Marine and Freshwater Resources Institute

Options for reducing incidental catch of seals on wet-boats in the SETF: a preliminary assessment.

Final Report to the
Australian Fisheries Management Authority

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ARF Project R01/0887
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Ian A. Knuckey\textsuperscript{1}, Steve Eayrs\textsuperscript{2}
and Ben Bosschietter\textsuperscript{2}

\textsuperscript{1} Marine and Freshwater Resources Institute
PO Box 114
Queenscliff VIC 3225

\textsuperscript{2} Australian Maritime College
PO Box 21
Beaconsfield TAS 7270
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NON-TECHNICAL SUMMARY

R01/0887  Options for reducing incidental catch of seals on wet-boats in the SETF: a preliminary assessment.

Principal investigator:  Ian Knuckey  
Co-investigator:  Steve Eayrs

Address:  
1 Marine and Freshwater Resources Institute  
P.O. Box 114 Queenscliff, VIC 3225

2 Australian Maritime College  
PO Box 21 Beaconsfield, TAS 7270

OBJECTIVES:

1. Monitor rates of incidental catch of seals in the 2001 winter blue grenadier fishery (wet boats)

2. Analyse the spatial and temporal patterns of incidental seal captures throughout the SETF and conduct power analysis on the level of observer coverage required to detect a significant change in seal bycatch.

3. Collate information on the effectiveness of various fishing practices at reducing incidental seal capture.

4. Collate information on current seal research.

5. Hold an Industry meeting to discuss methods of reducing seal bycatch.

6. Report the outcomes of the project to appropriate stakeholder groups.
Non-Technical Summary

The South East Fishery (SEF) is a commonwealth-managed multi-species fishery comprised of both trawl and non-trawl vessels working in the waters off southeastern Australia. Australian and New Zealand fur seals (Arctocephalus pusillus doriferus and A. forsteri, respectively) are commonly found in waters that overlap the SEF management area. Since the introduction of the protection of seals and other marine mammals, the numbers of both seal species has rapidly increased (doubling every 4 - 5 years). Not unexpectedly, SEF fishers have reported more interactions with seals in recent years, especially in the trawl fishery that operates throughout this region.

Under the Environment Protection and Biodiversity Conservation Protection Act 1999 it is the responsibility of fishers to operate in a manner that reduces the risk of seal bycatch and mortality. To this end, a separate project was initiated by fishers and scientists during 2000 to reduce the high seal bycatch by factory trawlers working in the blue grenadier spawning fishery off western Tasmania. The current project was commissioned by the AFMA Environment Committee to address seal bycatch for the non-factory “wet boats” comprising the rest of the SEF trawl fleet.

Information on life history, population dynamics and trophic impacts of seals was reviewed. Australian fur seals are the main species in the region of the SEF, with nine colonies in Bass Strait. Total annual pup production is estimated at about 17,000, of which 30% is at Lady Julia Percy Island and 27% at Seal Rocks. The population size is estimated to be about 69,000 and increasing significantly. The main New Zealand fur seal colonies were to the west of Kangaroo Island in the Great Australian Bight. Their total population size was estimated to be about 57,000 (rising). The main Australian sea lion colonies are also west of Kangaroo Island, but unlike the seals, their population numbers are lower (9000) and relatively stable.

Seals forage by constantly diving to the seabed over a period of up to 36 hours. Observations indicate that seals learn new hunting/foraging techniques and have adapted to exploit net and line fishing vessels. Constrained by the needs of the pups, females tend to forage for shorter periods, closer to the colonies than males. As such, fishery interactions are more likely to be with the males that tend to forage further afield for longer periods. Such interactions may have negligible impact on the long-term reproductive potential of the seals due to the harem nature of seal colonies.
Based on current population estimates of seals and modelling of their dietary requirements, it was estimated that the annual consumption of fish and squid by seals within the area of the SEF, was about 220,000 t of fish per year – more than five times the landed catch of fisheries in this region (~38,000 t). This consumption by seals, and the fishery interactions with seals, is expected to increase significantly in the next 15-30 years as seal numbers continue to rise.

Data from the Integrated Scientific Monitoring Program (ISMP) were analysed, revealing that seals were caught in shelf waters throughout all regions of the SEF during all months of the year. The ISMP sampling regime was not designed to be extrapolated to total fishery catch estimates for rarely caught species such as seals, and as a result, estimates differed considerably depending on which stratification (zone, season and depth) was applied. In lieu of any other information however, ISMP estimates showed that annual seal capture rates varied considerably, with an average of about 720 seals caught each year across the fishery (0.02 seals per shot). This equated to about 1 seal every 50 shots in most zones of the fishery, although slightly higher catch rates were recorded in western Tasmania and western Victoria. Indications are that about one third of these captured seals were released alive. Recent development of an industry Code of Fishing Practice with a special section on seal bycatch is expected to reduce the likelihood of seal capture and improve their survival rates. The efficacy of the Code of Practice with respect to seal bycatch is discussed.

Based on the ISMP data, the level of monitoring required to accurately detect any change in seal capture levels was estimated using power analysis. This showed that more than 4000 shots need to be monitored to detect a 100% increase or 50% decrease in the seal capture rate. This is more than five times the current ISMP sampling level.

Seal interactions with wet boats were monitored during the 2001 spawning blue grenadier fishery. Eight trips, incorporating 59 sea-days, 38 fishing days and 99 individual shots were monitored. A total of 9 seals were captured of which five were released alive. All were Australian fur seals. The total seal capture rate was 0.081 seals per shot (one seal per 12 shots) and mortality rate was 0.030 seals per shot (one seal per 33 shots). Fifty eight percent of shots observed during the study had no seals present either during shooting or hauling. The number of seals sighted during hauling (162) was almost twice that observed during shooting (89). During one haul, 28 seals were observed. Although nets were hauled at various times throughout the day, most of the seals were sighted between 10:00 and 19:00 hours. Seals were sighted in any wind or sea conditions.
The background research and analysis work mentioned above formed the basis of a 1-day workshop where industry and other stakeholder groups considered the issues and discussed options that might be suitable to reduce seal bycatch in the SEF trawl fishery (wet boats). The outcomes of the workshop are discussed.

Views of the different stakeholders were presented at the workshop. These views differed greatly, but it was apparent that all stakeholders clearly believed in the need to reduce the capture of seals and a zero bycatch was the ultimate goal. Methods to reduce seal captures were discussed including application of the Industry Code of Conduct, deployment of Seal Excluder Devices (SEDs) and use of seal deterrents. The relative merits and problems with each of these approaches are discussed.

Whether one or a combination of these approaches may be suitable to reduce seal captures on wet boats in the SETF would need to be tested as part of a broader research project. It was apparent, that such a project would require considerable resources, extensive industry support, and liaison between all stakeholders. There appeared to be a number of reasons that had prevented this occurring to date, not the least of which was finding the human and financial resources to drive such a project. Until this hurdle is overcome, workshop participants realised that progress to better understand seal/fishery interactions and further reduce seal captures by fishing vessels would be a slow and frustrating process.
BACKGROUND

The South East Fishery (SEF) is a commonwealth-managed multi-species fishery comprised of both trawl and non-trawl vessels working in the waters off southeastern Australia. Australian and New Zealand fur seals (*Arctocephalus pusillus doriferus* and *A. forsteri*, respectively) are commonly found in waters that overlap the SEF management area (Figure 1). Since the introduction of the protection of seals and other marine mammals under the National Parks and Wildlife Protection Conservation Act 1975, the numbers of both seal species has rapidly increased; *A. doriferus* currently numbers an estimated 60,000 while *A. forsteri* is reportedly doubling in numbers every 4 - 5 years. Given this increase, it is not unexpected that SEF fishers have reported more interactions with seals and fishing gear in recent years.

The protection of seals is now legislated in the Environment Protection and Biodiversity Conservation Protection Act 1999. Under this legislation it is the responsibility of fishers to operate in a manner that reduces the risk of seal bycatch and any live seals that are caught must be released to the sea uninjured.

Due to an alarmingly high incidental catch of seals by factory trawlers working in the 1999 blue grenadier spawning fishery, a collaborative project by fishers and scientists was undertaken in 2000 to reduce seal bycatch in this fishery (Tilzey, 2000). An industry-initiated code of fishing practice was introduced, and trials of a rigid inclined grid known as a seal excluder device (SED) were initiated. The results of these initiatives have yielded some positive results.

The AFMA Environment Committee has identified the urgent need to address seal bycatch for the remainder of the trawl fleet in the SETF. The development of techniques to avoid seal catches is also a high priority in the SETF and GAB Bycatch Action Plans. This project is designed to be the first step in that process. It comprises a strategic approach in which available information from three relevant areas is analysed and presented at an industry meeting where future options to reduce the bycatch of seals can be discussed. The source of the available information is highlighted below.

The Integrated Scientific Monitoring Program has been in operation since the mid 1990s, and has collected information throughout the fishery on the incidental capture of seals by the trawl
and Danish seine fleet. This information was augmented by extra monitoring of the wet-boat catch of seals during the 2001 winter grenadier fishery undertaken as part of the current project. All of the ISMP data has been recorded on a shot-by-shot basis and accurate information on the time and place of capture is available. This information will be analysed to provide an insight into the spatial and temporal trends in seal bycatch and indicate the level of monitoring that would be required to accurately detect any change in capture levels.

Industry has prepared a Code of Fishing Practice with a special section on how to minimise the incidental capture of seals. Through its involvement in the work undertaken on the factory vessels in the winter grenadier fishery last year, AMC has collected limited information on the effectiveness of these various methods, including the use of Seal Exclusion Devices. The effectiveness of these methods is discussed.

There has been significant research undertaken on seal stocks in south eastern Australia. Information on their migrations and feeding behaviour and the location of major seal colonies with respect to fishing effort in the SETF has not, and should be collated.

**OBJECTIVES**

1. Monitor rates of incidental catch of seals in the 2001 winter blue grenadier fishery (wet boats)

2. Analyse the spatial and temporal patterns of incidental seal captures throughout the SETF and conduct power analysis on the level of observer coverage required to detect a significant change in seal bycatch.

3. Collate information on the effectiveness of various fishing practices at reducing incidental seal capture.

4. Collate information on current seal research.

5. Hold an Industry meeting to discuss methods of reducing seal bycatch.

6. Report the outcomes of the project to appropriate stakeholder groups.
METHODS

Data collection

Trained observers endeavoured to spend a total of 40 days at sea onboard wet boats during the 2001 blue grenadier spawning fishery. In general terms, this fishery operates in the western Tasmanian Zone (Figure 1) between June to August inclusive. About half of this sea-time (20 days) was provided as part of the current ISMP project. The other 20 sea-days were undertaken by Mr. Ben Bosschieter using funds made available for this project. Typical ISMP information on the fishing activities were collected during each trip, including the date, time and location of each shot, catch composition of the retained and discarded portions of each shot and length frequency information on the main species. Additional information recorded by the observers during the current project included information on seal numbers, time and position of seal observation, fishing activity at the time of seal observation, and seal catch rates. Collection of seal interaction data was based on techniques developed during the SED-factory trawler project (see attached data sheet).

The daily observations were used as a guideline to obtain some spatial and temporal patterns of seal sightings. Whereas the hauling and shooting observations were used to ascertain seal numbers before and after each shot, hauling and shooting rate, total catch and nearby vessels.

Daily observations of seals were undertaken every 4 hours (daylight hours) and analysed with regard to information gathered simultaneously such as wind speed and direction, sea height, visibility, precipitation, number of seals, species, sector, ship activity and net location.

Analysis of ISMP data

Data collected during this project from the wet boats working on the west coast of Tasmanian during the 2001 was combined with all available ISMP data for the analysis. This information was collected on a shot-by-shot basis and generally has accurate position, depth and environmental information. The data was analysed to determine spatial and temporal trends in seal catches across the fishery. Correlations between seal captures and the region and depth of fishing were investigated. Geographic Information Software (GIS) was used to display the spatial and temporal trends in incidental seal catches and fishing effort.
**Power analysis**

A power analysis was undertaken to determine what level of observer coverage would be required to detect a given change in seal bycatch rates. Put simply, this provided an indication of what change in seal catch rates could be detected by the current ISMP, or alternatively, how much more/less coverage would be needed to statistically detect a significant increase or decrease in seal catch rates.

The distribution of seal capture rates was based on ISMP data. Preliminary analysis of these data was undertaken to determine the normality of variance. Normal, log-normal and binomial distributions were examined. A matrix of the number of shots that need to be monitored in each SEF zone (Figure 1) to provide 80% power to detect a statistically significant change ($a = 0.05$) in seal capture rates (in steps of 20%) was produced.

**Potential value of the Code of Fishing Practice**

The efficacy of the Code of Fishing Practice and the effectiveness of various fishing practices in reducing seal catches were examined based on observations by the trained observers, information sourced from the factory boats, anecdotal reports and the various literatures. The application of the Code of Fishing Practice including the potential use of seal excluder devices on the wet boats was also examined.

**Collation of seal data and seal projects**

A significant amount of work has already been conducted on the distribution of seal colonies and other aspects of their biology and life history. Dr Simon Goldsworthy (La Trobe University), Dr John Arnould (University of Melbourne) and Dr Peter Shaughnessy (CSIRO) were invited to present a summary of the research that was currently being undertaken on seals. This was presented at the workshop discussed below.

**Industry workshop to discuss seal bycatch issues**

The background research and analysis work mentioned above formed the basis of a 1-day workshop with industry and other stakeholder groups to discuss options that might be suitable to reduce seal bycatch in the SEF trawl fishery (wet boats). This was considered an important aspect of the project as it combined the knowledge of fishers with that of managers, conservation groups and seal and fishery scientists to plan the most appropriate way forward to overcome this issue.
RESULTS & DISCUSSION

Seal captures during the 2001 blue grenadier spawning fishery

A total of 59 sea-days were undertaken to monitor seal interactions with wet boats during the 2001 spawning blue grenadier fishery (Table 1). Of these sea days, 35 days were monitored by ISMP observers as part of their standard SETF sampling, and 24 days were monitored by an additional observer (Mr Ben Bosschieter) funded through the present study. Unfortunately, extremely bad weather during one of the ISMP trips (Trip 5) resulted in the vessel being layed-up behind an island for over a week and not fishing in the typical spawning grenadier area. This significantly reduced the number of actual fishing days that were monitored during the project. Nevertheless, the project easily achieved the target of 40 sea-days of monitoring during the blue grenadier spawning fishery.

Although most of the trips were undertaken in what is considered as the typical blue grenadier spawning fishery (off Western Tasmania during June to October), some trips fell slightly outside these criteria. Trip 1 was conducted within the spawning fishery prior to the project being initiated, so although seal captures were recorded, seal sighting data were not collected. Trip 7 was conducted off western Bass Strait but during the main spawning run. Trip 8 was conducted in the main spawning area off western Tasmania, but slightly after the main spawning run. Overall, during these eight trips a total of 38 fishing days were monitored incorporating 99 individual shots over 695 fishing hours. These data have been used to provide an estimate of seal capture rates and sightings for the project.

During the monitoring program a total of 9 seals were captured across the 99 shots; all were Australian fur seals. Five of the seals were released alive and four were dead. Of the four mortalities, three were considered to have died as a result of being caught in the trawl net during the shot. One of the seals had clearly been dead for several days as evidenced by its state of decay and was not been used in the catch rate analysis. Thus, the total (dead and alive) seal capture rate for wet boats was 0.081 seals per shot and the seal mortality rate was 0.030 seals per shot.

Seal sightings during the 2001 blue grenadier spawning fishery

The number of seals sighted around the boat was recorded at regular four-hourly intervals and an independent count was made when the vessels were shooting and hauling. In all except one instance, the seals that were sighted were recorded as Australian fur seals. The exception
was a single female Australian seal lion that approached a vessel when it was layed up behind an island during bad weather (Trip 5).

Sighting data from the shooting and hauling observations were analysed to provide the following results. Fifty eight percent of shots observed during the study had no seals present either during shooting or hauling (Figure 2). Thirty eight percent of shots had seals present during hauling, and 19% of shots had seals present during hauling but not shooting. Only 23% of shots had seals present during shooting.

The number of seals sighted during hauling (162) was almost twice that observed during shooting (89). On a per-shot basis, the mean number of seals sighted during hauling was 2.05 seals/shot compared to 1.03 seals/shot during shooting (Figure 3). Although there was a large amount of variation in the number of seals sighted during a shot, a paired t-test revealed that significantly more seals were observed during hauling than shooting ($t_{78} = -3.206$, $P<0.05$). The data were double square root transformed to gain homogeneity of variances (to overcome the large number of shots with zero seals). There were many shots in which no seals were observed either shooting or hauling but during one haul, 28 seals were observed. A frequency distribution of the number of seals observed per shot is given (Figure 4).

The obvious explanation for the larger congregations of seals during hauling is that there was more food available to attract the seals to the boats at that time. The seals would then often remain around the vessel: initially eating the fish caught in the trawl net and later, eating the fish that were discarded. Thus, when there was little time between the last haul and the next shot, the same seals may have been re-counted when shooting away. In this respect, sightings from each shot may not have been truly independent of each other.

There was no apparent relationship between the number of seals sighted during hauling and the weight of the catch (Figure 5). Although nets were hauled at various times throughout the day, most of the seals were sighted between 10:00 and 19:00 hours (Figure 6). It is difficult to determine whether this represents the abundance of seals around the boat or reflects the problems observing seals during darkness.

During the present study, seals were sighted in any wind or sea conditions (0-80kts, 0-8m respectively), although in low visibility it was more difficult to observe if any seals were present. When seals were around, however, they generally followed the vessel until hauling. In the incidents where seals were witnessed following a vessel but were not present during
hauling, there was generally another vessel in the area. Presumably these seals went to follow the other vessels when they began to haul.

Additional results from the daily observations indicate that under the prevailing wind conditions seals would appear in the lee of the vessel and vessels wake during trawling, steaming or hauling. During hauling seals were observed to remain to the lee or stern of the vessel until the net was retrieved to sufficient depth to dive on. At this point, the majority (if not all) seals disappeared and were found again minutes later several hundred metres back feeding on the trawled catch. This often occurred before the headline was visible to the observer. In general when seals were present they would stay close to the vessel until hauling or another vessel nearby was hauling their gear.

Although not analysed quantitatively, seal behaviour varied throughout the day. Often early in the morning the seals were found to be ‘playing’ with the fish throwing them around rather than attempting to eat them. Later in the day, however, seals tended to be more actively feeding and became more aggressive in their behaviour - ripping fish from the net. In particular, large males were the most aggressive, often ripping at the netting to get the fish paying little attention to the presence of the vessel or crew. Females and young pups were also witnessed on several occasions actively feeding from the trawled catch.

**Analysis of ISMP data**

The ISMP has been designed to estimate the discard rates of individual quota species and grouped non-quota species within specified error bounds (coefficients of variation – CVs). Predicted achievement of these CVs for discard rates determines the sampling intensity of the ISMP and hence the number of shots that are monitored. With an overall coverage of shots of about 2.5%, the ISMP has achieved the target CVs for nearly every species during the last four years of operation. The ISMP was not designed to provide accurate estimates of the catch rate of rarely caught species, such as seals. As such, one must be very cautious when interpreting the ISMP data on seal captures. Nevertheless, as the only information that is available on seal captures in the SETF, the ISMP data have been analysed to provide an indication on capture rates in the fishery.

Each year, 30,000 to 40,000 shots are carried out by SETF trawlers across the different zones of the fishery Table 2. Of these, about 700-900 shots are monitored by the ISMP (Table 3). Of the shots monitored by the ISMP, 121 seals have been caught since 1993 (Table 4).
Captures of seals have been recorded throughout most regions of the SETF where fishing effort occurs (Figure 7). Thus, these figures can be simply weighted-up to provide an estimate of seal capture rate in the fishery of about one seal for every fifty shots. It is apparent, however that there are some spatial and seasonal patterns in seal capture rates. Averaged over the years, seal capture rates tended to be higher in western Tasmania (0.03 per shot) than elsewhere in the fishery (<0.02 per shot) (Figure 8). Generally, the seals were caught in shots on the continental shelf in waters less than 200m depth, although they were caught in deeper shots in western Tasmania and western Bass Strait (Figure 9). Also, the incidental catch of seals was lowest during summer and peaked during winter (Figure 10). It was possible therefore, to stratify the fishery to try and obtain different estimates of the incidental catch of seals in the fishery based on zone, season and depth (and their combination). Depending on the stratification used, estimates for any particular stratum could change significantly, highlighting the problems of using the ISMP data in this manner. Because there was no alternative data to enable a decision or preference for any particular stratification method, the average of all methods was used to provide an indication that the number of seals captured in the SETF is about 720 per year (Table 5).

It is important to note, that as one of over four hundred species caught by SETF trawlers, extensive biological data are not recorded on seals by ISMP scientists – simply the weight and number of seals caught in the net. Only during the last year, has information on the life-state of seals been regularly recorded. The ISMP information available suggests that about 32% of the seals that are captured are released alive. Using the above estimate of total annual seal captures, it can be estimated that the average number of seals that die from being caught in SETF trawl nets is 490 per year. This may be a slight over-estimate, as some of the seals were obviously been dead before they were caught by the trawl.

Power analysis

Based on the power analysis undertaken on the ISMP data, the level of monitoring required to accurately detect any change in seal capture levels was estimated. The number of shots that would need to be monitored to detect different levels of increase or decrease in seal capture rates is shown in Table 6 and Table 7 respectively. Different monitoring levels were required in the various zones to detect the same amount of change. Basically, greater monitoring levels were required in the West, Bass Strait and East A zones than in East B, East Tas or West Tas. As an example, to provide 80% power to detect a 50% decrease in seal capture rates (a = 0.05) would required monitoring of over 4000 shots across the
different zones. The same level of monitoring would also detect a 100% increase in seal capture rates. This is more that five times the current ISMP sampling level. Put another way, at current levels of monitoring, the ISMP would have 80% power to detect an increase of 300% or a decrease of 70-80%. Thus, at the current level of monitoring, there would have to be a very sizeable change in seal capture rates before a statistically significant change could be detected.

Effectiveness of modified fishing practices at reducing incidental seal captures.

The Code of Fishing Practice introduced by SETFIA in May 2000, was analysed to verify its efficacy in reducing seal catches. The sections of the code below (in italics) were taken from Section 4: Fishing Practices and Section 5: Seals onboard. For each section, the present degree of application of the Code reported by the observers and its effectiveness in reducing seal captures is discussed.

To date, the Code of Fishing Practice has been sent to all trawl operators and promulgated by industry champions. A laminated copy of Section 4 has been provided to each operator to be put up in the wheelhouse, where it is easily available. On a fleet-wide basis, it is difficult to gauge the uptake and effectiveness of the Code of Practice on fishing activities. The section below provides an indication of its effectiveness on the vessels that took part in the wet boat observer program during the current project.

Section 4.1 A co-operative approach by large factory trawlers and small fresh-fish vessel operators is needed to foster safety at sea and reduce by-catch of marine mammals (p3).

Overall, vessel operators involved in this project were aware of the Code of Fishing Practice and practiced safe sea procedures and did not intentionally induce by-catch of marine mammals.

Section 4.2 Standard watch keeping practices will be observed (p3).

On all vessels observed during this project, standard watch-keeping practices were observed as per maritime legislation. Seal watch-keeping was also carried out by vessel crews during hauling and deployment of gear. When and if seals were captured in the trawl gear, most crew knew what to do and acted accordingly.

Section 4.3 If seals or marine animals are sighted adjacent to stern of the vessel when gear deployment is about to occur, deployment should be delayed until the animals have dispersed (p4).
On several occasions gear deployment was undertaken while seals could still be sighted to the stern of the vessel. It should be noted, however, that in contrast to factory vessels, wet boats discard relatively greater amounts of bycatch and offal overboard, and over a longer period of time. As a result, seals tend to congregate and stay around the vessel after the catch has been brought aboard, waiting for the potential food provided by the discards. In such cases, deployment of gear to shoot on a mark whilst seals are not present is difficult due to their persistence in following these vessels.

Section 4.4 Whenever marine mammals are brought on board in fishing gear, all efforts must be made to ensure they are released unharmed (p4).

In this project the vast majority of operators and crew made every effort to ensure that captured seals were released alive. This included modifying gear retrieval speed, taking care not to injure or suffocate the seal under the weight of the catch and directing landed seals back into the water. In almost all instances these techniques were successful, although on several occasions seal mortality was unavoidable due to unforeseen events (e.g. gear entanglement, large catches).

Section 4.5 Deployment and hauling of gear must be carried out as rapidly as possible to minimise the time that gear is in the top 150m or so of the water column where seals are most likely to be encountered, i.e. the normal diving range of the species usually encountered in the fishing areas. This has been found to be one of the most effective methods of avoiding the accidental capture of seals (p4).

In general, vessels exercised expedient deployment and hauling of the trawl gear and attempts were made to discourage seals away from entering the trawl. This was achieved by turning the vessel immediately following retrieval of the otter boards (before the net reached the surface) and by expediting the hauling speed. Both manoeuvres are designed to close the trawl mouth as the net nears the surface.

Section 4.6 Fishing masters and skippers should adopt whatever techniques are available to close the trawl opening during recovery to minimise the opportunities for seals to enter the net. These manoeuvres may include turning at the end of the haul to collapse the net mouth and/or slackening off one warp when hauling. NONE OF THESE MANOEUVRES SHOULD BE EXECUTED IN A MANNER WHICH COULD JEOPARDISE THE SAFETY OF THE VESSEL OR THE CREW (p4).

Observations indicated that skippers could reduce the chances of seal capture through vessel manoeuvring and techniques to close the trawl mouth. In general turning the vessel and/or slackening off one warp whilst seals were present effectively narrowed the chance of capture.
Section 4.7 Where any difficulties arise, the headline and ground rope should be hauled on board as quickly as possible. If this cannot be done, the net should be towed at a depth greater than 150 meters to a location some distance from the fishing area where the problem can be rectified (p4).

During retrieval of the trawl gear, the entire net (including headline and ground rope) was generally hauled onboard as quickly possible with due regard for weather conditions and crew safety. Under normal circumstances the trawl gear was hauled onboard within minutes of the net reaching the sea surface. On one occasion however a seal was observed inside the trawl, but additional netting was entangled around the trawl making it difficult to retrieve. However, expedient untangling of the entwined netting and reduced hauling speed (i.e. allowing it to float better), allowed the seal to breathe and enabled an effective (live) release of the animal.

Section 4.8 During the course of any trawl shot, the vessel must not execute turns or changes of direction with the doors deployed and the net mouth open near the surface. If fishing along defined courses, such as a narrow shelf edge, the net should be recovered at the end of each line and shot away again after the turn has been made (p4).

In all observations recorded throughout the project no turns were made with the net mouth near the surface, nor were there any changes of direction with the gear above 150m. Gear was sometimes ‘flown’ over obstacles but this did not occur within 150m of the surface.

Section 4.9 Watch keepers should be posted during deployment and recovery of trawls, day and night, to detect any marine mammals, which become enfolded, or caught at the surface, so the animals can be rapidly and humanely released (p5).

Watch keepers were used on all vessels during the deployment and hauling of gear. When seals were observed captured inside the trawl at the surface, operators generally expedited hauling of gear thus allowing the seal/s in most instances to be released alive.

Section 4.10 During night trawling, the after gantry lights should be switched off when not required for shooting and hauling. Lights attract bait, squids, small fish and birds to the vessel. These are followed by seals and other marine mammals, which may use the vessel lights as a final cue to the location of the vessel (p4).

Gantry lights were not always turned off after deployment of the trawl gear during night trawling. Whilst there were 2 captures of Australian fur seals at night their mortality was due to being either crushed by the weight of the catch or by drowning in the gear. Their initial attraction to the vessel may have been from the gantry lights being switched on during haulback. In both instances the gantry lights had been switched off throughout the towing
period. On vessels that left gantry lights on continuously no seals were captured. Whilst in theory during night trawling, after gantry lights should be switched on only for shooting and hauling of the gear (to minimise the attraction of baitfish to the vessel and possible attraction to seals), there appeared to be in practice little difference between leaving the lights on or off in this particular study.

SECTION 5 SEALS ON BOARD

Section 5.1 If a seal is observed coming aboard trapped in folds of netting, stop hauling as soon as it is heaved on deck past the stern ramp roller. Release the animal as quickly as possible. If a swell is running or the net is full and tight, secure the strop around the net below the animal to take the weight of the net, slack off and release the animal (p4).

Seals when observed captured in a trawl were usually handled as per the Code of Fishing Practice, and every attempt made to expedite their safe return to the water. On one occasion however (as mentioned in section 4.5) a short delay in trawl retrieval caused the drowning of a seal.

Section 5.2 As far as possible animals trapped inside the forepart of the net should be freed as soon as they arrive on deck without netting “frills” that may cause the seal to suffer or eventually die (p4).

On several occasions seals were reported in the forepart of the net as the gear was hauled onboard. In all instances the seals were carefully freed from the net and guided back into the water; in total this action resulted in 5 seals returned (alive) to the water.

Section 5.3 If the catch is large and the seal is visible it should be cut free immediately. If the catch is small, a seal can be tipped carefully onto the deck with the fish (p4).

This practice was generally observed as outlined in sections 4 & 5. However, on one occasion the observer noted a captured seal in the codend as the catch was being hauled onboard. As the catch was reasonable large, it was hauled onboard in small, manageable amounts as per normal operating practice. By the time the seal was hauled onboard it was dead, despite no appreciable delays in catch retrieval. It was not known if the seal was dead before the net was hauled to the surface or died during retrieval of the catch.

Section 5.4 Seals on deck should be restricted to an area close to the ramp and prevented from gaining access to other parts of the vessel. Seals can be moved around the deck using fire hoses, sheets of plywood, nets or choker poles (Appendix B.). Animals manoeuvred onto the ramp will usually enter the water of their own accord. When handling frightened active seals on deck or below, extreme care should be taken at all times. Their bites can be very severe (13.1) (p5).
When seals were released onboard all hatches and doors were shut. In some instances however the seals were reluctant to move back towards the water and the use of a deck hose as per the Code appeared to be largely ineffectual; in contrast the seal appeared to enjoy the stream of water. The seal eventually retreated voluntarily back to the water unharmed. On other occasions large male seals made aggressive movements and barking noises at the crew before jumping back into the water. More often than not, the seals entered the water of their own accord.

SECTION SIX IDENTIFICATION OF SPECIES

Wherever possible, live seals that are released and dead seals that are dumped at sea should be identified to species. Appendix C provides relevant details and illustrations (p5).

Seals were identified to species by the observer, however whilst the observer was onboard no formal attempt was made by the skipper or crew to identify seals before being released dead or alive.

SECTION EIGHT OFFAL DISPOSAL

Seals are attracted to vessels and will feed on fish scraps and offal dumped from factory chutes and from cleaning operations. Wherever possible, on factory vessels all fish offal and waste should be converted to meal or incinerated. On non-processing vessels where this is not possible offal can be dumped while the vessel is moving, but NOT when engaged in deploying or hauling gear. Preferably, offal should be dumped away from the trawl grounds, so as to divert marine mammals from the fishing area (p5).

Offal disposal is unavoidably a part of the wet boat fishery. On certain occasions processing and disposal of bycatch continued through deployment and hauling manoeuvres.

Seal workshop

A workshop was held at which the above information was presented to a range of stakeholder groups including industry, managers, researchers, and conservation groups (government and NGOs). The aim of the workshop was to discuss this information and, in light of relevant input from the various stakeholders, determine a way forward to address the seal issue on the wetboats in the SETF.

The following people were present at the workshop: John Arnould (University of Melbourne), Ben Bosschieter (Australian Maritime College), Rebecca Brand (HSI), Barry Bruce (CSIRO), Steve Buckless (SETFIA), Campbell Davies (National Oceans Office), Steve Eayrs (AMC), Geoff Fuller (SETFIA), Simon Goldsworthy (Latrobe University), Ian Knuckey (MAFRI)
The first half of the workshop was used to present the current research on seals and the information available from various monitoring programs in the SETF. The perspectives of the different stakeholders were also presented. The second half of the workshop was directed at discussing options to reduce seal bycatch and developing a way to progress these options.

The workshop was successful in bringing all stakeholders to a similar level of understanding on the population dynamics, foraging behaviour and trophic interactions of seals in south eastern Australia. The level of interaction of the fishing industry with seals was also elucidated. The following presents a summary of the perspectives of the different stakeholder groups. These perspectives were not necessarily supported by all of the participants at the workshop.

**Current seal research**

The life history of Australian fur seals is reasonably well understood. Females live to around 21 years of age, which is slightly older than the male life expectancy (17 years). Full-grown males weight between 160-290 kg (220kg average). The smaller females usually weigh between 50-120kg (76kg average). Sexual maturity is reach after 3-4 years for females. Males reach maturity at 4-5 years, but most are unlikely to successfully mate until they are 8-13 years old. They have an annual breeding period between late October – mid December. A single pup is suckled for around 10 months.

**Status of Australian seal colonies**

Dr Peter Shaughnessy presented information on the location, status and trends of seal colonies in south-eastern Australia. The broad distribution of seal colonies revealed that the major colonies of seals in the region of the SEF are the Australian fur seal (Figure 11). The main New Zealand fur seal and the Australian sea lion colonies were on Kangaroo Island and west of it into the Great Aust Bight.

Estimation of the abundance of seals is made by monitoring the pup numbers, as that is the only recognisable age class that is ashore at one time. A pup multiplier is then used to
estimate total seal numbers. Direct counts and mark-recapture techniques may be used to estimate pup numbers.

Dr Shaughnessy revealed that there are 31 colonies of New Zealand fur seal (13 South Australia, 17 Western Australia and one in Tasmania) with a total annual pup production of about 14,000. About 50% of this production is at Neptune Is and 30% at Kangaroo Island. Over the last decade until 2000, there has been a continual 10% increase in pup numbers (Shaughnessy and Denis 2001, Figure 12). Total population size is estimated to be about 57,000.

There are nine colonies of Australian fur seal, all of which are in Bass Strait. Total annual pup production is estimated at about 17,000, of which 30% is at Lady Julia Percy Island and 27% at Seal Rocks (Shaughnessy et. al. 2000, Figure 13). The population size is estimated to be about 69,000 and increasing significantly.

The Australian sea lion breeds at approximately 70 locations across the Great Australian Bight and the south-west coast of Western Australia. Total pup production during a breeding cycle (17.5 months) is about 2,700, most of which is at the eastern end of their range. Pup production varies, but no trend is obvious – they appear to be stable (Figure 14). Total population size is estimated to be about 9000.

Overall, fur seal and sea lion numbers should be increasing from the over-harvesting that occurred last century. This is occurring for the fur seals, and is likely to result in increased interactions with fishing operations. It is expected that fur seal populations might reach pre-sealing numbers within the next 15-30 years. Numbers of sea lions are stable but they are an endemic species with low population size, so this may be of concern.

Foraging behaviour of Australian fur seals

The foraging behaviour of seals is being studied by John Arnould, who provided the following summary of his research. Diving behaviour is measured by miniature electronic recorders attached to the seals. Most of the research has been restricted to studies of females around Kanowna Is, because females tend to be more susceptible to changes in food availability. Results of this research have shown that male and female seals will constantly dive whilst foraging for food for periods up to 36 hours (Figure 15, Figure 16). Most of the foraging (>70%) involves diving to the seabed. Females foraging behaviour is often constrained by the needs of the pups, so foraging trips during tend only about 3-4 days during
summer and 5-6 days during winter. They then return to the colony (and pup) for between 1-
3 days. Males, on the other hand, are free to roam and may haul-out at various locations.

Satellite tracking devices provide a very accurate means of monitoring seal movements. Seals
have been tracked from all of the major seal colonies in Victoria: Lady Julia Percy Island,
Kanowna Island, Seal rocks and the Skerries (which accounts for >70% of the Victorian seal
population). Prior to the pupping season (July – October), females have been observed to
forage the continental shelf areas throughout south eastern Australia. They may travel up to
500 km from colony and over 1500 km per trip, stopping at other colonies en route to rest.

Dr Arnould has monitored the foraging locations of a few females from the four colonies over
the winter and spring seasons during 2001. Preliminary results are shown in Figure 17-20.
Seasonal annual and individual difference in foraging behaviour may be great and much more
data are required to determine the key foraging areas.

New Zealand fur seals are breeding at 3 colonies in Bass Strait: Lady Julia Percy Is (>20
pups); Kanowna Island (>50 pups); and The Skerries (>100 pups). Tracking results show
some obvious differences to Australian fur seals. New Zealand fur seals tend to be pelagic
foragers, often feeding off the continental shelf for very long trips (up to 22 days). An
example of a New Zealand fur seal track is shown in

Dr Arnould commented that there are bound to be interactions of foraging seals with fishing
vessels. Seals can learn new hunting/foraging techniques and are likely exploit net and line
fishing vessels. He considered that fisheries might impact differently on sexes, as most
interactions would be with the males that tend to forage further afield for longer periods. It
was suggested that such interactions may have negligible impact on the reproductive potential
of the seals due to the harem nature of seal colonies. The potential for trawls to impact on the
benthic foraging habitat was highlighted.

Trophic implications of seals and fishery interactions
Dr Simon Goldsworthy presented a summary of the research he is conducting on the
consumption rates of seals and the trophic implications for the SEF region. Based on current
population estimates of seals and modelling of their dietary requirements, Dr Goldsworthy
estimated that the annual consumption of fish and squid is about 420,000 tonnes across south
eastern Australia (Figure 21). Just within the area of the SEF, seal consumption was
estimated to be about 220,000 fish per year – more than five times the landed catch of
fisheries in this region (Figure 22, Figure 23). This is expected to increase significantly in the next 15-30 years as seal numbers continue to rise.

The implications of these results are discussed in the following abstract from a scientific paper entitled “Trophic interactions between marine mammals and Australian fisheries: an ecosystem approach” by Simon Goldsworthy, Cathy Bulman, Xi He, James Larcombe and Charles Littnan (2002).

The extent of ecological or trophic interactions between marine mammals and fisheries is becoming an increasingly important conservation and fisheries management issue worldwide. In Australia there are economic concerns that increasing pinniped populations will reduce fisheries production, and conservation concerns that increased fishing effort will impact on the recovery and status of pinniped species. This study represents the first effort to synthesize information on these trophic interactions in Australia, and provide a framework by which the nature and extent of trophic interactions between marine mammals and fisheries can be objectively assessed. Here we develop population, bioenergetic and foraging distribution models for the three Australian pinniped populations, and use these to model the spatial distribution of their consumption effort. We then overlaid these with spatial data on the distribution of fisheries catch (available for south-eastern Australia), to identify regions where consumption overlap (and presumably trophic interactions) are likely to be greatest. The estimated total annual consumption by pinnipeds in southern Australia is 419,800 t·y\(^{-1}\), most of which is consumed by Australian (58%) and New Zealand (34%) fur seals, with Australian sea lions (8%) consuming the least of the three species. Within south-eastern Australia, pinnipeds are estimated to consume about 5 times the catch of commercial fisheries. The greatest pinniped consumption effort occurs in Bass Strait and south and west of Kangaroo Island where consumption exceeds 1,000 kg·km\(^2\)·year\(^{-1}\). We developed trophodynamic models using the Ecopath and Ecosim software, for one region of extensive consumption overlap between seals and fishers in eastern Bass Strait, where trophic linkages between commercial and other fish species and seal diet is relatively well known. We used Ecosim to simulate the impacts of increased fishing effort on seal biomass, and increasing seal populations on the biomass of commercial and other fish species over 30-year periods. Seal biomass was found to be relatively insensitive to changes in fishing effort, while increasing seal populations produced positive changes in five commercial species, neutral in one species, and negative changes in the biomass in two other species. Results are very much preliminary, and more research is needed. However, results indicate that pinnipeds are major competitors of marine resources utilized by humans in southern Australia, and are important in structuring the predator-prey interactions of commercial and other species. As fur seal populations and their consumption will likely treble over the next 15-30 years in southern Australia, it will bring about significant changes to marine ecosystems and fisheries production. How these anticipated changes are incorporated into the short and long-term management of commercial fish stocks, seal populations, and marine ecosystems in general, remains an important management challenge.

**Summary of the Winter 2001 Blue Grenadier Fishery Sed Program on Factory Trawlers**

Richard Tilzey provided a summary of the SED program that had been undertaken on the factory trawlers operating in the winter blue grenadier fishery off western Tasmania. This was part of a three year project which is due to be completed in June 2003.
Two factory trawlers, the *FV Aoraki* and *FV Ocean Dawn* operated during the 2001 season. An overall total of 502 shots (252 bottom and 250 midwater) occurred, of which 26 shots (5.2%) contained seal bycatch (Table SED-1). Comparisons between daily seal counts by observers in 2000 and 2001 found seal numbers around vessels in 2001 to be about half those observed in 2000. Why this was so is unclear. The higher incidence of seal bycatch in 2000 (8.6% - 40/466 shots) was probably largely attributable to greater seal abundance on the fishing ground. The overall number of seals caught in 2001 (31) was also about half that in 2000 (59), although the survival rate was much lower. Male seals were again dominant, with only one female being captured in 2001.

*Table SED-1  Summary of 2001 fishing operations and SED use.*

<table>
<thead>
<tr>
<th>TRAWL TYPE</th>
<th>SED TYPE</th>
<th>NO. SHOTS</th>
<th>SEAL SHOTS</th>
<th>% OCCURR'CE</th>
</tr>
</thead>
<tbody>
<tr>
<td>BOTTOM</td>
<td>No SED</td>
<td>112</td>
<td>2</td>
<td>1.8</td>
</tr>
<tr>
<td></td>
<td>SED Closed</td>
<td>80</td>
<td>3</td>
<td>3.7</td>
</tr>
<tr>
<td></td>
<td>SED Open</td>
<td>60</td>
<td>0</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>ALL SHOTS</td>
<td>252</td>
<td>5</td>
<td>2.0</td>
</tr>
<tr>
<td>MIDWATER</td>
<td>No SED</td>
<td>116</td>
<td>6</td>
<td>5.2</td>
</tr>
<tr>
<td></td>
<td>SED Closed</td>
<td>65</td>
<td>7</td>
<td>10.8</td>
</tr>
<tr>
<td></td>
<td>SED Open</td>
<td>69</td>
<td>8</td>
<td>11.6</td>
</tr>
<tr>
<td></td>
<td>ALL SHOTS</td>
<td>250</td>
<td>21</td>
<td>8.4</td>
</tr>
<tr>
<td>ALL SHOTS</td>
<td>No SED</td>
<td>228</td>
<td>8</td>
<td>3.5</td>
</tr>
<tr>
<td></td>
<td>SED Closed</td>
<td>145</td>
<td>10</td>
<td>6.9</td>
</tr>
<tr>
<td></td>
<td>SED Open</td>
<td>129</td>
<td>8</td>
<td>6.2</td>
</tr>
<tr>
<td></td>
<td>ALL SHOTS</td>
<td>502</td>
<td>26</td>
<td>5.2</td>
</tr>
</tbody>
</table>
2001 shot summary
The initial fishing plan was to achieve replicate sets of shots with; (a) no SED, (b) a SED with the escape hatch open and (c) a SED with the escape hatch closed. Statistical comparison between (a) and (b) shots would assess SED effectiveness at excluding seals. Similar comparison between (b) and (c) would assess if a simple grid preventing seals from entering the codend (where most mortality appears to occur) was as effective as an entire SED which is cumbersome to deploy and may attract seals (see below). On the FV Aoraki, underwater video footage from cameras sited on the trawl/SED was to be obtained where possible when SEDs were used.

Few replicate sets were obtained because of a variety of reasons, not the least of which was the need to maintain fish catches at around 20-30 tonnes per day per vessel throughout periods of inclement weather and changes in SED design (see below). During the first half of the fishing season most of the fish caught were large and problems were experienced with fish-loss, the SED grid blocking, bending and, in a few instances, breaking. One shot resulted in about 20 tonnes of blue grenadier jammed in front of the grid, and extensive gear damage was only just avoided. However, an overall spread of 45.4% (a), 28.9% (b) and 25.6% (c) shots was obtained (Table SED-1). Initial analysis of the ‘sets’ showed that the incidence of seal bycatch was too low to be able to calculate statistically rigorous confidence limits. Analysis of pooled data is continuing. No significant difference was found between open and closed SEDs in midwater trawls, although the total number of seals passing through the open SEDs is unknown.

The number of seals caught as bycatch again fell in comparison with those during 1999 and 2000 (Table SED-2), although their survival rate was much lower than in 2000. The 2001 totals do not include 3 seals taken in an aborted Aoraki shot on 1/8/01. Overall fishing effort (no. shots) was similar for each year.

Table SED-2  Seal captures 1999-2001

<table>
<thead>
<tr>
<th></th>
<th>1999</th>
<th>2000</th>
<th>2001</th>
</tr>
</thead>
<tbody>
<tr>
<td>No.vessels</td>
<td>3</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>No. seals</td>
<td>89</td>
<td>53</td>
<td>28</td>
</tr>
<tr>
<td>No. mortalities</td>
<td>87</td>
<td>20</td>
<td>26</td>
</tr>
<tr>
<td>Survival rate</td>
<td>2.2%</td>
<td>62.3%</td>
<td>7.1%</td>
</tr>
</tbody>
</table>
An important 2001 result was that the incidence of seal bycatch in nets with a SED was again (as in 2000) significantly higher (almost double) than that in nets without a SED, further suggesting that SEDs may be attracting seals to the net (possibly through providing access and/or acting as a ‘feeding’ chamber).

The overall incidence of seal bycatch in bottom shots was of a much lower order in 2001 (2.0%) than in the 2000 season (7.6%). Despite the comparatively lower seal numbers in 2001 seal counts, this reduction was possibly also, in part, attributable to improved avoidance procedures by fishers when shooting the net. The 2001 incidence of seals in midwater shots (8.4%) was only slightly lower than that in 2000 (9.6%). In 2000, fishers were still experimenting with avoidance procedures early in the season, whereas they were adhered to throughout the 2001 season.

Comparisons between pooled 2000 and 2001 shot data found no relationship between the distance travelled by a trawl shot and the incidence of seal bycatch, expressed as a percentage of the shots concerned. Similar comparisons between the depth categories of trawl shots found no relationship between the depth fished and seal captures, except for shots at depths less than 200 m. As only a very small proportion (1.3%) of shots fell into this category it is possible that the two recorded instances of seal capture skewed this result. The absence of a relationship in both sets of data suggested that seals were predominantly caught during trawl shooting or recovery (i.e. near the surface).

Underwater video coverage was less than planned as problems were again experienced with gear breakage/failure. Initial footage from bottom trawls showed that visibility was of a very low order because of sediment being stirred-up by the trawl. Cameras were then confined to midwater trawls only. Video footage of 18 shots only was obtained. Observed fish loss through forward facing SED escape hatches was virtually zero.

Several changes to SED design occurred during the season. These were mainly aimed at preventing excessive fish loss and facilitating better fish passage through the SED grid, without compromising the SED’s ability to expel seals. The “standard” design is similar to the SEDs used during the 2000 winter when the backward-facing escape cover was trialled both on the top and the bottom of the SED. In 2001 this was used at the start of the season, but major problems were experienced with fish loss and grid blockage. The escape cover was then modified to face forwards and this appeared to significantly reduce fish loss. Further modifications were made later in the season with the escape cover being located on the
bottom of the SED and steel floats being used. This was hoped to improve water velocity through the escape hatch. The dates shown in Figure 1 reflect the times of use on the FV Ocean Dawn. Communication between the two vessels was continuous and the FV Aoraki trialled similar modifications. The latter vessel also trialled a hinged grid held in an ‘upright’ position by the tension generated by trailing floats attached to the upper edge. The tension was strong enough to resist pressure from a large (300 kg) seal, but the grid folded down when a mass of fish banked up in front of it. This modification was successful in preventing a build up of fish forward of the grid and preventing gear damage. Industry funded 3 days of flume tank trials of several SED modifications at the AMC during October 2001. The major aim of these trials was to assess water flow speeds and directions through the SED(s). The results showed a forward facing water flow speeds and directions through the SED grid.

**Stakeholder perspectives**

*Fishery Management (AFMA)*

AFMA stated that seals were protected under different legislation to which they operated. Nevertheless, AFMA recognised there was a need for a fisheries management regime that endeavoured to minimise the interactions of the fishery with seal populations. Not only was this in line with community expectations, but it also recognised that seals have a negative impact on the fishery both from a practical perspective (seals reduce catches and damage the catch) but also because seal mortality from fishing created negative perceptions from the general community. As a result, AFMA has committed significant resources into reducing seal interactions with fisheries through the development of Bycatch Action Plans for all fisheries and supporting research and monitoring programs that are helping to address the issue (ISMP, FRDC study, Industry Code of Practice, current project).

*Humane Society International (HSI)*

The following is a summary of a written submission by HSI; the full submission is provided in Appendix 2. Preventing wildlife interactions with fisheries is one of HSI’s major campaigns, and seal bycatch is an issue about which HSI receives a lot of correspondence from our supporters. Efforts to address the high level of seal bycatch experienced by the processing factory vessels and the code of conduct that industry has developed have been welcomed by HSI but they are greatly concerned about the capture of seals by the wet boats in the South East Trawl Fishery, which cumulatively may be as high as several hundred seals. They expressed disappointment that little progress has been made to trial Seal Excluder
Devices on the wet boats. HSI welcomed the opportunity to participate in discussions to develop measures to reduce the incidental capture of seals during fishing operations. HSI is calling for AFMA and the fishing industry's efforts to strive for zero seal bycatch. They believe that there should be a legal requirement for parties to use bycatch reduction measures and not simply an industry self-regulated Code of Conduct. Under the precautionary principle, HSI expected SED trials to go ahead on the wet boats in 2002. HSI expressed the view that the SETF Bycatch Action Plan should not be accredited under the EPBC Act until it was substantially improved by having clear mechanisms, timeframes and goals for both government and industry to monitor and minimise bycatch in the fishery. The use of SEDs and seasonal area closures were suggested as options to achieve this goal. Due to reports of fishermen shooting seals during fishing operations, HSI will continue to campaign for legislation to be amended to prohibit the possession of firearms on fishing vessels. In conclusion, HSI welcomed the work that AFMA, EA and the fishing industry have done so far to address the issue of seal interactions in the SETF, but stated that there was a long way to go before their concerns are no longer warranted.

World Wide Fund for Nature Australia (WWF)

WWF stated that it was important to understand where Australia’s community perception lay with respect to the capture of seals by the fishing industry. Articles run in the media about seals clearly are mostly in favor of the seals and it is critical to communicate a ‘we (the fishing industry) care and we are doing all we can’ message in the first instance. WWF believes the lack of a coherent and coordinated approach to resolving this issue is a serious failing. WWF stated it is vigorously promoting the need to address this issue through SETMAC and the new South East Trawl Fishery Ecological Advisory Group. The representative from WWF felt that a concerted effort by the fishing industry to address the issue was required and that there were opportunities to learn from the examples of where there was progress being made to consider and at times mitigate this issue (eg. through the MSC certification processes in the Alaskan Pollock and NZ Hoki fisheries). WWF came to this meeting with the objective of supporting any ‘post-meeting’ coordination efforts and to obtain agreement from stakeholders for the fishery to have an over-arching goal of zero seal bycatch. It was explained that this would clearly set an agenda and send a clear message to the public that all efforts were being made to mitigate this issue. WWF supported the need for communication and publication of data that highlighted the issues and the efforts that industry is making to reduce the capture of seals. WWF requested that clear goals and timelines for
this reduction should be made. The WWF representative put in an apology from Greenpeace but stated that the Greenpeace stance in the issue was clear - stop catching seals.

**South East Trawl Fishing Industry Association (SETFIA)**

SETFIA recognised that the capture of seals was an issue that needed to be addressed by trawl fishers. They highlighted that the trawl fishing industry has been very pro-active in this area and had already committed significant resources and effort to this issue. Among the work they are doing is a three-year industry initiated research program involving the trial of SED’s in the freezer boat component of the fishery, identifying seal behaviour as it relates to fishing, and understanding the seal population risks arising from unintentional seal interactions. In conjunction with seal scientists, industry has also developed a Code of Practice that is proving effective in the mitigation of seal captures. The Code of Practice and been promoted throughout the SETF fleet. Industry has also encouraged further work to be undertaken on seal biology and population dynamics. They explained that their attendance and support for the current workshop is based on a real desire to reduce seal captures by trawlers.

Industry stated that fishery/fur seal interactions was a generic issue across the South East of Australia (bigger than just the trawl industry) and that it needed to be addressed by all fisheries in an integrated way. It was recognised that due to expanding seal populations, this issue had increased over recent years and, based on the information presented at the workshop, was likely to continue to increase. From Industry’s point of view, it was important that stakeholders realised that expanding populations of seals had significant potential to impact on catches taken by the fishery through competition for the same resource – fish. It was highlighted that the fishing industry was keen to push for and support further research to better understand seal population dynamics, their interaction with fishing and ways to reduce the capture of seals. They believed that it was vital to form a steering committee to address this issue on a national level. They were disappointed that efforts to get such a group up and running have repeatedly been thwarted by lack of support from government agencies and that no particular agency appeared willing to take responsibility for this issue. The fishing industry was keen to investigate ways to mitigate seal captures and expressed a willingness to work with any research project and to help address this issue. They were not willing to adopt the use of SEDs on wetboats if there was no evidence that seal captures would be reduced by this measure. They felt most benefits would be to wait for the results of the factory boat study. Industry were keen to aim to reduce seal captures to zero but were well aware that this would be difficult on a practical basis and would encompass a range of legal issues. They
expressed frustration at the current situation in which the lack of an approved management plan left the wet boats “in limbo” with respect to the legalities of recording and notification of seal captures.

**Options to reduce seal bycatch on wetboats**

*Target seal bycatch levels*

Throughout the workshop there was considerable discussion about the goals / targets that should be set with respect to seal captures in the SEF wetboats. While all participants at the workshop agreed that a zero bycatch was the preferred goal, agreement could not be reached on whether a statement to this effect should be a specific outcome of the workshop. The main point of contention was the potential ramifications if a goal, which was otherwise commendable, could not be met in practice. Would it be better to have more practical goals that could be readily achieved? It was generally considered the current available information was not sufficient to be able to determine the likelihood of achieving a zero catch within a certain timeframe; far more quantitative information was required on seal population dynamics and the likely success of seal capture mitigation techniques. Options other than zero bycatch were discussed, such as acceptable levels of mortality or a strategy of continual improvement. Workshop participants could not agree on the best strategy, but ultimately there was agreement that although the long-term goal should be zero, in the short-term, stakeholders should do all that was feasible to reduce the capture of seals.

*Application of a Code of Conduct*

Based on the results of the observer reports, information sourced from the factory boats, anecdotal reports and the various literature, it is possible to comment on the potential application of the Code of Fishing Practice to the wet boat fleet and the implementation of modified fishing practices to reduce seal by-catch.

Overall there seems to be little reason why much of the Code of Fishing Practice, and in particular Section 4: Fish Practices and Section 5: Seals Onboard, could not be adopted by the wet boat fleet in the SEF. Based on the observer reports, knowledge of the Code is widespread and wet boat operators are already implementing most if not all the recommendations for modifying fishing practices and reducing seal mortality. In addition to standard watchkeeping practices, communication between the skipper and watchkeeper or crew already occurs throughout deployment and recovery of the fishing gear, and planning the safe release of captured seals is an obvious extension of this communication. The skipper and
crew already perform effective monitoring of the trawl during retrieval, and captured seals therefore have a high chance of detection before the net is hauled onboard. Modifying the retrieval speed and hauling procedure to ensure captured seals are not injured or drowned are operating practices that are already in place, and the observers noted they greatly maximise the chances of releasing seals unharmed. The use of strops secured to the net below the seal to prevent suffocation under the weight of the catch can potentially be employed as part of the normal process of hauling the catch onboard, and requires little change to current practices.

There are some practices for reducing seal by-catch, however, which were not observed on the wet boats. Tilzey (2000) reported that removing enmeshed fish from the trawl (a.k.a ‘stickers’) before trawl deployment was a procedure successfully adopted by the factory trawlers to minimise seal capture. This procedure could be adopted by the wet boats, however, given the size of the net, time and other operational limitations it may not be feasible to remove all ‘stickers’ from the trawl in readiness for the next trawl shot. Tilzey and Goldsworthy (2001) reported that steaming at 10 - 12 knots for at least 40 minutes prior to deployment was another successfully implemented method used by the factory trawlers to reduce seal by-catch. This option however may not exist for the wet boats given their limited engine power and ability to steam at these speeds, particularly in heavy seas. Moreover, the additional consumption of diesel fuel and associated costs may reduce the desire of fishers to implement such a strategy.

The practice of holding offal onboard before deployment and retrieval of the trawl is another option that could be introduced with minor adjustments to normal deck operations, although any operational or safety issues associated with keeping catch temporarily onboard would need to be addressed. Alternatively, dumping grounds could be established well away from the next shot position.

The introduction of The Code of Fishing Practice in the winter blue grenadier fishery has effectively reduced seal by-catch and increased the survival rate of seals captured in a trawl. The implementation of this Code into the remainder of the South East Fishery should be relatively straight forward given that fishers already practice many aspects of the Code as part of their normal fishing practice.

**Mechanical options (SEDS)**

The introduction of Seal Exclusion Devices (SEDS) to the trawl is an option with some potential for application to the wet boat fleet. The successful introduction and voluntary
adoption of these devices by fishers is, however, strongly linked to their concerns related to fish loss, crew safety, ease of handling, cost, impact on the trawling operation, and fish quality. These devices have been used onboard factory trawlers in the Tasmanian winter blue grenadier fishery since 2000. Some problems have been experienced with these devices throughout the trials, e.g. Tilzey (2000) reported that fish loss through the SED escape hatch was significant and that seals were observed entering the net via this escape hatch. There was also some evidence that bar spacing was too wide, thus enabling seals to occasionally become fouled in the device, and the bars were sometimes bent or broken due to catch induced impacts. Tilzey noted, however, that there was no significant difference in the quality of fish caught with or without the SED. Tilzey and Goldsworthy (2001) also reported problems with fish loss, particularly when the grid became blocked with large catches, despite a bar spacing of 250mm. Unfortunately the option of increased bar spacing may be limited given the perceived likelihood of increased seal fouling in the grid or capture in the codend.

Problems with similar devices in New Zealand (where they have been used in the Squid fishery and are known as Sea lion exclusion devices, or SLEDs) include high catch loss, and handling problems resulting from poor SLED design. Observations by Mr Ben Bosschieter in the squid fishery in 2001 indicated a loss of squid and other commercial species of approximately 10 per cent. This loss was based on catches from a cover-net located over the escape opening of the SLED and may have been influenced by the presence or design of the cover-net. Underwater observations of the SLED indicated that the so-called accelerator panel was orientated horizontally during the tow, and therefore was not effectively guiding squid and fish away from the escape opening. On many occasions the three grids that comprised the complete SLED became deformed; with the middle grid becoming orientated horizontally (Figure 24). The bars of the grids were also frequently bent by catch impacts to the extent that bar spacing became inconsistent. The presence of the SLED occasionally delayed deployment of the trawl, although this was due mainly to poor deployment technique. On these vessels, the net is laid out on deck so that it can stream rapidly over the stern ramp into the water. On several occasions this resulted in the SED being orientated upside down and the net had to be retrieved onboard to turn the device over. On wet boats, however, this deployment technique is not used and with normal operating practice this problem is likely to be seldom experienced.

It has also been noted by the New Zealand Department of Conservation in the Conservation Services Levy Preliminary Autopsy Report 2001 that animals suffered traumatic wounds from
their passage through the net and SLED. However given that they were caught in cover nets to
determine successful ejection, it is not known at what point this trauma occurred.

The issue of SEDs and crew safety should also be considered, particularly when handling the
device in heavy seas and on the smaller wet boats. The SEDs used on factory trawlers in
Tasmanian waters generally comprised of one large grid or two or three small grids hinged
(hammer locked) together, and were usually constructed from stainless steel or other metal.
The complete device can weigh over 100 kgs, will typically measure about 2.5m high and
2.3m wide, and may have half a dozen of more large plastic floats attached to various
locations around the grid. Handling of this device on the deck of smaller wet boats is unlikely
to be easy, and caution required to minimise the risk of injury. Whilst there is potentially
some scope to reduce the size and weight of these devices for the wet boat fleet, any reduction
in size will be limited by the need to provide an adequately sized escape opening for seals to
escape through. Therefore, replacement with lightweight materials may need to be sought
without compromising strength. The replacement of metal grids with lightweight nylon or
plastic material could be an alternative, having been successfully introduced into several trawl
fisheries in the United States. These grids have the added advantage of being flexible enough
to be wound around net drums without permanent deformation.

There was discussion as to the value of introducing SEDs onto wetboats in the SEF in an
effort to reduce seal captures. Based on research from the blue grenadier factory vessels
working off western Tasmania to date, it was unclear whether SEDs reduced the capture of
seals or whether this goal was better achieved by altering fishing practices in accordance with
the Industry Code of Conduct. With this uncertainty, industry were unwilling to commit to
the mandatory introduction of SEDs at this stage, given that it was likely to require
considerable changes to deck practices and may be unworkable and dangerous for smaller
vessels. They also did not want to “re-invent the wheel” with respect to duplicating the work
that is due to finish on the factory vessels in 2003. Nevertheless, there were indications that a
number of industry members would be willing to take part on a voluntary basis in a properly
designed research project to test the efficacy of the Code of Practice and use of SEDs to
reduce seal captures on wet boats.

**Mechanical options (deterrents)**

The value of seal deterrents was also considered at the workshop. One option was the use of
an arc-discharge transducer (Shaughnessy *et. al.* 1981) to frighten seals away from the nets
during setting and hauling. This method has proved effective in research trials and there were
indications that it should be investigated further as a seal deterrent. Interestingly, although the results were encouraging with trawlers, they did not prove effective with purse seiners, which was the aim of the development. Some members of the fishing industry indicated that they would be willing to partake in such work if a suitable research project was implemented.

Strategic plan
As the different topics were discussed at the workshop, it was apparent that all stakeholders were eager to reduce seal captures by wet boats in the SETF. What also became very obvious was that there was a lack of coordinated approach to address this issue on a broad scale. This has ultimately resulted in little overall progress in addressing the issue, due to many of the reasons discussed below.

- No agency has taken the lead and/or responsibility for addressing the issue: it was unclear whether resolution of seal/fishery interactions fell within the jurisdiction of Environment Australia (responsible for protected species) or the Australian Fisheries Management Authority (responsible for fishery). A number of the stakeholders considered that it should probably be the responsibility of a coordinated effort by both agencies as a ‘whole of government response’. (In reality, it is probably a dedicated (funded) person – rather than an agency – and an agreed strategy that needs to drive this. The right person, and funds to support such a person, have not been highlighted and it is recommended that this be resolved).

- The seal/fishery issues (and similar cetacean issues) are of concern for a number of fisheries (state and commonwealth), so some level of complementary and coordinated management arrangement needs to be considered.

- Most of the seal research to date has been undertaken outside of the typical sphere of fisheries research activities and has not specifically endeavoured to address fisheries issues.

- The current seal research is being carried out by a number of different agencies (mainly universities) with limited coordination (other than informal networks) between the research.

- A previous proposal to conduct research on seal population dynamics and the potential interaction with fisheries did not receive a high priority from SETMAC. The current
project working to reduce seal captures on factory vessels in the blue grenadier fishery was supported.

- The type of research and operational facilitation that needs to be undertaken to address this issue has not been clarified, much less the particular objectives of such activity.

- There has been limited funds to undertake this type of work and the source of such funds was not apparent.

- A comprehensive review of progress with mitigation measures for fur seal/fishery interactions outside of Australia has not been undertaken.

Thus, the difficulties in moving forward on this issue were made apparent at the workshop. As a first step to resolving this, workshop participants agreed to form a stakeholder working group and outline a broad strategic approach to address the issue.

It was agreed that the working group would include (but not be restricted to) representatives from the following agencies/areas:

Australian Fisheries Management Authority (Ian Towers)
South East Trawl Fishing Industry Association (Steve Buckless)
National Oceans Office (Campbell Davies)
World Wide Fund for Nature Australia (Katherine Short)
Bureau of Resources Sciences (Richard Tilzey)
and a seal research scientist (John Arnould / Simon Goldsworthy)

Without detailing what would be required in a full research proposal on the seal issue in fisheries, the workshop participants agreed to the general scope of work that could be done in the short term.

- Seek initial funding (from FRDC, AFMA EA – whole of government) to pay for a person to drive the process henceforth and coordinate further work on seal/fishery interactions.

- Following consultation with the main stakeholders, develop a funding proposal to support a Strategic Plan and targeted actions address the issues of seal/fishery interactions.

- Synthesise the information available on seal populations in south east Australia and the fisheries that may have some level of interaction.
- Develop a data collection package that could be used by the ISMP and the fishing industry to collect far more extensive information on the biology of seals that interact with fishing vessels.

- Assess the effectiveness of the Code of Conduct for wet boats in the SETF.

- Assess the effectiveness of SEDs and seal deterrents on wet boats in the SETF.

- Undertake a review (literature and operational) of seal/fishery interactions in major fisheries globally.

Industry members indicated that they would be willing to partake in data collection on seals and other trials to reduce seal captures, but they were concerned about legislative repercussions of reporting seal captures while the management plan for the fishery is yet to be endorsed by EA. This would need to be resolved before industry could be a part of such projects.

One difficulty that was highlighted in discussions about potential research projects on wet boats was the likelihood of inconclusive results. Because captures of seals are a relatively rare event on any one vessel, the probability of proving that a changed fishing practice or the use of a SED resulted in a significant drop in seal captures would be very low. Thus, if a dedicated research program was to operate on a low number of vessels (eg. a control and experiment) it is highly likely that not enough seals would be captured to prove that any process that may reduce seal capture rates was statistically conclusive. To emphasis this point, the power analysis on ISMP data revealed that detection of a 50% decrease in seal captures with 80% certainty would require a monitoring program more than five times the size of the current ISMP. It quickly became apparent that the cost of such a research project may be prohibitive. The alternatives discussed were to reduce the need for statistical proof or to broaden the sampling power used in such a project. The obvious and most cost-effective means of achieving the latter solution is to use industry vessels as the sampling platform on a broad scale across the fishery. In this manner large-scale “experiments” could be conducted to test the efficacy of the Code of Conduct, SEDs and deterrents at reducing seal captures. Obviously, this would require considerable buy-in from industry volunteers and extensive coordination and liaison with all stakeholder groups for it to get off the ground.

Overall, the workshop was felt to be an important event, heralding a change in the way that stakeholder groups will address the issue of seal-fishery interaction. The participation, interest
and attendance of all participants attested to the need to rigorously address the issue and the breadth and depth of presentations and interventions demonstrated the concern there is over this issue. Participants agreed that it was absolutely critical that some form of formal follow-up to this project be supported by agencies concerned in a ‘whole of government’ approach and that an inter-disciplinary, multi-stakeholder process facilitate a long term sustainable outcome for all concerned and for marine ecosystems in the South East. The workshop participants came up against the problem of how such a project would be funded and who would drive it. Ultimately, it was realised that unless there was a serious commitment of resources, progress to better understand seal-fishery interactions and reduce seal captures by fishing vessels would be a slow and frustrating process.
REFERENCES


Further Reading

Table 1  Details of the observed trips and shots undertaken on wet boats working in the blue grenadier spawning fishery during 2001.

<table>
<thead>
<tr>
<th>Trip No.</th>
<th>Observer</th>
<th>Start date</th>
<th>Cruise days</th>
<th>Fishing days</th>
<th>No. shots</th>
<th>Hours fished</th>
<th>Hours steamed</th>
<th>Hours lost</th>
<th>Hours observed</th>
<th>Seals captured</th>
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<td>20</td>
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<td>151</td>
<td>0</td>
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</tr>
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<td>695</td>
<td>256</td>
<td>176</td>
<td>1185</td>
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Note: the mortality of one of the seals was not a direct result of that vessel’s fishing operations.

Table 2  Annual number of SETF shots undertaken in each of the zones.

<table>
<thead>
<tr>
<th>Year</th>
<th>East A</th>
<th>East B</th>
<th>East Tas</th>
<th>West Tas</th>
<th>West</th>
<th>Bass Strait</th>
<th>Grand Total</th>
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* Incomplete data for 2001

Table 3  Annual number of SETF shots monitored by the ISMP in each of the zones.

<table>
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<tr>
<th>Year</th>
<th>East A</th>
<th>East B</th>
<th>East Tas</th>
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<th>Bass Strait</th>
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* Incomplete data for 2001
Table 4  Annual number of SETF shots monitored by the ISMP in each of the zones.

<table>
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<th>Year</th>
<th>East A</th>
<th>East B</th>
<th>East Tas</th>
<th>West Tas</th>
<th>West</th>
<th>Bass Strait</th>
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* Incomplete data for 2001

Table 5  Estimated numbers of seals captured by SETF trawlers calculated using various stratifications of the fishery. Based on ISMP data from 1993 – June 2001.

<table>
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<tr>
<th>Year</th>
<th>Fishery</th>
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<th>Zone Season Depth</th>
<th>Average</th>
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<td>744</td>
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Table 6  The number of shots that need to be monitored in each SEF zone to provide 80% power to detect a statistically significant (a = 0.05) increase in seal capture rates.

<table>
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<th>% Increase</th>
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<th>Shots per Zone</th>
<th>Shots per Zone</th>
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Table 7  The number of shots that need to be monitored in each SEF zone to provide 80% power to detect a statistically significant ($a = 0.05$) decrease in seal capture rates.

<table>
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<th>% Decrease</th>
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<th>West</th>
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<td>10</td>
<td>20</td>
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</table>
Figure 1  Geographical extent of the South East Trawl Fishery and zones used to summarise the spatial distribution of sub-fisheries (from Klaer and Tilzey 1994).

Figure 2  Seal presence during shooting and hauling by wet boats in the blue grenadier spawning fishery.
Figure 3  Mean number of seals sighted during shooting and hauling by wet boats in the blue grenadier spawning fishery.

Figure 4  Frequency distribution of the number of seals sighted during hauling and shooting by wet boats fishing the blue grenadier spawning fishery.
Figure 5  Plot of the number of seals sighted during hauling against the weight of the total catch by wet boats in the 2001 blue grenadier spawning fishery.

Figure 6  Number of seals sighted against the time of day that the net was hauled by wet boats in the blue grenadier spawning fishery.
Figure 7  Spatial capture of seals caught by SETF vessels monitored by the ISMP during 1993 – 2001.
Figure 8 Mean catch rate of seals (+/- s.e.) in the different zones of the SETF. Data are from ISMP-monitored shots during 1993-June 2001.
Figure 9  Mean depth of trawl shots (+/- s.e.) in which seals were caught for each of the sub-fishery zones. Data are from ISMP-monitored shots during 1993-June 2001.

Figure 10  Mean seasonal catch rate of seals across the SETF. Data are from ISMP-monitored shots during 1993-June 2001.
Figure 11  Distribution of Australian sea lion (*Neophoca cinerea*), New Zealand fur seal (*Arctocephalus forsteri*) and Australian fur seal (*A. pusillus doriferus*) colonies in southeastern Australia.

Figure 12  Trend in New Zealand fur seal pup numbers on Kangaroo Island. (from Shaughnessy and Dennis 2001).
Figure 13  Pup production of Australian fur seals at Seal Rocks (from Shaughnessy et. al. 2000).

Figure 14  Pup production of Australian sea lions at Seal Bay, Kangaroo Island. (Shaughnessy unpublished).
Figure 15  Depth profile and frequency of dives by female Australian fur seals over a 48 hour period (Arnould unpublished).

Figure 16  Depth profile and frequency of dives by female Australian fur seals over a one-hour period (Arnould unpublished).
Figure 17  Foraging locations of female Australian fur seals from the Lady Julia Percy Island colony (Arnould unpublished).

Figure 18  Foraging locations of female Australian fur seals from the Kanowna Island colony (Arnould unpublished).
Figure 19  Foraging locations of female Australian fur seals from the Seal Rocks colony (Arnould unpublished).

Figure 20  Foraging locations of female Australian fur seals from the Skerries colony (Arnould unpublished).
Figure 21  Distribution of consumption effort of seals and sea lions in southern Australia (Goldsworthy et al. 2002).

Figure 22  Distribution of consumption effort by commercial fisheries in the region of the South East Fishery (Goldsworthy et al. 2002).
Figure 23  Distribution of consumption effort of seals and sea lions in the region of the South East Fishery (Goldsworthy et al. 2002).

Figure 24  Photograph of a three-grid SED that has effectively collapsed. Note the middle grid is orientated almost horizontally and many bars are bent due to catch-induced impacts. Photo by Ben Bosschieter.
## Appendix 1 – Seal Workshop Agenda

### Reducing Incidental Seal Capture in the SETF

**Agenda**
10.00 am – 5.00 pm October 22, 2001
Hilton Airport Hotel

<table>
<thead>
<tr>
<th>No.</th>
<th>Item</th>
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<tbody>
<tr>
<td>1.</td>
<td>Preliminaries</td>
<td>Ian Knuckey</td>
</tr>
<tr>
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<td>- Introductions / apologies</td>
<td></td>
</tr>
<tr>
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<td>- Housekeeping</td>
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<td>- What are we trying to achieve today?</td>
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<tr>
<td>2.</td>
<td>What do we know about seals?</td>
<td>Peter Shaughnessy</td>
</tr>
<tr>
<td></td>
<td>- Biology</td>
<td>Simon Goldsworthy</td>
</tr>
<tr>
<td></td>
<td>- Life history</td>
<td>John Arnould</td>
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<tr>
<td></td>
<td>- Status of population</td>
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</tr>
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<td>3.</td>
<td>Interactions of seals and the SETF</td>
<td>Ian Knuckey</td>
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<tr>
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<td>- ISMP records (spatial / temporal / life state)</td>
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<tr>
<td></td>
<td>- Summary of results from factory trawler project</td>
<td>Richard Tilzey</td>
</tr>
<tr>
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<td>- Management issues</td>
<td>Ian Towers</td>
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<td>4.</td>
<td>Conservation Perspective</td>
<td>Katherine Short</td>
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<tr>
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<td>Melissa Bran</td>
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<td>- HSI</td>
<td>Tori Wilkinson</td>
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<td>- EA</td>
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<td>5.</td>
<td>Industry Perspective</td>
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<td>- SETFIA</td>
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<td>6.</td>
<td>Lunch</td>
<td>1.00pm</td>
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<tr>
<td>7.</td>
<td>Is there an issue in the wet boat component of the SETF and how big is it?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Zero vs. ‘acceptable’ mortality</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Timeframe</td>
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<tr>
<td>8.</td>
<td>Strategic Plan</td>
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<tr>
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<td>- Partners for an Industry working group?</td>
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<tr>
<td></td>
<td>- Immediate research / monitoring projects?</td>
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<tr>
<td></td>
<td>Funding opportunities</td>
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</table>
Appendix 2 - Written submission by Humane Society International

Preventing wildlife interactions with fisheries is one of HSI's major campaigns, and seal bycatch is an issue about which HSI receives a lot of correspondence from our supporters. We have welcomed the efforts thus far to address the high level of seal bycatch experienced by the processing factory vessels and the code of conduct that industry has developed. However, HSI has been greatly concerned about the capture of seals by the wet boats in the South East Trawl Fishery, which cumulatively may be as high as several hundred seals. We are disappointed that little progress has been made to trial Seal Excluder Devices on the wet boats. HSI welcomed the opportunity to participate in discussions to develop measures to reduce the incidental capture of seals during fishing operations in, but not limited to, the South East Trawl Fishery. HSI is calling for:

**Objective of “ZERO”**
HSI believes the goal for AFMA and the fishing industry's efforts to strive for should be zero seal bycatch. The bycatch of marine mammals is an issue of wide public concern, and HSI expects government and industry to show that they are taking all measures available to minimise the catch of seals in this fishery. Striving for ‘zero’ bycatch of seals in the SETF would be an important indication to the public of industry's desire to do all that they can to eliminate the problem.

**Legally Binding Outcomes**
HSI believes that there should be mechanisms in place to legally require parties to use bycatch reduction measures and not simply rely upon the good faith of parties complying with an industry self-regulated Code of Conduct. Unfortunately, history has shown time and time again that while the majority of resource users are willing to do the right thing and will do so voluntarily - there will always be those that need strict regulation. In the interim, HSI would ask for full transparency in the reporting of the implementation of the industry's Code of Conduct in this fishery. Once measures, such as Seal Excluder Devices are shown to be effective at preventing seal bycatch, all fishing vessels in the SETF, including the ‘wet boats’ should be obliged by law to use them during fishing operations.

**Precautionary Principle**
HSI is disappointed that the trials of Seal Excluder Devices have still not taken place on the wet boats, as they have for the factory trawlers in this fishery, especially considering the
number of seals that are being taken cumulatively by the wet boats. Suggestions that further research needs to be carried out to assess the extent of the problem before commitments to trialing BRDs on the wet boats is contrary to the precautionary approach to environmental management. It is known that the wet boats are each catching small numbers of seals. Multiply that by the number of wet boats in the fishery, and it is clear that there is enough evidence to warrant the application of the precautionary principle. HSI therefore will expect SED trials to go ahead on the wet boats in 2002.

**Bycatch Action Plan**

HSI is aware that the Australian Fisheries Management Authority (AFMA) is planning to send the SETF Bycatch Action Plan (SETF BAP), to the Federal Minister for Environment and Heritage, for accreditation under the *Environment Protection and Biodiversity Conservation Act* 1999. HSI is of the view that the SETF BAP should not be accredited under the EPBC until it is substantially improved. Among other issues, the SETF BAP lacks clear timeframes for both government and industry to work towards the goal of minimising bycatch in the fishery; it does not set clear goals for reducing bycatch, it does not require the mandatory implementation of Bycatch Reduction Devices; and promotes the sourcing of new markets for bycatch species – thus reducing bycatch by converting it into by-product. There also needs to be a reliable percentage of observer coverage on vessels in this fishery to ensure that wildlife bycatch is being adequately monitored, as well as additional mechanisms to ensure compliance and enforcement. HSI finds these weaknesses unacceptable, and will not therefore support the accreditation of the BAP before substantial improvements are made.

**Seasonal area closures**

HSI supports closing areas to all fishing operations on a seasonal basis in areas where there is a high risk of seal bycatch at sensitive times. Once areas and times of greatest risk are identified, such as seal breeding colonies and seasons, these areas should be closed to all fishing operations that may have an impact on these animals. Seasonal closures should also be included in the Bycatch Action Plans.

**Guns off Boats**

HSI continues to receive reports of fishermen shooting seals during fishing operations to try and protect their fishing gear, despite being warned by AFMA in the past that these actions were illegal. We are shocked by anecdotal information we have received which suggests the practice is quite widespread. While all fishermen cannot be accused of taking this action, the
unwarranted and illegal actions of a few are undermining the efforts of the majority of fishermen to be responsible. HSI will continue to campaign for legislation to be amended to prohibit the possession of firearms on fishing vessels.

**Conclusion**

We welcome the work that AFMA, EA and the fishing industry have done so far to address the issue of seal interactions in the SETF. However, there is a long way to go before our concerns are no longer warranted.