





Australian Government
Australian Fisheries Management Authority

-  Australian sub-Antarctic fisheries
-  Bycatch and discarding workplan



 March 2013

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Introduction

All Commonwealth fisheries are committed to minimising bycatch under the Australian Government's Commonwealth Policy on Fisheries Bycatch. 'Bycatch' is defined as any 'part of the fisher's catch which is returned to the sea either because it has no commercial value or because regulations preclude it being retained, and any part of the catch that does not reach the deck of the fishing vessel but is affected by interactions with the fishing gear.'

The Bycatch and Discard Workplan for the Australian sub-Antarctic Fisheries outlines the measures that are in place to address bycatch and discarding issues in the Heard Island and McDonald Islands Fishery and the Macquarie Island Toothfish Fishery. Both fisheries have an offal retention policy whereby the discharge of dead fish, fish offal or by-products of fish processing is not permitted in order to minimise the feeding opportunities for seabirds and marine mammals around vessels.

No species have been identified as being at high risk in the sub-Antarctic Fisheries from the Ecological Risk Assessment process undertaken by CSIRO.

Fisheries Descriptions

Heard Island and McDonald Islands Fishery

The Heard Island and McDonald Islands Fishery (HIMIF) lies in waters adjacent to the Islands of the same name. The Islands are Australia's most remote sovereign territory and are located on the Kerguelen Plateau in the south Indian Ocean, about 4,000 kilometres south-west of Perth. The fishery extends from 12 nautical miles offshore to the edge of the 200 nautical mile Australian Exclusive Economic Zone (EEZ) around the Islands.

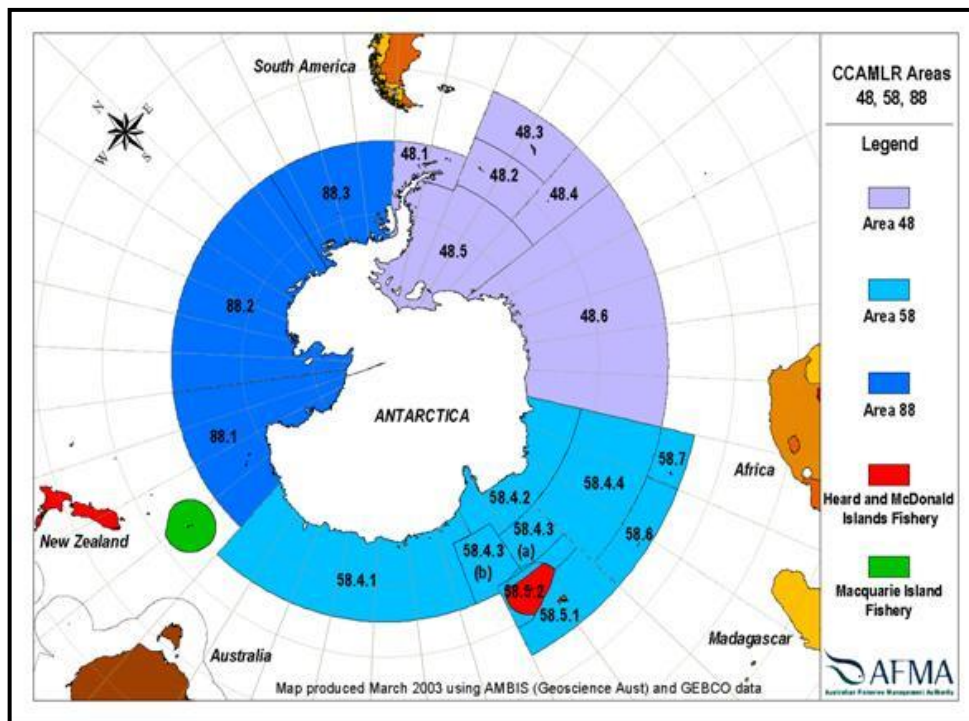


Figure 1: Location of the HIMI Fishery within the CCAMLR Convention area

The HIMIF falls within the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) Convention area (see figure 1), and is managed by AFMA in close cooperation with the Australian Antarctic Division (AAD) in accordance with CCAMLR Conservation Measures. Given the environmental significance of the area, AFMA and CCAMLR are committed to minimising the impacts of fishing on the marine environment and have adopted a precautionary approach to management. This approach considers the effects of harvesting on target, dependent and associated species, and ecological relationships, to ensure sustainability of target species stocks and the broader marine environment.

The target species are Patagonian Toothfish (*Dissostichus eleginoides*) and Mackerel Icefish (*Champscephalus gunnari*).

Macquarie Island Toothfish Fishery

The Macquarie Island Toothfish Fishery (MITF) lies in waters adjacent to Macquarie Island. Macquarie Island falls under Tasmanian jurisdiction and is located outside the Antarctic convergence, approximately 1500 kilometres south-east of Hobart.

The waters surrounding Macquarie Island out to 3 nautical miles are Tasmanian State waters and the Tasmanian Department of Primary Industries, Parks, Water and Environment controls activities in these waters. State waters were closed to fishing and classified as a Nature Reserve under Tasmanian law in July 2000. Waters from 3 nautical miles to the 200 nautical mile outer boundary of the Australian fishing zone falls under Commonwealth jurisdiction, with fishing in these waters being managed by the AFMA under the *Fisheries Management Act 1991*.

Figure 2 shows an indicative map of the location of Macquarie Island. Australia shares a maritime delimitation boundary with New Zealand whose EEZ abuts the Australian EEZ north-east of Macquarie Island.

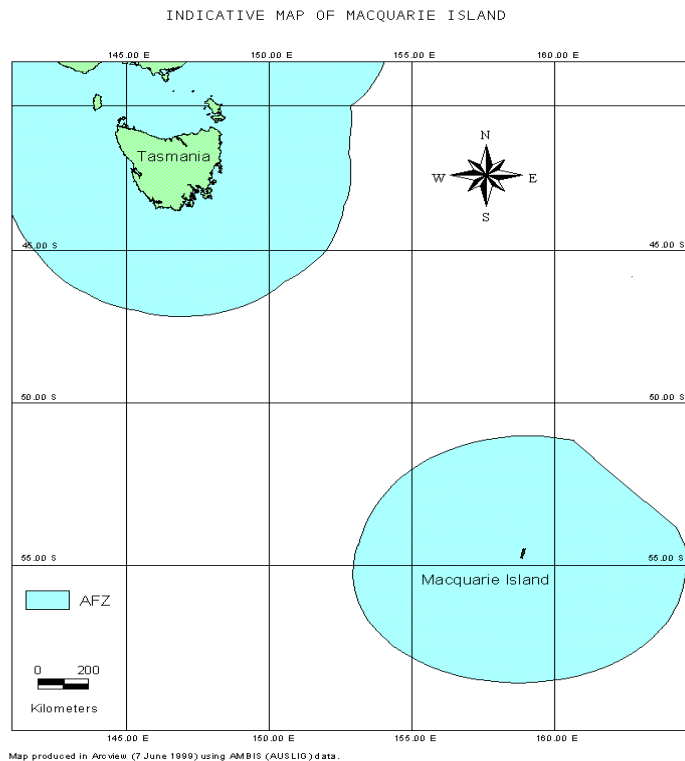


Figure 2: Indicative map of the location of Macquarie Island and nearby Tasmania

While Macquarie Island is outside the Convention area of CCAMLR (see map at figure 1), CCAMLR Resolution 10/XII calls on Members of CCAMLR, which includes Australia, to ensure that vessels flying their flag harvest stocks which are also found in the Convention area do so responsibly and with due respect for Conservation Measures adopted by CCAMLR. Both the HIMIF and the MITF are managed similarly and in accordance with the Conservation Measures adopted by CCAMLR.

Patagonian Toothfish (*Dissostichus eleginoides*) is the target species in the MITF.

Ecological Risk Assessment

The ecological risk assessment (ERA) process was designed and undertaken by CSIRO to assess and rank the ecological effects of fishing in Commonwealth fisheries. The ERA process analysed the effect of commercial fishing, based on the effects on all organisms (protected species, bycatch, byproduct and target species) that occur in the area of a fishery.

Assessments have been undertaken on the following sub-fisheries: HIMIF demersal trawl, HIMIF midwater trawl; HIMIF demersal longline, MITF demersal trawl, and MITF demersal longline.

The Ecological Risk Management (ERM) reports prepared by AFMA concluded that there were no target, bycatch, byproduct or protected species considered to be at high risk from the effects of fishing in the sub-fisheries given the suite of management and conservation initiatives that are in place for the fishery.

The ERA and ERM reports are available on the AFMA website at www.afma.gov.au

Bycatch and discarding issues

There are a range of measures in place in Australia's sub-Antarctic fisheries to ensure levels of bycatch are minimised and mitigation strategies are implemented to avoid interactions.

No discarding

The Management Plans for the HIMIF and MITF require that all bycatch and offal be retained (with some exceptions) in order to limit possible interactions with marine mammals and seabirds. All retained bycatch is processed into fish meal or minced offal with the exception of Grey Rockcod and Unicorn Icefish (in the HIMIF), which are generally retained whole. Skates, sharks, jellyfish, sponges, crabs and coral are generally returned to the ocean as these species either have a high chance of survival, do not attract seabirds and marine mammals when discarded, or cannot be effectively processed through the meal plant or mincer.

Catch limits

All fish bycatch species are subject to catch limits which AFMA and the Sub-Antarctic Resource Assessment Group (SARAG) monitors catch against the seasonal limits. The bycatch levels in sub-Antarctic fisheries are low with catches historically being well below the catch limits, as outlined in tables 1, 2 and 3 below.

Heard Island and McDonald Islands Fishery

In the HIMIF catch limits are set by AFMA for each by-catch species in line with limits determined by CCAMLR. For the 2012/13 season the catch limits for bycatch species are skates and rays (120 tonnes), Macrourids (360 tonnes), Unicorn Icefish (150 tonnes), Grey Rockcod (80 tonnes) and each other species (50 tonnes).

Fishing season (1 December to 30 November)	Skates & rays	Macrourids	Unicorn icefish	Grey rockcod	All other species
2005/06	13	27	33	5	6
2006/07	17	65	15	10	5
2007/08	23	86	37	20	20
2008/09	30	119	53	27	24
2009/10	30	103	80	48	18
2010/11	14	151	25	27	34
2011/12	Not available on CCAMLR website at the time this report was prepared				

Table 1: Seasonal catch of bycatch species (tonnes) in the HIMIF (CCAMLR Statistical Bulletin).

In the HIMIF observer data from the fishery indicates 148 different catch categories entries during the 2006 – 2011 fishing period. Of these entries, 46 had catches of more than 100 kilograms in at least one of the years.

The three major bycatch species are *Macrourus* spp. (grenadiers), Grey Rockcod (*Lepidonotothen squamifrons*) and Unicorn Icefish (*Channichthys rhinoceratus*). Research has been carried out on these species, resulting in the setting of species specific catch limits.

Table 2 provides a further breakdown of catch by fishing method.

Fishing season (1 December to 30 November)	Total bycatch (tonnes) by fishing method					
	Trawl		Longline		Pot	
	Fish	Invertebrates	Fish	Invertebrates	Fish	Invertebrates
2005/06	58.1	7.0	40.9	2.5	0.09	0.09
2006/07	46.3	5.5	72.1	0.5	No potting activity	
2007/08	84.4	27.0	110.0	2.6		
2008/09	105.4	16.7	155.0	3.5	0.03	0.03
2009/10	177.0	46.8	163.3	2.2	0.03	0.02
2010/11	62.6	5.8	155.2	4.3	0.09	0.11
2011/12	22.0	4.5	76.5	2.2	No potting activity-	

Table 2: Seasonal catch of bycatch species (tonnes) in the HIMIF by fishing method (AAD and AFMA records)

Macquarie Island Toothfish Fishery

In August 2012 SARAG agreed that it was appropriate in the MITF to retain the CCAMLR approach where a 50 tonnes limit is set for any one species. To date the total maximum annual catch of bycatch in the MITF has been around 34 tonnes.

The total catch (tonnes) by season of bycatch species in the MITF is shown in table 3.

Fishing season	Total bycatch (tonnes) by fishing method					
	Trawl			Longline		
	Fish	Sharks	Invertebrates	Fish	Sharks	Invertebrates
2005/06	2.4	5.8	3.56	No longline fishing occurred during this period		
2006/07	0.4	1.8	0.35			
2007/08	3.6	4.5	1.90	7.8	1.0	0.01
2008/09	7.3	9.2	0.62	17.7	1.00	0.01
2009/10	No trawl fishing occurred during this period			10.0	4.5	0.10
2010/11				7.3	3.0	0.11
2011/12				18.4	0.6	0.14

Table 3: Seasonal catch of bycatch species in the MITF (AAD records). Note: the shark species are generally sleeper sharks which are returned to the sea.

Bycatch assessments

A number of assessments have been undertaken on some of the principal bycatch species in sub-Antarctic fisheries.

A review and risk assessment of the bycatch of sleeper sharks (*Somniosus* sp.) in sub-Antarctic fisheries was undertaken by AAD and CSIRO scientists in 2002. Using the historic catch rates, the assessment concluded that the risk to sleeper sharks was not likely to be serious, but recommended that data collection continue to gain a better understanding of the biology, distribution and abundance of sleeper shark species (van Wijk et al, 2002).

Table 4 shows the catch (numbers) of sleeper sharks by fishery and fishing method.

Fishing season	Heard Island and McDonald Islands Fishery						Macquarie Island Toothfish Fishery			
	Trawl		Longline		Pot		Trawl		Longline	
	Alive	Dead	Alive	Dead	Alive	Dead	Alive	Dead	Alive	Dead
2005/06	13	-	1	1	-	2	6	-	-	-
2006/07	8	2	-	-	-	-	2	-	2	-
2007/08	9	1	2	3	-	-	11	-	1	-
2008/09	6	-	1	1	1	-	13	2	2	-
2009/10	2	-	2	2	-	-	-	-	2	2
2010/11	12	2	-	-	2	-	-	-	3	1
2011/12	5	1	-	3	-	-	-	-	1	7
TOTAL	55	6	6	10	3	2	32	2	11	10

Table 4: Seasonal catch of sleeper sharks (number) by fishery and fishing method (AAD and AFMA records) Note: sleeper sharks are all returned to the sea.

A joint assessment of the skate distribution on the Kerguelen Plateau (which generally covers the EEZ around HIMI and the adjacent French territory around Kerguelen Island) has been undertaken by Australian and French scientists. The paper reports that three species of skates (*Bathyraja irrasa*, *Bathyraja murrayi* and *Bathyraja eatonii*) are commonly taken as incidental bycatch in the Patagonian Toothfish longline and trawl fisheries, and the Mackerel Icefish trawl fishery on the Kerguelen Plateau. The three species are widely distributed across the Kerguelen Plateau. The catch rates of skates from the trawl fisheries at HIMI are low and do not show any evidence of depletion in the main fishing grounds at this stage. The marine reserves applied by Australia, combined with the conservation measures employed by CCAMLR and implemented by AFMA in the HIMIF appear to provide effective protection for the skates (Nowara et al, 2009).

In September 2012 scientists from AAD prepared an analysis of the bycatch of Unicorn Icefish and Grey Rockcod taken in the HIMIF in demersal trawl and midwater trawl operations. Over the 15 years of the fisheries approximately 20 tonnes of Unicorn Icefish and 9 tonnes of Grey Rockcod have been caught annually. The commercial and research data show that both species are widespread over the Kerguelen Plateau in waters shallower than 1000 metres. The analysis concludes that annual take of these species is well below the precautionary catch limits set by CCAMLR. In addition, move-on rules apply (see below), and a substantial part of their distribution occurs within the HIMI Marine Reserve and therefore current bycatch levels are likely to be low risk (Nowara et al, 2012).

Move-on provisions

In the HIMIF move-on provisions apply to all fish bycatch species. These provisions prevent vessels accumulating catches of bycatch species caught as a result of aggregations of these species coinciding with commercial quantities of target species. The provision is triggered if the catch for a trawl shot or longline set exceeds either one tonne or two tonnes (depending on the bycatch species taken). The fishing vessel is required to move at least five nautical miles from the location where the bycatch exceeded the limit for a period of at least five days.

The move-on provisions apply if the bycatch, in any one haul/set, is:

- equal to or greater than two tonnes for Unicorn Icefish, Grey Rockcod or Sleeper Shark; or
- equal to or greater than one tonne for any other fish species.

Seabird bycatch mitigation strategies

Patagonian Toothfish is increasingly being targeted using demersal longlining in sub-Antarctic fisheries, with demersal trawl (and to a much lesser extent potting) also being used in the HIMIF. Mackerel Icefish can only be targeted using midwater or demersal trawl fishing methods.

The Commonwealth has listed the incidental capture of seabirds in oceanic longline operations as a key threatening process. Sub-Antarctic fisheries manage seabird bycatch by longline through provisions under the 'Threat Abatement Plan 2006 for the incidental catch (or bycatch) of seabirds during oceanic longline fishing operations' (TAP). Under the TAP, the interaction rate for seabirds must be less than 0.01 seabirds per 1000 hooks set.

A range of best practice mitigation strategies have been effectively adopted in sub-Antarctic fisheries to avoid potential interactions with seabirds.

Longline operations

For longline operations the following measures apply:

- **limited longline seasons** – in the HIMIF longline operations are limited to a ‘core’ season of 1 May to 14 September, with season extensions allowed from 15 to 30 April and 15 September to 31 October (where there is full compliance with CCAMLR Conservation Measures in the previous season). In the MITF longline operations are limited to the period 1 May to 31 August;
- **no offal discharge** - dumping of offal is prohibited and applies to all Australian vessels operating in sub-Antarctic fisheries;
- **night setting** – in the MITF line setting can only occur during the hours of darkness between the times of nautical twilight. Day setting is permitted in the HIMIF;
- **integrated weight line** – longline vessels use integrated weight line capable of achieving the CCAMLR standard sink rate of 0.2 metres per second;
- **paired streamer lines** - two streamer lines are used to scare birds away from gear during line setting;
- **bird excluder device** – or ‘brickle curtain’ (designed and developed by Australian Longline Pty Ltd and subsequently adopted by CCAMLR) is deployed to discourage birds from accessing baits during line hauling;
- **stern setting tube** – this is an innovation developed by Australian Longline Pty Ltd for the vessel ‘Antarctic Chieftain’ to avoid seabirds accessing baits during longline setting operations;
- **prohibition on the use of plastic packaging bands** - to prevent ingestion of or entanglement in the debris by seabirds or marine mammals; and
- **minimisation of lighting** – to reduce the risk of seabirds colliding with the boat.

Additionally in the MITF, AFMA has decided that the group of seabirds comprising wandering albatross, black-browed albatross, grey headed albatross, grey petrel or soft-plumaged petrel have protection in excess of the TAP and a trigger limit of one, will apply on a per vessel basis. Therefore if one of these species is killed as a result of an interaction with the fishing gear, the vessel is required to immediately cease fishing in the MITF for the remainder of the season. Any gear remaining in the water is allowed to be retrieved.

For other species of seabirds in the MITF, AFMA has decided that any interactions should comply with the TAP, where a seasonal rate of 0.01 birds per 1000 hooks is specified. The rate is applied retrospectively over a season to the fishery as a whole, so the capture of a bird(s) will not require an operator to cease fishing for the season. The review procedures outlined in the TAP will be applied.

In the HIMIF the TAP rate of 0.01 birds per 1000 hooks applies in the ‘core’ season (1 May to 14 September), and a 3 seabird limit per vessel applies during the season extension periods (15 to 30 April and 15 September to 31 October).

Trawl operations

For trawl operations the following measures apply:

- **no offal discharge** - dumping of offal is prohibited and applies to all Australian vessels operating in sub-Antarctic fisheries;

- **midwater trawl closures** - to avoid seabird interactions no midwater trawling occurs during the period 1 February to 31 March each year. At all other times midwater trawling can only occur at night;
- **operational protocols** - mitigation strategies include the removal of the ‘stickers’ from the net prior to the trawl being shot away, ensuring the trawl deck is swept clean of any fish, aiming to keep the meshes closed when the net is on the surface by maintaining a practical speed, monitor the number of birds around the boat and not shoot away where there is a significant risk of seabirds becoming entangled;
- **mesh size restrictions** – to assist escapement of juvenile target species and bycatch finfish species;
- **prohibition on the use of plastic packaging bands** - to prevent ingestion of or entanglement in the debris by seabirds or marine mammals; and
- **minimisation of lighting** – to reduce the risk of seabirds colliding with the boat.

Wildlife interactions

Wildlife interactions with the fishing gear have been low since operations began. Table 5 summarises the number of seabird and marine mammal interactions with fishing gear by fishing method in the HIMIF up to 30 November 2012. Further details of each interaction are provided in Attachment 1.

Fishery	Seabirds		Marine mammals	
	Total interactions	Deaths	Total interactions	Deaths
Trawl (since 1997)	29	27	27	23
Longline (since May 2003)	19	12	19	15
Pot (since December 2005)	-	-	-	-

Table 5: Interactions with fishing gear in the HIMIF (covers wildlife being caught or entangled in fishing gear)

There have been no seabird interactions with fishing gear in the MITF since operations began in 1994. There has been one marine mammal interaction with the fishing gear in the MITF. In 2008 a New Zealand fur seal was briefly hooked in a flipper when it swam into the ‘moonpool’ on the longline vessel ‘Avro Chieftain’. A ‘moonpool’ is a seabird bycatch mitigation design on the vessel which allows the longline to be hauled through the keel of the boat.

Should an interaction occur, fishers are required to submit detailed reports of the wildlife interaction within 24 hours of the incident occurring. Each report must also include a detailed response to the wildlife interaction which must be implemented immediately by the fisher to minimise the likelihood of similar interactions. A report of such incidents is submitted by AFMA to the Protected Species Unit at the Department of Sustainability, Environment, Water, Population and Communities.

Other management measures

Marine Protected Areas

Extensive Marine Protected areas (MPAs) have been established in the EEZs around Heard Island and McDonald Islands and Macquarie Island under the National Representative System of Marine Protected Areas. No commercial fishing takes place in these waters.

Within the HIMI EEZ around 65,000 km² has been declared as a Marine Reserve (see figure 3). The HIMI Marine Reserve is one of the world's largest protected marine reserves and provides representative ecosystem protection across the physiological classifications, setting aside over 39% of all waters shallower than 1000 metres. Additionally there is a buffer zone of 1 nautical mile which has been added to the closure of territorial waters (out to 12 nautical miles as part of the Heard Island Wilderness Reserve).

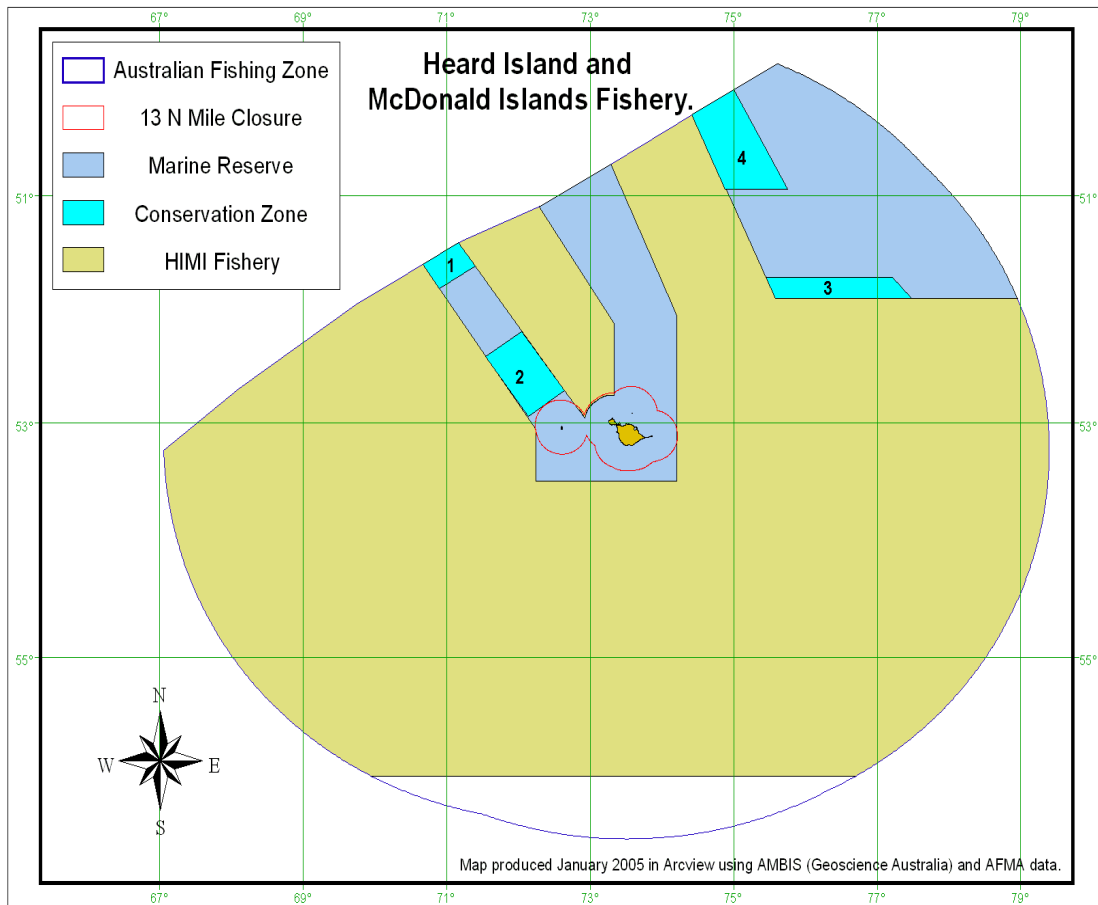


Figure 3: Indicative map showing the HIMI Marine Reserve and Conservation Zone

In conjunction with the declaration of the Marine Reserve, a Conservation Zone comprising four separate areas was also established. The conservation and fisheries values of the Conservation Zone have been assessed and the results and recommendations on proposals to include some of these areas in the Marine Reserve have been released for a period of public comment. A decision by the Minister for Sustainability, Environment, Water, Population and Communities is expected in early 2013.

The Macquarie Island Marine Park (see figure 4) comprises almost one third of the EEZ around Macquarie Island and contains one of the world's largest 'no take' areas. The Aurora Trough sector is the main trawl ground where the majority of the trawl catch has historically been taken and covers a total area of 130 square kilometres. The Marine Park covers 162,000 square kilometres, from a total EEZ area of 476,000 square kilometres.

The Tasmanian state government has declared a Nature Reserve under Tasmanian law within 3 nautical miles of Macquarie Island with a prohibition on commercial fishing.

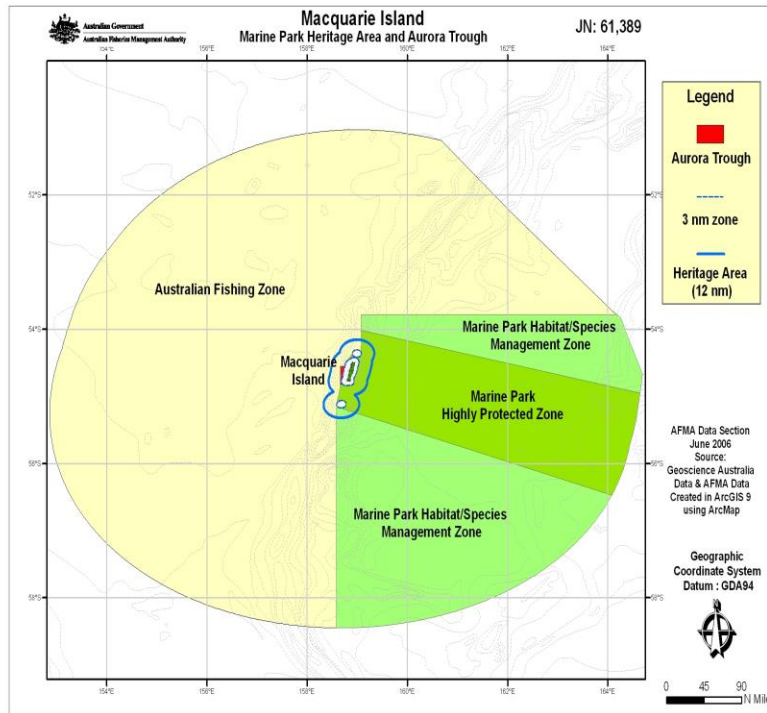


Figure 4: Indicative map showing Macquarie Island Marine Park

Observer coverage

Two observers are deployed on all trips to the fishery to monitor compliance with management arrangements, collect environmental, ecological and fisheries data and undertake wildlife observations.

Future actions

There is an ongoing program of collecting data on target and bycatch species. SARAG will continue to monitor catch against the bycatch catch limits determined for each fishery, and make recommendations on appropriate management action as necessary.

The major fish bycatch species will be subject to ongoing assessments by scientists from AAD:

- an updated assessment of skate species on the Kerguelen Plateau will be undertaken in 2012/13;
- a further study on the population dynamics to evaluate the performance of current management measures is to be undertaken of two major bycatch species: Grey Rockcod (*Lepidonotothen squamifrons*) and Unicorn Icefish (*Channichthys rhinoceratus*); and
- an assessment of the macrourids species (rattails), the other significant sub-Antarctic bycatch species, will be undertaken in the next 2 to 3 years.

A review of ERAs for each sub-fishery is scheduled to be conducted in 2014, after five years of operation.

An assessment of the risk of demersal fishing to benthic taxa and habitats will be included in the 2014 update of the ERAs.

Annual status reports for the HIMIF and MITF will continue to be provided to the Department of Sustainability, Environment, Water, Population and Communities.

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Van Wijk, E.M., Williams, R., Stevens, J.D., 2002. A review of the *Somniosus* (sleeper shark) genus and a risk assessment of the sleeper shark by-catch caught in Australian subantarctic fisheries. Report for the Australian Fisheries Management Authority

Acronyms

AAD	-	Australian Antarctic Division
AFMA	-	Australian Fisheries Management Authority
CCAMLR	-	Commission for the Conservation of Antarctic Marine Living Resources
CSIRO	-	Commonwealth Scientific and Industrial Research Organisation
EEZ	-	Exclusive Economic Zone
ERA	-	ecological risk assessment
ERM	-	ecological risk management
HIMIF	-	Heard Island and McDonald Islands Fishery
MITF	-	Macquarie Island Toothfish Fishery
MPA	-	Marine Protected Area
SARAG	-	Sub-Antarctic Resource Assessment Group
TAP	-	threat abatement plan

Attachment A

Summary of seabirds and marine mammal interactions with the fishing gear in the Heard Island and McDonald Islands Fishery (to 30 November 2012)

Note: there have been no interactions with fishing gear in the Macquarie Island Toothfish Fishery

Seabird interactions with fishing gear

Date	Gear	Target species	Seabird species	Life status		Details
				Dead	Alive	
03/11/1998	trawl	icefish	White chinned petrel	1		Bird came up tangled in meshes (dead), halfway down the net on a shot where a large number of small icefish were caught in meshes.
21/02/1999	trawl	icefish	Southern giant petrel	1		Bird was found in the Gloria trawl. Carcass disposed of by crew.
31/03/1999	trawl	icefish	White chinned petrel	1		Bird was found in pounds after an icefish survey trawl. Carcass was retained.
26/06/1999	trawl	icefish	Cape petrel	1		Bird was observed dead floating near warp. The carcass could not be retrieved.
06/12/1999	trawl	toothfish	White chinned petrel	1		wing found below trawl wire splice
11/04/2002	trawl		Cape petrel		1	Flew into warp wire and got caught in winch brake mechanism, injured. recovered and was released
08/03/2003	trawl	icefish	White chinned petrel	1		Found in the trawl dead. Caught during shooting of gear.
06/04/2003	trawl	icefish	Black browed albatross	1		Bird crashed into trawl net during hauling. Bird sustained a broken wing. Death was by euthanasia
13/04/2003	trawl	icefish	White chinned petrel	1		Found dead in fish pound.
21/04/2003	trawl	icefish	Black browed albatross	1		Found dead on deck. Possibly snared on a sprag from the main warp end splice during shooting of net
28/04/2003	trawl	toothfish	Cape petrel	1		Caught in net during hauling
01/05/2003	trawl	toothfish	Cape petrel	1		Snared in net during hauling. Broken neck
28/05/2003	longline	toothfish	Cape petrel	1*		During hauling bird came in contact with backbone and was entangled in a snood while lunging into water. It appeared to be hooked at the back of its neck by its feathers. No wound or blood found. Bird was released and it flew away immediately.
01/06/2003	longline	toothfish	Cape petrel	1*		At the time the hauler was stopped. Bird came into contact with backbone and became entangled in a snood while lunging into water. Bird was not hooked and was immediately disentangled and released un injured.

Date	Gear	Target species	Seabird species	Life status		Details
				Dead	Alive	
17/06/2003	longline	toothfish	Cape petrel	1*		Bird came in contact with the backbone and was entangled in a snood while lunging for something just below the sea surface. The bird was not hooked and was quickly caught by a crewmember and disentangled and immediately released uninjured.
30/01/2005	trawl		White chinned petrel	1		Found tangled and drowned in line being trialed to keep birds further away from the ship's side.
29/03/2005	trawl	icefish	Black-browed albatross	1		Bird was found during hauling with its head stuck in the mesh.
29/03/2005	trawl	icefish	Black-browed albatross	1		Found tangled by the AFMA observer and crew while hauling the mid-trawl net. The seabird had tangled its feet and wing in the larger mesh squares near the opening of the net. The observer noted that the albatross had been tangled during the setting operations. It had drowned and sustained a broken leg during the entanglement.
30/03/2005	trawl	icefish	3 white chinned petrels 2 black browed albatross	5		Birds found entangled in large mesh diamonds near the opening of the net. Observer noticed birds had been immersed for an extended period of time and therefore were entangled when setting the gear.
06/04/2005	trawl	icefish	Black-browed albatross	1		Bird died while mid water trawling and it is assumed to have had its wing caught in a large mesh.
09/04/2005	trawl	toothfish	White chinned petrel	1		Presumed caught during shooting of demersal trawl, retrieved during processing by factory hand.
10/04/2005	trawl	icefish	White chinned petrel	1		Became entangled in large mesh of mid-water trawl during hauling.
10/04/2005	trawl	icefish	Black-browed albatross	1		Became entangled in large mesh of mid-water trawl during hauling.
10/04/2005	trawl	icefish	Black-browed albatross	1		Became entangled in large mesh of mid-water trawl during hauling.
07/06/2006	longline	toothfish	Cape petrel		1	Bird was caught in the tori line but flew away without observer intervention
17/06/2007	trawl	toothfish	Cape petrel	1		Bird observed to be caught near the seal excluder device but could not be found when net fully retrieved.
28/06/2007	trawl	toothfish	Cape petrel	1		Bird found dead in fish pounds.

Date	Gear	Target species	Seabird species	Life status		Details
				Dead	Alive	
19/08/2008	longline	toothfish	Southern giant petrel	1		Bird became entangled in tori line with wing entangled for 3-4 minutes. It was released alive but fell into water rather flying away.
23/08/2008	longline	toothfish	Giant petrel	1		Bird was hooked in the wing during setting operations and found dead after hauling.
20/05/2009	longline	toothfish	Cape petrel	1		Bird was hooked in the wing during setting operations and found dead after hauling.
27/05/2009	longline	toothfish	Giant petrel		1	Bird was hooked in the beak and lifted 1 m out of the water before escaping a feeding normally.
07/05/2010	trawl	toothfish	Cape petrel	1		Bird found dead in fish pounds
09/05/2010	longline	toothfish	Northern giant petrel		1	Bird was briefly hooked during hauling.
11/05/2010	longline	toothfish	Northern giant petrel		1	Bird superficially hooked in foot and released unharmed.
07/06/2010	longline	toothfish	Cape petrel	1		Bird was hooked in the neck during setting and found dead after hauling.
09/06/2010	longline	toothfish	Cape petrel	1*		Bird foul hooked in wing/elbow during hauling. Hook removed by the observer with slight bleeding. The bird flew away at speed.
12/06/2010	longline	toothfish	Cape petrel	1		Bird was hooked in the bill during setting and found dead after hauling.
11/04/2011	trawl	toothfish	Black browed albatross		1	Bird had leg caught in codend for around 10 seconds and began foraging immediately upon escape.
21/05/2011	longline	toothfish	Northern giant petrel	1		Bird hooked in the wing while trying to access bait during hauling. The bird was cut free with the hook and snood still in place. Fate unknown.
02/06/2011	longline	toothfish	Northern giant petrel		1	Bird temporarily caught in bird excluder device during hauling.
13/05/2012	longline	toothfish	Southern giant petrel		1	Bird temporarily hooked in wing when it breached the bird excluder device during hauling. Hook removed by observer and bird adopted normal behavior.
06/10/2012	longline	toothfish	Southern giant petrel		1	Bird made contact with mainline during setting and flew away uninjured.
20/10/2012	longline	toothfish	Giant petrel	1		Bird hooked in the beak during setting.
21/10/2012	longline	toothfish	Southern giant petrel	1		Bird hooked across the shoulder and dragged underwater during setting.

* - fate unknown so assumed to have died.

Marine mammal interactions with fishing gear

Date	Gear	Target species	Mammal species	Life status		Details
				Dead	Alive	
13/10/1998	trawl	toothfish	Antarctic fur seal	1		Landed in trawl gear and was dead when observed. Observers unable to determine time or cause of death.
27/10/1998	trawl	toothfish	Antarctic fur seal		1	One male Antarctic fur seal was landed in trawl gear alive and was released unharmed.
28/09/2000	trawl	toothfish	Antarctic fur seal	1		Found dead in fish pound. Occurred during towing or hauling.
17/04/2001	trawl	toothfish	Antarctic fur seal		1	Found in net. Herded down stern ramp
11/09/2001	trawl	toothfish	Antarctic fur seal	1		Discovered in fish pounds with catch.
21/09/2001	trawl	toothfish	Antarctic fur seal	1		Found dead in cod end
24/09/2001	trawl	toothfish	Antarctic fur seal	1		Discovered in net
01/10/2001	trawl	toothfish	Antarctic fur seal	1		Discovered in cod end
09/10/2001	trawl	toothfish	Antarctic fur seal		1	Found in net. Released from deck
04/06/2002	trawl	toothfish	Elephant seal	1		Found in codend of the net. Juvenile barely alive, didn't recover.
15/10/2002	trawl	toothfish	Antarctic fur seal	1		Found in net.
24/10/2002	trawl	icefish	Antarctic fur seal	1		Found in net.
14/03/2003	trawl	icefish	Antarctic fur seal	1		Discovered dead in fish pounds with catch.
20/03/2003	trawl	icefish	Antarctic fur seal	1		Discovered dead in fish pounds with catch.
03/06/2003	trawl	icefish	Elephant seal	1		Juvenile male found dead in cod end
06/06/2003	longline	toothfish	Elephant seal	1		Seal became entangled in the backbone and presumably drowned. No other seal sightings.
09/06/2003	longline	toothfish	Elephant seal	1		Seal got part of the backbone looped around its neck and was dead when brought to the surface. As this is the second elephant seal to be caught in this area vessel chose to move on
11/06/2003	longline	toothfish	Elephant seal	1		Seal became entangled in the backbone of the longline and was brought to the surface dead. It had presumably drowned.
25/08/2003	trawl	toothfish	Elephant seal	1		After hauling Male 300kg, 2.1 m elephant seal was found dead in holding pounds. Presumed drowned during trawling. Head retained
19/11/2003	trawl	toothfish	Antarctic fur seal	1		Juvenile male (52 kg) found dead in fish pounds following trawling. Presumed drowned during trawling
21/11/2003	trawl	toothfish	Crabeater seal	1		Adult male (750-800 kg). Found dead in net.

Date	Gear	Target species	Mammal species	Life status		Details
				Dead	Alive	
16/06/2004	longline	toothfish	Elephant seal	1		Seal became entangled in the backbone of the line and was brought to the surface dead, presumably drowned. Estimated weight 1.2 tonnes, sex unknown. A snood and hook were trailing from the corner of the seal's mouth.
07/08/2004	longline	toothfish	Antarctic fur seal	1		Seal was hooked in the mouth when it came to the surface. It was not tangled in the line in any way and appeared to have no visible injuries. The snood broke when the animal surfaced and no samples were taken. The seal drifted aft and sank and was presumed dead.
13/09/2004	trawl	toothfish	Antarctic fur seal	1		Seal found dead in the cod end after hauling.
01/07/2005	longline	toothfish	Elephant seal	1		Seal was hooked in the mouth and was dead when reaching the surface. Carcass came off the hook at the surface.
20/08/2005	longline	toothfish	Elephant seal	1		Juvenile male seal weighing approx. 500kgs came up entangled in line.
26/08/2005	longline	toothfish	Elephant seal	1		Juvenile male seal weighing approx. 700kgs came up entangled in line.
21/09/2005	trawl	toothfish	Antarctic fur seal	1		Seal found dead in codend after hauling. Male. 1.62 m, piece of rear flipper retained.
16/06/2006	trawl	toothfish	Leopard seal	1		Seal found dead in the cod-end, weighing approx 150 kgs and 2.3 m in length.
27/10/2006	trawl	toothfish	Antarctic fur seal	1		Seal found dead in the cod-end, approx 150 - 170 kgs, 1.75 m in length, girth 1.4 m. Skin and tissue samples taken.
04/11/2006	trawl	toothfish	Antarctic fur seal	1		Seal found dead in the codend, approx 170kgs, 1.61 m in length and 1.42 m girth. Carcass was not retained. To mitigate against further incidents no shooting or hauling will occur half an hour before or after sunset.
15/11/2006	trawl	toothfish	Antarctic fur seal	1		Seal found dead in codend, approx 155kgs, 1.5m in length and 1.2 m in girth. The body temp was 20 degrees suggesting the seal was caught during hauling. No seals observed during the fishing operation.
16/11/2006	trawl	toothfish	Antarctic fur seal	1		Seal found dead in codend, approx 165kgs, 1.6m in length and 1.23 m in girth. The body temp was 8.6 degrees suggesting the seal was caught early in the operation. 2 seals were observed at the stern of the vessel prior to setting.
18/08/2007	longline	toothfish	Elephant seal	1		Seal tangled in mainline, approx. 900 kgs and 2.3 m in length. Pulled free when came to surface.

Date	Gear	Target species	Mammal species	Life status		Details
				Dead	Alive	
26/10/2007	trawl	toothfish	Antarctic fur seal	1		Male seal found dead in codend, approx. 200 kgs and 2.6 m in length
26/06/2008	longline	toothfish	Antarctic fur seal	1		Seal tangled in mainline
01/09/2008	longline	toothfish	Seal (unidentified)		1	Seal hooked briefly and swam away with no apparent injury
13/09/2008	longline	toothfish	Elephant seal	1		Female entangled in mainline, female weighing approx. 200 kgs.
14/09/2008	longline	toothfish	Elephant seal	1		Male weighing approx. 2000 kgs found entangled in mainline.
03/06/2009	longline	toothfish	Elephant seal	1		Female weighing approx. 200 kgs found entangled in mainline. Photos taken.
11/06/2009	longline	toothfish	Elephant seal	1		Seal weighing approx. 200 kgs found entangled in mainline.
09/08/2010	longline	toothfish	Elephant seal		1	Seal weighing approx. 200 kgs was hauled up on longline and fell off the line when line surfaced. The seal swam away alive.
23/10/2011	trawl	toothfish	Antarctic fur seal		1	Seal discovered in net and was guided down the stern ramp alive and well.
13/05/2012	longline	toothfish	Elephant seal		1	Seal lightly hooked in the lip as it broke the surface. It gave a vigorous flick of its head and the hook came free.
14/05/2012	longline	toothfish	Elephant seal		1	Seal became slightly entangled in mainline when it broke the surface. Swam off vigorously.
05/07/2012	longline	toothfish	Elephant seal	1		Female seal was hooked in the mouth and wrapped around the mainline. It untangled when reaching the surface.