>1</b>			<b>1</b>			<b>1</b>			<b>1</b>				
<b>Cetaceans</b>	Dolphin	1	1	HNF	1				1			1				
	Dolphin	27	72	PS	69	3			64	1	7	65	7			
	Common Dolphin	13	54	PS	54				54			54				
	<b>Total</b>	<b>41</b>	<b>127</b>		<b>124</b>	<b>3</b>			<b>119</b>	<b>1</b>	<b>7</b>	<b>120</b>	<b>7</b>			
<b>Pinnipeds</b>	Australian Fur Seal	1	1	PTN	1				1			1				
	Common Seal	1	1	PS	1					1		1				
	Long-nosed Fur Seal	1	6	E				6	6							6
	Long-nosed Fur Seal	51	373	K				373	373							373
	<b>Total</b>	<b>54</b>	<b>381</b>		<b>2</b>			<b>379</b>	<b>380</b>	<b>1</b>		<b>2</b>				<b>379</b>
<b>Fish</b>	Great White Shark	1	1	D				1	1							1
	Great White Shark	1	1	HL				1	1							1
	Great White Shark	2	2	LL	1	1			1		1	1		1		
	Great White Shark	3	3	PS	2			1	3			2				1
	Common Seadragon	1	1	PTN	1						1				1	
	Leafy Seadragon	1	1	PTN	1				1			1				
	Pipefish	16	17	PTN	17				16		1	16			1	
	Pipehorse	5	5	PTN	5						5				5	
	Potbelly Seahorse	1	1	PTN	1				1			1				
	Seahorse	45	56	PTN	56				46		10	46			10	
<b>Total</b>	<b>76</b>	<b>88</b>		<b>84</b>	<b>1</b>		<b>3</b>	<b>70</b>		<b>18</b>	<b>67</b>			<b>18</b>	<b>3</b>	
<b>Total</b>		<b>172</b>	<b>597</b>		<b>210</b>	<b>5</b>		<b>382</b>	<b>570</b>	<b>2</b>	<b>25</b>	<b>190</b>	<b>7</b>	<b>18</b>	<b>382</b>	

**Table 9.** TEPS interactions by taxonomic group and fishing method in South Australian commercial fisheries (all fisheries combined) 2011/12.

Taxonomic Group	TEPS	# of Interactions	# of Animals	Gear Code	Nature of Interaction				Status			Fate				
					Caught	Entanglement	Impact/collision	Other	Alive	Alive / Injured	Dead	Released	Retained	Discarded	Other	
Birds	Albatross	1	1	LL		1					1				1	
	Cormorant	1	2	HNS	2				2			2				
	<b>Total</b>	<b>2</b>	<b>3</b>		<b>2</b>	<b>1</b>			<b>2</b>		<b>1</b>	<b>2</b>			<b>1</b>	
Cetaceans	Dolphin	72	218	PS	139	8		71	211	2	5	213	4		1	
	Common Dolphin	32	85	PS	71	1		13	84	1		85				
	<b>Total</b>	<b>104</b>	<b>303</b>		<b>210</b>	<b>9</b>		<b>84</b>	<b>295</b>	<b>3</b>	<b>5</b>	<b>298</b>	<b>4</b>		<b>1</b>	
Pinnipeds	Common Seal	4	5	PS	4			1	5			4				1
	<b>Total</b>	<b>4</b>	<b>5</b>		<b>4</b>			<b>1</b>	<b>5</b>			<b>4</b>				<b>1</b>
Fish	Great White Shark	1	1	CP		1			1			1				
	Great White Shark	2	2	D				2	2							2
	Great White Shark	3	3	PS	3				3			3				
	Great White Shark	1	1	PTN	1					1		1				
	Common Seadragon	2	3	PTN	3				3			3				
	Pipefish	26	69	PTN	68	1			18		51	18			51	
	Pipehorse	17	24	PTN	24				14		10	14			10	
	Seahorse	70	87	PTN	87				69		18	69			18	
<b>Total</b>		<b>122</b>	<b>190</b>		<b>186</b>	<b>2</b>		<b>2</b>	<b>110</b>	<b>1</b>	<b>79</b>	<b>109</b>		<b>79</b>	<b>2</b>	
<b>Total</b>		<b>232</b>	<b>501</b>		<b>402</b>	<b>12</b>		<b>87</b>	<b>412</b>	<b>4</b>	<b>85</b>	<b>413</b>	<b>4</b>	<b>81</b>	<b>3</b>	

**Table 10.** TEPS interactions by taxonomic group and fishing method in South Australian commercial fisheries (all fisheries combined) 2012/13.

Taxonomic Group	TEPS	# of Interactions	# of Animals	Gear Code	Nature of Interaction				Status			Fate			
					Caught	Entanglement	Impact/collision	Other	Alive	Alive / Injured	Dead	Released	Retained	Discarded	Other
Birds	Australian Pelican	1	1	E	1				1			1			
	Blue Billed Duck	1	1	F	1				1			1			
	Cormorant	9	11	F	8	3			8		3	8		3	
	Cormorant	2	2	HNS	2						2				2
	Dusky Moorhen	1	2	F	2						2				2
	Grebe	2	2	E	2				1		1	1			1
	Grebe	1	1	F	1				1			1			
	Musk Duck	2	2	F	2				2			2			
<b>Total</b>		<b>19</b>	<b>22</b>		<b>19</b>	<b>3</b>			<b>14</b>		<b>8</b>	<b>14</b>		<b>8</b>	
Cetaceans	Dolphin	77	184	PS	93	4		87	180	1	3	181	2	1	
	Common Dolphin	22	42	PS	34	2		6	41		1	41	1		
	<b>Total</b>	<b>99</b>	<b>226</b>		<b>127</b>	<b>6</b>		<b>93</b>	<b>221</b>	<b>1</b>	<b>4</b>	<b>222</b>	<b>3</b>	<b>1</b>	
Pinnipeds	Common Seal	2	6	PS				6	6			6			
	Long-nosed Fur Seal	2	2	E				2	2						2
	Long-nosed Fur Seal	14	54	F				54	54						54
	<b>Total</b>	<b>18</b>	<b>62</b>					<b>62</b>	<b>62</b>			<b>6</b>			<b>56</b>
Fish	Common Seadragon	5	9	PTN	9				8	1		9			
	Flutemouth	1	3	PTN	3				3			3			
	Great White Shark	1	1	PS	1				1			1			
	Leafy Seadragon	2	2	PTN	2				2			2			
	Pipefish	34	124	PTN	124				116	1	7	117			7
	Pipehorse	13	18	PTN	18				13		5	13			5
	Seahorse	70	97	PTN	96	1			69		28	69			28
<b>Total</b>	<b>126</b>	<b>254</b>		<b>253</b>	<b>1</b>			<b>212</b>	<b>2</b>	<b>40</b>	<b>214</b>			<b>40</b>	
<b>Total</b>		<b>262</b>	<b>564</b>		<b>399</b>	<b>10</b>		<b>155</b>	<b>509</b>	<b>3</b>	<b>52</b>	<b>456</b>	<b>3</b>	<b>49</b>	<b>56</b>

**Table 11.** TEPS interactions by taxonomic group and fishing method in South Australian commercial fisheries (all fisheries combined) 2013/14.

Taxonomic Group	TEPS	# of Interactions	# of Animals	Gear Code	Nature of Interaction				Status			Fate			
					Caught	Entanglement	Impact/collision	Other	Alive	Alive / Injured	Dead	Released	Retained	Discarded	Other
Birds	Australian Pelican	2	2	F		2			2			2			
	Cormorant	24	55	F	12	43			39		16	39		16	
	Grebe	2	5	E	2	2		1	3		2	3		2	
	Grebe	1	1	F		1					1			1	
	<b>Total</b>	<b>29</b>	<b>63</b>			<b>14</b>	<b>48</b>		<b>1</b>	<b>44</b>		<b>19</b>	<b>44</b>		<b>19</b>
Reptiles	Turtle	5	5	F	5				5			5			
	Loggerhead Turtle	1	1	LL	1				1			1			
	<b>Total</b>	<b>6</b>	<b>6</b>		<b>6</b>				<b>6</b>			<b>6</b>			
Cetaceans	Common Dolphin	34	81	PS	54	1		26	80		1	80	1		
	Dolphin	59	159	PS	83	3		73	158	1		159			
	<b>Total</b>	<b>93</b>	<b>240</b>		<b>137</b>	<b>4</b>		<b>99</b>	<b>238</b>	<b>1</b>	<b>1</b>	<b>239</b>	<b>1</b>		
Pinnipeds	Long-nosed Fur Seal	98	3630	E				3630	3630						3630
	Long-nosed Fur Seal	97	668	F				668	668						668
	<b>Total</b>	<b>195</b>	<b>4298</b>					<b>4298</b>	<b>4298</b>						<b>4298</b>
Fish	Common Seadragon	1	1	PTN	1				1			1			
	Great White Shark	1	1	D				1	1						1
	Great White Shark	2	2	LL				2	2						2
	Great White Shark	1	1	N/A				1	1						1
	Great White Shark	2	2	PS	1		1		2			1			1
	Pipefish	19	53	PTN	53				49		4	49		4	
	Pipehorse	8	10	PTN	10				6		4	6		4	
	Seahorse	37	59	PTN	59				47		12	47		12	
<b>Total</b>	<b>71</b>	<b>129</b>			<b>124</b>		<b>1</b>	<b>4</b>	<b>109</b>		<b>20</b>	<b>104</b>		<b>20</b>	<b>5</b>
<b>Total</b>		<b>394</b>	<b>4736</b>		<b>281</b>	<b>52</b>	<b>1</b>	<b>4402</b>	<b>4695</b>	<b>1</b>	<b>40</b>	<b>393</b>	<b>1</b>	<b>39</b>	<b>4303</b>

## Appendix 6. TEPS interactions within each commercial fishery in South Australia between 2007/08 and 2013/14.

**Table 12.** TEPS interactions in the Sardine Fishery between 2007/08 and 2013/14.

Year	Effort (shots)	TEPS	# of Animals	Gear Code	Nature of Interaction				Status			Fate			
					Caught	Entanglement	Impact/collision	Other	Alive	Alive / Injured	Dead	Released	Retained	Discarded	Other
2007/08	890	Long-nosed Fur Seal	1	PS	1						1		1		
		Dolphin	132	PS	118	13		1	117		15	117	13		2
		Common Dolphin	30	PS	30				30			30			
		Unidentified seal species	37	PS	23	1		13	35	1	1	32	1		4
		Australia Fur Seal	1	PS		1					1		1		
		<b>Total</b>	<b>201</b>		<b>172</b>	<b>15</b>		<b>14</b>	<b>182</b>	<b>1</b>	<b>18</b>	<b>179</b>	<b>16</b>		<b>6</b>
2008/09	925	Shearwater	2	PS		2					2			2	
		Dolphin	118	PS	111	7			112	1	5	113	5		
		Common Dolphin	42	PS	39	1		2	42			42			
		Unidentified seal species	70	PS	9			61	70			19			51
		Australian Sea Lion	4	PS	1			3	4			1			3
		Long-nosed Fur Seal	1	PS	1				1			1			
		Great White Shark	2	PS				2	2			1			1
		<b>Total</b>	<b>239</b>		<b>161</b>	<b>10</b>		<b>68</b>	<b>231</b>	<b>1</b>	<b>7</b>	<b>177</b>	<b>5</b>	<b>2</b>	<b>55</b>
2009/10	1,132	Dolphin	136	PS	111	2		23	132	1	3	133	1	2	
		Common Dolphin	43	PS	43				41		2	41	2		
		Unidentified seal species	14	PS	14				14			14			
		Great White Shark	2	PS	2				2			2			
		<b>Total</b>	<b>195</b>		<b>170</b>	<b>2</b>		<b>23</b>	<b>189</b>	<b>1</b>	<b>5</b>	<b>190</b>	<b>3</b>	<b>2</b>	
2010/11	1,014	Dolphin	72	PS	69	3			64	1	7	65	7		
		Common Dolphin	54	PS	54				54			54			
		Unidentified seal species	1	PS	1					1		1			
		Great White Shark	3	PS	2			1	3			2		1	
		<b>Total</b>	<b>130</b>		<b>126</b>	<b>3</b>		<b>1</b>	<b>121</b>	<b>2</b>	<b>7</b>	<b>122</b>	<b>7</b>	<b>1</b>	
2011/12	1,107	Dolphin	218	PS	139	8		71	211	2	5	213	4	1	
		Common Dolphin	85	PS	71	1		13	84	1		85			
		Unidentified seal species	5	PS	4			1	5			4		1	
		Great White Shark	3	PS	3				3			3			
		<b>Total</b>	<b>311</b>		<b>217</b>	<b>9</b>		<b>85</b>	<b>303</b>	<b>3</b>	<b>5</b>	<b>305</b>	<b>4</b>	<b>1</b>	
2012/13	864	Dolphin	184	PS	93	4		87	180	1	3	181	2	1	
		Common Dolphin	42	PS	34	2		6	41		1	41	1		
		Unidentified seal species	6	PS				6	6			6			
		Great White Shark	1	PS	1				1			1			
		<b>Total</b>	<b>233</b>		<b>128</b>	<b>6</b>		<b>99</b>	<b>228</b>	<b>1</b>	<b>4</b>	<b>229</b>	<b>3</b>	<b>1</b>	
2013/14	786	Dolphin	159	PS	83	3		73	158	1		159			
		Common Dolphin	81	PS	54	1		26	80		1	80	1		
		Great White Shark	2	PS	1		1		2			1		1	
		<b>Total</b>	<b>242</b>		<b>138</b>	<b>4</b>	<b>1</b>	<b>99</b>	<b>241</b>	<b>1</b>	<b>1</b>	<b>240</b>	<b>1</b>	<b>1</b>	



**Table 13.** TEPS interactions in the Lakes and Coorong Fishery between 2007/08 and 2013/14.

Year	Effort (Boat days)	TEPS	# of Animals	Gear Code	Nature of Interaction				Status			Fate			
					Caught	Entanglement	Impact/collision	Other	Alive	Alive / Injured	Dead	Released	Retained	Discarded	Other
2007/08	7,780	Cormorant	4	F		4			3		1	3		1	
		Freshwater Turtle	3	F		3			2		1	2		1	
		<b>Total</b>	<b>7</b>			<b>7</b>			<b>5</b>		<b>2</b>	<b>5</b>		<b>2</b>	
2008/09	7,016	Cormorant	2	F		2					2			2	
		Freshwater Turtle	2	F		2			2			2			
		Great Crested Grebe	1	F		1			1			1			
		<b>Total</b>	<b>5</b>			<b>5</b>			<b>3</b>		<b>2</b>	<b>3</b>		<b>2</b>	
2009/10	6,108	Freshwater Turtle	20	C	20				20			20			
		Freshwater Turtle	8	F	8				8			8			
		Freshwater Turtle	40	I	40				40			40			
		Long-nosed Fur Seal	1	H				1	1						1
		Long-nosed Fur Seal	513	K				513	513						513
		<b>Total</b>	<b>582</b>			<b>68</b>			<b>514</b>	<b>582</b>			<b>68</b>		<b>514</b>
2010/11	6,033	Long-nosed Fur Seal	6	E				6	6						6
		Long-nosed Fur Seal	373	K				373	373						373
		<b>Total</b>	<b>379</b>					<b>379</b>	<b>379</b>						<b>379</b>
2011/12	6,316	<b>No interactions reported</b>	<b>0</b>												
2012/13	6,760	Australian Pelican	1	E	1				1			1			
		Blue Billed Duck	1	F	1				1			1			
		Cormorant	11	F	8	3			8		3	8		3	
		Dusky Moorhen	2	F	2						2			2	
		Grebe	2	E	2				1		1	1		1	
		Grebe	1	F	1				1			1			
		Musk Duck	2	F	2				2			2			
		Long-nosed Fur Seal	2	E				2	2						2
		Long-nosed Fur Seal	54	F				54	54						54
		<b>Total</b>	<b>76</b>			<b>17</b>	<b>3</b>		<b>56</b>	<b>70</b>		<b>6</b>	<b>14</b>		<b>6</b>
2013/14	7,611	Australian Pelican	2	F		2			2			2			
		Cormorant	55	F	12	43			39		16	39		16	
		Grebe	5	E	2	2		1	3		2	3		2	
		Grebe	1	F		1					1			1	
		Long-nosed Fur Seal	3,630	E				3,630	3,630						3,630
		Long-nosed Fur Seal	668	F				6,68	668						6,68
		Turtle	5	F	5				5			5			
		<b>Total</b>	<b>4,366</b>			<b>19</b>	<b>48</b>		<b>4,299</b>	<b>4,347</b>		<b>19</b>	<b>49</b>		<b>19</b>

**Table 14:** TEPS interactions in the Gulf St Vincent Prawn Fishery from 2007/08 to 2013/14.

Year	Effort (Trawl Shots)	TEPS	# of Animals	Gear Code	Nature of Interaction				Status			Fate			
					Caught	Entanglement	Impact/collision	Other	Alive	Alive / Injured	Dead	Released	Retained	Discarded	Other
2007/08	2,282	Leatherback Turtle	1	PTN	1				1			1			
		<b>Total</b>	<b>1</b>		<b>1</b>				<b>1</b>			<b>1</b>			
2008/09	2,226	<i>No interactions reported</i>	0												
2009/10	2,186	<i>No interactions reported</i>	0												
2010/11	2,032	<i>No interactions reported</i>	0												
2011/12	1,823	<i>No interactions reported</i>	0												
2012/13	<i>Fishery closed</i>	<i>No interactions reported</i>	0												
2013/14	<i>Fishery closed</i>	<i>No interactions reported</i>	0												

**Table 15.** TEPS interactions in the Spencer Gulf Prawn Fishery from 2007/08 to 2013/14.

Year	Effort (Trawl Shots)	TEPS	# of Animals	Gear Code	Nature of Interaction				Status			Fate					
					Caught	Entanglement	Impact/collision	Other	Alive	Alive / Injured	Dead	Released	Retained	Discarded	Other		
2007/08	18,752	<i>No interactions reported</i>															
2008/09	17,721	<i>No interactions reported</i>															
2009/10	16,499	Common Sea Dragon	13	PTN	13				13			13					
		Pipefish	4	PTN	4				4			4					
		<b>Total</b>	<b>17</b>		<b>17</b>				<b>17</b>			<b>17</b>					
2010/11	16,013	Australian Fur Seal	1	PTN	1				1			1					
		Common Sea Dragon	1	PTN	1						1			1			
		Pipefish	15	PTN	15				15			15					
		Potbelly Seahorse	1	PTN	1				1			1					
		Seahorse	43	PTN	43				42		1	42		1			
		<b>Total</b>	<b>61</b>		<b>61</b>				<b>59</b>		<b>2</b>	<b>59</b>		<b>2</b>			
2011/12	17,566	Common Sea Dragon	3	PTN	3				3			3					
		Great White Shark	1	PTN	1					1		1					
		Pipefish	68	PTN	67	1			17		51	17		51			
		Pipehorse	1	PTN	1				1			1					
		Seahorse	65	PTN	65				64		1	64		1			
		<b>Total</b>	<b>138</b>		<b>137</b>	<b>1</b>			<b>85</b>	<b>1</b>	<b>52</b>	<b>86</b>		<b>52</b>			
2012/13	17,801	Common Sea Dragon	9	PTN	9				8	1		9					
		Flutemouth	3	PTN	3				3			3					
		Leafy Sea Dragon	2	PTN	2				2			2					
		Pipefish	123	PTN	123				116	1	6	117		6			
		Seahorse	58	PTN	57	1			52		6	52		6			
		<b>Total</b>	<b>195</b>		<b>194</b>	<b>1</b>			<b>181</b>	<b>2</b>	<b>12</b>	<b>183</b>		<b>12</b>			
2013/14	18,430	Common Sea Dragon	1	PTN	1				1			1					
		Pipefish	53	PTN	53				49		4	49		4			
		Seahorse	41	PTN	41				37		4	37		4			
		<b>Total</b>	<b>95</b>		<b>95</b>				<b>87</b>		<b>8</b>	<b>87</b>		<b>8</b>			

**Table 16.** TEPS interactions in the West Coast Prawn Fishery from 2007/08 to 2013/14.

Year	Effort (Trawl Shots)	TEPS	# of Animals	Gear Code	Nature of Interaction				Status			Fate			
					Caught	Entanglement	Impact/collision	Other	Alive	Alive / Injured	Dead	Released	Retained	Discarded	Other
2007/08	1,008	Pipefish	20	PTN	20				7		13	7		13	
		Seahorse	29	PTN	29				18		11	18		11	
		<b>Total</b>	<b>49</b>		<b>49</b>				<b>25</b>		<b>24</b>	<b>25</b>		<b>24</b>	
2008/09	1,495	Pipefish	2	PTN	2					2				2	
		Seahorse	5	PTN	5				5			5			
		<b>Total</b>	<b>7</b>		<b>7</b>				<b>5</b>		<b>2</b>	<b>5</b>		<b>2</b>	
2009/10	1,426	Unidentified seal species	2	PTN			2			2				2	
		Pipefish	1	PTN	1					1				1	
		<b>Total</b>	<b>3</b>		<b>1</b>		<b>2</b>			<b>3</b>				<b>3</b>	
2010/11	2,056	Leafy Sea Dragon	1	PTN	1				1			1			
		Pipefish	2	PTN	2				1	1	1		1		
		Pipehorse	5	PTN	5						5			5	
		Seahorse	13	PTN	13				4	9	4		9		
		<b>Total</b>	<b>21</b>		<b>21</b>				<b>6</b>	<b>15</b>	<b>6</b>		<b>15</b>		
2011/12	1,949	Pipefish	1	PTN	1				1			1			
		Pipehorse	23	PTN	23				13	10	13		10		
		Seahorse	22	PTN	22				5	17	5		17		
		<b>Total</b>	<b>46</b>		<b>46</b>				<b>19</b>	<b>27</b>	<b>19</b>		<b>27</b>		
2012/13	2,208	Pipefish	1	PTN	1					1				1	
		Pipehorse	18	PTN	18				13	5	13		5		
		Seahorse	39	PTN	39				17	22	17		22		
		<b>Total</b>	<b>58</b>		<b>58</b>				<b>30</b>	<b>28</b>	<b>30</b>		<b>28</b>		
2013/14	1,518	Pipefish	10	PTN	10				6	4	6		4		
		Seahorse	18	PTN	18				10	8	10		8		
		<b>Total</b>	<b>28</b>		<b>28</b>				<b>16</b>	<b>12</b>	<b>16</b>		<b>12</b>		

**Table 17.** TEPS interactions in the Marine Scalefish Fishery from 2007/08 to 2013/14.

Year	Effort (Boat Days)	TEPS	# of Animals	Gear Code	Nature of Interaction				Status			Fate					
					Caught	Entanglement	Impact/collision	Other	Alive	Alive / Injured	Dead	Released	Retained	Discarded	Other		
2007/08	32,015	Unidentified seal species	1	HL				1	1							1	
		Cormorant	23	HNF	23				23			23					
		Cormorant	2	HNS		2			2			2					
		Dolphin	4	HNF	4				4			4					
		Great White Shark	2	HL	1		1		2			1				1	
		Great White Shark	1	LL		1					1		1				
		Great White Shark	1	PO	1				1			1					
		Little Penguin	1	N/A				1			1						1
		Pacific Gull	1	HL		1			1			1					
		Silver Gull	1	PO		1			1			1					
		<b>Total</b>	<b>37</b>		<b>29</b>	<b>5</b>	<b>1</b>	<b>2</b>	<b>35</b>		<b>2</b>	<b>33</b>	<b>1</b>		<b>3</b>		
2008/09	31,927	Cormorant	22	HNS	19	3			22			22					
		Dolphin	1	HNF	1				1			1					
		Dolphin	3	HNS	3				3			3					
		Dolphin	1	N/A				1			1		1				
		Great White Shark	1	HL				1	1							1	
		Turtle	1	HNF	1				1			1					
		<b>Total</b>	<b>29</b>		<b>24</b>	<b>3</b>		<b>2</b>	<b>28</b>		<b>1</b>	<b>27</b>	<b>1</b>		<b>1</b>	<b>1</b>	
2009/10	33,455	Pacific Gull	1	HL	1				1			1					
		Cormorant	14	HNF	14				13	1	13			1			
		Cormorant	6	HNS	6				6			6					
		Long-nosed Fur Seal	1	HNF	1				1			1					
		Turtle	1	HNS	1				1			1					
		Great White Shark	1	HL				1	1							1	
		<b>Total</b>	<b>24</b>		<b>23</b>			<b>1</b>	<b>23</b>		<b>1</b>	<b>22</b>		<b>1</b>	<b>1</b>	<b>1</b>	
2010/11	32,173	Dolphin	1	HNF	1				1			1					
		Great White Shark	1	HL				1	1							1	
		Great White Shark	2	LL	1	1			1	1	1	1	1				
		<b>Total</b>	<b>4</b>		<b>2</b>	<b>1</b>		<b>1</b>	<b>3</b>		<b>1</b>	<b>2</b>		<b>1</b>	<b>1</b>		
2011/12	33,369	Albatross	1	LL		1					1				1		
		Cormorant	2	HNS	2				2			2					
		Great White Shark	1	CP		1			1			1					
		<b>Total</b>	<b>4</b>		<b>2</b>	<b>2</b>			<b>3</b>		<b>1</b>	<b>3</b>		<b>1</b>	<b>1</b>		
2012/13	32,186	Cormorant	2	HNS	2						2				2		
		<b>Total</b>	<b>2</b>		<b>2</b>						<b>2</b>				<b>2</b>		
2013/14	28,402	Great White Shark	2	LL				2	2							2	
		Great White Shark	1	N/A				1	1							1	
		Loggerhead Turtle	1	LL	1				1			1					
		<b>Total</b>	<b>4</b>		<b>1</b>			<b>3</b>	<b>4</b>			<b>1</b>				<b>3</b>	

**Table 18.** TEPS interactions in the Abalone Fishery from 2007/08 to 2013/14.

Year	Effort (Days)	TEPS	# of Animals	Gear Code	Nature of Interaction				Status			Fate					
					Caught	Entanglement	Impact/collision	Other	Alive	Alive / Injured	Dead	Released	Retained	Discarded	Other		
2007/08	1,928	<i>No interactions reported</i>	0														
2008/09	1,857	Great White Shark	3	D				3	3								3
		<b>Total</b>	<b>3</b>					<b>3</b>	<b>3</b>								
2009/10	1,912	<i>No interactions reported</i>	0														
2010/11	1,905	Great White Shark	1	D				1	1								1
		<b>Total</b>	<b>1</b>					<b>1</b>	<b>1</b>								
2011/12	1,930	Great White Shark	2	D				2	2								2
		<b>Total</b>	<b>2</b>					<b>2</b>	<b>2</b>								
2012/13	2,099	<i>No interactions reported</i>	0														
2013/14	1,732	Great White Shark	1	D				1	1								1
		<b>Total</b>	<b>1</b>					<b>1</b>	<b>1</b>								

**Table 19.** TEPS interactions in the Blue Crab Fishery from 2007/08 to 2013/14.

Year	Effort (Boat Days)	TEPS	# of Animals	Gear Code	Nature of Interaction				Status			Fate					
					Caught	Entanglement	Impact/collision	Other	Alive	Alive / Injured	Dead	Released	Retained	Discarded	Other		
2007/08	1,678	<i>No interactions reported</i>	0														
2008/09	1,366	Leatherback Turtle	1	CP		1			1			1					
		<b>Total</b>	<b>1</b>			<b>1</b>			<b>1</b>			<b>1</b>					
2009/10	1,216	Leatherback Turtle	1	CP		1			1			1					
		<b>Total</b>	<b>1</b>			<b>1</b>			<b>1</b>			<b>1</b>					
2010/11	1,109	<i>No interactions reported</i>	0														
2011/12	1,150	<i>No interactions reported</i>	0														
2012/13	1,063	<i>No interactions reported</i>	0														
2013/14	1,113	<i>No interactions reported</i>	0														

**Table 20.** TEPS interactions in the Charter Boat Fishery from 2007/08 to 2013/14.

Year	Effort (Trips)	TEPS	# of Animals	Gear Code	Nature of Interaction				Status			Fate			
					Caught	Entanglement	Impact/collision	Other	Alive	Alive / Injured	Dead	Released	Retained	Discarded	Other
2007/08	3,641	Dolphin	7	IS	1			6	7			1			6
		Great White Shark	1	IS	1				1			1			
		Long-nosed Fur Seal	1	IS				1	1						1
		Pacific Gull	1	IS		1			1			1			
		<b>Total</b>	<b>10</b>		<b>2</b>	<b>1</b>		<b>7</b>	<b>10</b>			<b>3</b>			<b>7</b>
2008/09	3,561	Common Dolphin	1	OS		1			1			1			
		Great White Shark	8	IS	5		1	2	8			5			3
		<b>Total</b>	<b>9</b>		<b>5</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>9</b>			<b>6</b>			<b>3</b>
2009/10	3,552	Great White Shark	1	IS			1		1						1
		<b>Total</b>	<b>1</b>				<b>1</b>		<b>1</b>						<b>1</b>
2010/11	3,322	Australasian Gannet	1	IS		1			1			1			
		<b>Total</b>	<b>1</b>			<b>1</b>			<b>1</b>			<b>1</b>			
2011/12	3,566	<i>No interactions reported</i>	0												
2012/13	3,391	<i>No interactions reported</i>	0												
2013/14	2,830	<i>No interactions reported</i>	0												



**Table 21.** TEPS interactions in the Northern Zone Rock Lobster Fishery from 2007/08 to 2013/14.

Year	Effort (Pot lifts)	TEPS	# of Animals	Gear code	Nature of Interaction				Status			Fate			
					Caught	Entanglement	Impact/collision	Other	Alive	Alive / Injured	Dead	Released	Retained	Discarded	Other
2007/08	615,154	Petrel	10	N/A				10	10			10			
		Dolphin	1	LP		1					1			1	
		<b>Total</b>	<b>11</b>			<b>1</b>	<b>10</b>	<b>10</b>	<b>1</b>	<b>10</b>	<b>1</b>			<b>1</b>	
2008/09	597,876	<i>No interactions reported</i>	0												
2009/10	350,908	<i>No interactions reported</i>	0												
2010/11	289,695	<i>No interactions reported</i>	0												
2011/12	286,724	<i>No interactions reported</i>	0												
2012/13	334,465	<i>No interactions reported</i>	0												
2013/14	355,104	<i>No interactions reported</i>	0												

**Table 22.** TEPS interactions in the Southern Zone Rock Lobster Fishery from 2007/08 to 2013/14.

Year	Effort (Pot Lifts)	TEPS	# of Animals	Gear Code	Nature of Interaction				Status			Fate			
					Caught	Entanglement	Impact/collision	Other	Alive	Alive / Injured	Dead	Released	Retained	Discarded	Other
2007/08	1,661,392	Turtle	1	LP		1				1		1			
		<b>Total</b>	<b>1</b>			<b>1</b>				<b>1</b>		<b>1</b>			
2008/09	1,916,436	<i>No interactions reported</i>	0												
2009/10	2,049,961	<i>No interactions reported</i>	0												
2010/11	1,321,654	<i>No interactions reported</i>	0												
2011/12	1,283,673	<i>No interactions reported</i>	0												
2012/13	1,418,794	<i>No interactions reported</i>	0												
2013/14	1,252,830	<i>No interactions reported</i>	0												

## **Appendix 7. Fisheries Management Act 2007 (SA) Schedule 5 – Protected Species**

### **Fisheries Management (General) Regulations 2007**

#### **Schedule 5—Protected species**

- Murray River Crayfish (*Euastacus armatus*)
- South-east Crayfish (*Euastacus bispinosa*)
- Western Blue Groper (*Achoerodus gouldii*) in the waters of or near Spencer Gulf and Gulf St. Vincent contained within and bounded by a line commencing at Mean High Water Springs closest to 34°56'46.59" South, 135°37'33.92" East (Cape Carnot, Eyre Peninsula), then beginning north-easterly following the line of Mean High Water Springs to the location closest to 35°38'33.80" South, 138°31'20.83" East (Newland Head, Fleurieu Peninsula), then south-westerly to the location on Mean High Water Springs closest to 35°50'32.70" South, 138°08'03.59" East (Cape Willoughby, Kangaroo Island), then beginning north-easterly following the line of Mean High Water Springs to the location closest to 35°53'11.31" South, 136°32'03.88" East (Vennachar Point, Kangaroo Island), then north-westerly to the point of commencement.
- Scalefish of the Family Syngnathidae
- Scalefish of the Genus *Ambassidae*
- Scalefish of any species of *Mogurnda*
- Scalefish of any species of *Nannoperca*
- Scalefish of the following species:
  - River Blackfish (*Gadopsis marmoratus*)
  - Freshwater Catfish (*Tandanus tandanus*)
  - Trout Cod (*Maccullochella macquariensis*)
  - Silver Perch (*Bidyanus bidyanus*)
- White Shark (*Carcharodon carcharias*)

## Appendix 8. The gear types used in commercial fishing operations

Gear	Code	Gear	Code	Gear	Code
<b>Traps</b>		<b>Other Gear (cont.)</b>		<b>Charter Boat Codes</b>	
Fish Trap (inc Ocean Jacket Trap)	FT	Spade/Fork	SF	Inshore Scale Fishing	IS
Octopus	OT	Razor Fish Tongs	RT	Offshore Scale Fishing	OS
Crab Lift Net (Hoop/Drop Nets)	CN	Hand	HA	<b>Inland Waters Codes</b>	
Lobster Pot	LP	Diving	D	Dab Net	B
Crab Pot	CP	Other (may include diving)	XX	Drum Net	C
<b>Lines</b>		<b>Nets</b>		Electrofisher	D
Handline	HL	Haul Net (Floating Gar Net)	HNF	Gill Net (Small Mesh)	E
Squid Jig	SQ	Haul Net (Sinking Mixed Net)	HNS	Gill Net (Large Mesh)	F
Long Line	LL	Haul Net (Sinking Mesh Net)	HNM	Handline	G
Drop Line	DL	Haul Net	HN	Hauling Net (Small Mesh)	H
Trot Line	TT	Drum Net	DRN	Hauling Net (Large Net)	I
Troll Line	TL	Purse Seine	PS	Purse Seine Net	J
Poles/Rod And Line	PO	Salmon Net	SA	Ring Net	K
<b>Other Gear</b>		Set Gill Net (5 Cm)	GN	Set Line	L
Dab Net	DN	Bait Net (5 Cm)	BN	Swinger Net	M
Cockle Rake	CR	Large Mesh Set Net (>15 Cm)	SH	Yabbie Pot	N
Crab Rake	RA	Prawn Trawl Net	PTN	Other	X

### Appendix 9. Commercial Fisheries licence holders by financial year between 2007/08 and 2013/14.

Year	Abalone			Blue Crab	Charter Boat	Inland Waters		Prawn			Rock Lobster		Sardine	Scale Fish		
	Central Zone	Southern Zone	Western Zone	Gulf Waters Pot Fishers Only	Charter Boat Fishery	Lakes and Coorong	River	Gulf St Vincent	Spencer Gulf	West Coast	Northern Zone	Southern Zone	Sardine	Marine Scale	Restricted	Miscellaneous
2007/08	6	6	23	9	108	36	6	10	39	3	68	181	14	341	13	20
2008/09	6	6	23	9	108	36	6	10	39	3	68	181	14	340	12	20
2009/10	6	6	23	9	109	36	6	10	39	3	68	181	14	337	12	20
2010/11	6	6	23	9	109	36	6	10	39	3	68	181	14	334	12	19
2011/12	6	6	23	9	109	36	6	10	39	3	68	181	14	334	12	19
2012/13	6	6	23	9	109	36	6	10	39	3	68	181	14	328	11	19
2013/14	6	6	23	9	105	36	6	10	39	3	68	181	14	326	10	19