

SOUTHERN FISHERMEN'S ASSOC. INC.



smarter fishing for industry

BEST PRACTICES TO MINIMISE INTERACTION OF JUVENILE MULLOWAY, CRABS AND BIRDS WITH FISHING GEAR

Lakes and Coorong fishers consider a healthy and environmentally sustainable ecosystem results in a healthy economically sustainable fishery. Consequently, they endeavour to conduct activities in a manner that minimises any adverse impact and where possible enhance the health of the ecosystem.

Lakes and Coorong Fishery

There are 38 commercial licence holders in the Lakes and Coorong Fishery. Some are third generation fishers, while others are new entrants. They fish in a series of Coorong lagoons and freshwater lakes that are separated by the sand hills of the Younghusband Peninsula from the Southern Ocean. The Coorong is a long narrow estuary that extends 2-3 kilometres wide, and runs southeasterly from the Murray Mouth, for 120 kilometres, see Figure 1.

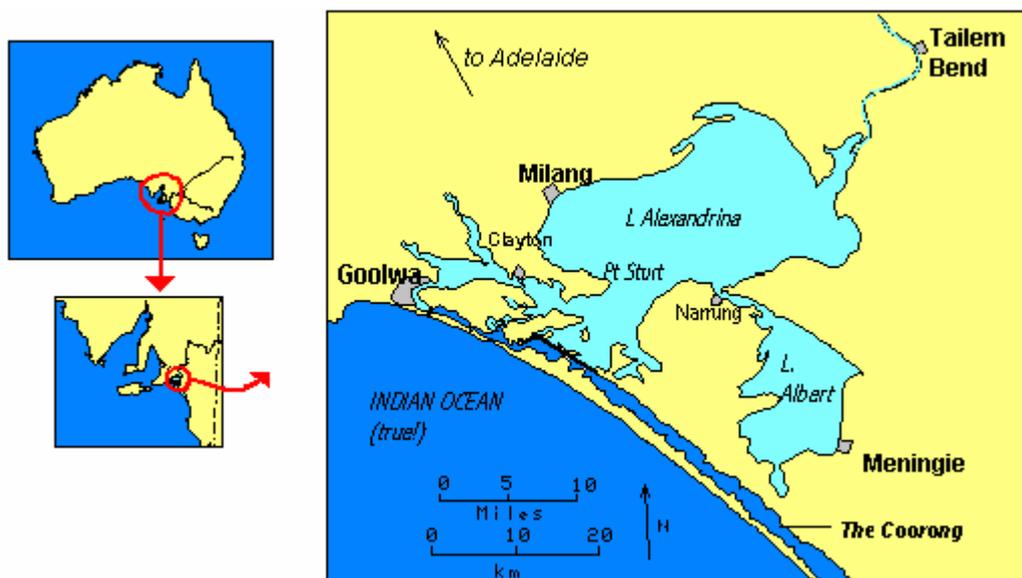


Figure 1: Series of maps depicting the location of the Coorong in SA, and associated fishing grounds

In this region, Lakes and Coorong commercial fishers predominately target Carp, Callop, Bony Bream, Flounder, Mulloway, Cockles and Yellow-eye Mullet. The main type of gear used to target these species varies from drum nets, haul nets, seine nets, ring nets, swinger nets, cockle rakes and mesh nets.

Although the fishing methods in the Coorong are highly selective for the target species mentioned, the practice of using mesh nets to target Yellow-eye Mullet occasionally results in the capture of juvenile Mulloway. Commercially, the Mulloway are a highly valuable species, and therefore protection of growing stock is important. Juvenile Mulloway migrate along the coastal fringe during the warmer months and numbers are influenced by river flows, barrage openings and oceanographic influences, eg El Nino and La Nina.

Not only are fishers faced with the interaction of juvenile Mulloway with gear, they also encounter crabs in excessive numbers during their fishing operation. Crabs interfere with fishing gear, crawl onto mesh nets and feed on the commercial catch. Crabs have the ability to substantially reduce the value and quality of commercially targeted species. As a result, fishers have developed best practices that reduce the interaction with crabs and target species that are of significant economic value.

Birds such as pelicans and cormorants also pose a threat to commercial fisheries. Although seabirds rarely become entangled, they aggressively pilfer netted fish, are frequently removing fish from mesh nets and leaving damaged (unsaleable) carcasses. Clearly this is an issue that fishers can potentially face on a daily basis and work tirelessly to avoid.

Solutions to Bycatch

Lakes and Coorong fishers have developed solutions to minimise the interaction of juvenile mullet with fishing gear, and to reduce fish loss due to crab, and bird predation. Fishers have used strategies that aid bycatch reduction for generations, and it is anticipated that this document will increase the uptake of best fishing practices by new and inexperienced fishers entering the commercial industry through the transferability of licences.

Targeting Mullet and avoiding Juvenile Mullet

There are several measures that can be taken to avoid and minimise bycatch of juvenile Mullet when targeting Yellow-eye Mullet. These include:

- Floating nets
- Reducing net depth
- Ensuring nets are slung correctly and the optimal mesh size and ply rating is used
- Avoiding areas of high bycatches
- Timing the setting and hauling of nets.

The strategies used by fishers to minimise bycatch varies over temporal and spatial scales and depends on the behavioural characteristics of both the target and non-target species. Information collected by long-time fishers in regard to patterns of fish movement and fish feeding behaviours are often passed on to new entrants or inexperienced fishers. This may assist them in minimising the catch of non-target species.

Floating and Sinking Nets

During the warmer months, when food supplies are readily available, Mullet tend to feed on the benthos. On these occasions fishers add extra buoyancy to their mesh nets, reduce leadline weight and float nets off the bottom. This allows juvenile Mullet to pass beneath the net, which ensures minimal interaction with non-target species. Yellow-eye Mullet tend to remain prolific mid water and at the surface, consequently the fishing practices remain selective for the target species. To achieve the same result, fishers may also choose to reduce the depth of their net, in some cases up to 75%. Figure 2 illustrates the different size nets used in the Lakes and Coorong.



Figure 2. Different types of nets used in the Lakes and Coorong

In contrast, when Mulloway are feeding in the pelagic zone, and when there are no or few crabs present, fishers may sink their nets; which further reduces the interaction with birds and gear at the surface. This method is economically viable if Yellow-eye Mullet are not aggregating in the same areas as the juvenile Mulloway and furthermore is most effective during the day, when bird activity is at its highest and Mulloway movement is at its lowest.

Mesh Size and Netting material, Ply Rating and Hanging Ratio

Using an appropriate mesh size, net material, ply rating, and net hanging ratio can substantially reduce interaction with non-target species including juvenile Mulloway. An industry driven initiative to legislate the use of mesh sizes between 2"-2.5" when targeting Yellow-eye Mullet has further avoided unnecessary juvenile Mulloway bycatch. In addition, the introduction of monofilament nets into the fishery as opposed to nylon has substantially reduced the incidence of bycatch of non-target species.

Ply rating also becomes important in reducing bycatch in the fishery. Where possible, industry uses the heaviest ply rating during the warmer months to maintain catch efficiency and to minimise bycatch.

Construction of Nets

The way nets are slung (hanging ratio) in the water plays a large role in determining the resultant catch. The hanging ratio is the ratio of the floatline length to the stretched length of netting which is mounted on the floatrope. The hanging ratio influences the shape of the meshes in the net, and therefore the composition and size of the commercial catch. Figure 3 a and b show both poor and optimal hanging ratios. Fishers maximise net efficiency when high hanging ratios are used. In these circumstances, nets are more selective and will often mesh only a limited size range of fish.



Figure 3a: Poorly slung net



Figure 3b: Net that has been slung correctly to ensure optimal catching efficiency

Although there has not been any formal research conducted into the optimal hanging ratio when targeting Yellow-eye Mullet, Lakes and Coorong fishers through their generations of fishing, have developed a great understanding as to the most effective hanging ratio; from an ecological and economic efficiency perspective. Fishers share this information with new and inexperienced fishers, with the aim to prevent further interaction of fishing gear with non-target species. Professional Mullet fishers have found 50% hanging ratios, (i.e. for every 100 metres of mesh when slung will deliver 50 metres of mesh net), are most efficient.

Avoiding areas of high bycatches

Lakes and Coorong commercial fishers affect bycatch rates by selecting fishing areas known to them to have lower bycatches, or by moving away from areas where results are negative. High-risk areas have been identified as reef, rocky bottom and mud environments. Historical information of high risk areas derived from fishers in the Coorong, combined with information on water movement, by water flow managers, can substantially reduce the likelihood of fishers encountering bycatch.

Timing the set and haul of mesh nets & Soak time

Timing the setting and retrieval of Yellow-eye Mullet nets can be crucial in terms of encountering bycatch. Mulloway schools in particular, are likely to come across mesh nets during the warmer months when actively pursuing prey. This activity occurs during the low light of dawn and dusk. Consequently to reduce bycatch, commercial fishers do not set their nets during these periods.

Soak time (the amount of time nets are left in the water until checked) can play a large role in determining what percentage of discarded bycatch (if any) will survive. Fishers therefore tend to keep soak time at a minimum and check nets regularly.

Reducing crab predation on catch

It is fair to suggest that every fisher who has deployed a net or line in the Coorong has at one time or another observed the presence of crabs in this environment. In some areas, crabs are highly prolific. When fishers use bottom set mesh nets, they often have problems with crabs feeding on the fish caught in the net. To avoid or minimise this, fishers float their nets off the bottom (as in the case for reducing interaction with juvenile Mulloway). Similarly, they do not set their nets in areas where crab numbers are known to be high. Through identifying the type of environments in which crabs are abundant, fishers are in a greater position to identify associated habitats and modify or limit fishing practices in these areas.

Another novel approach used by fishers to reduce fish loss due to crabs is to use rings on the bottom of nets as opposed to lead line (see Figure 4).



Figure 4. Ring net (shown middle); an alternative to the use of lead line. Suitable for calm conditions

The use of rings reduces the likelihood of crabs crawling onto nets and preying on catch, and further becoming enmeshed. Fishers are encouraged to use this gear, particularly if crabs are a real issue, and cannot easily be avoided without substantially effecting fishing performance.

Reducing bird interference with gear and catch

Bird activity is greatest during the day, and when there is a full moon. Armed with this knowledge, and given birds are an issue at that time of the year, some fishers elect to set their mesh nets at night. Night setting significantly reduces seabird predation, and associated fish loss and damage to gear.

Further solutions for minimising bird interaction with gear includes:

- Attending to mesh nets regularly (reducing soak time)
- Watching for baited schools that attract birds
- Avoiding setting nets near bird rookeries or colonies.

Commercial fishers are on the water most days of the year, and as a result have a wealth of knowledge as to the locations and seasons where birds may inhabit, and consequently the areas which need to be avoided. For those fishers who are new into the fishery, communication with existing fishers is vital in gathering the important historical information on ‘critical bird sites’ to avoid. Further advice and information can be sought at Southern Fishermen’s Association committee meetings, or through one-one communication with fishers.



Figure 5. Fisherman and Birds can share the same environment and prosper.

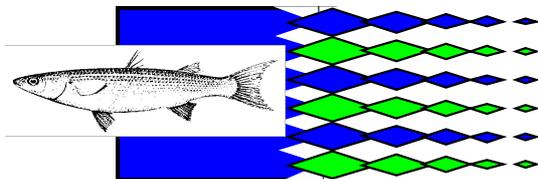
Fishing for the future

It is clear that there are already best practices in place by Coorong fishers to minimise the catch of non-target and bycatch species, and to ensure for a sustainable fishing industry. Although methods to reduce bycatch are subject to spatial and temporal variations, they have been extremely successful.

The pool of new entrants that have come into the Lakes and Coorong fishery through the transferring of licences, generally lack the skills and knowledge to avoid bycatch. This document will therefore provide the necessary information and advice for fishers to increase their economic efficiency and minimise ecological impacts such as bycatch in the Lakes and Coorong environment.

More Information

If you would like to hear more about best fishing practices in the Lakes and Coorong Fishery have developed new and innovative ideas to further reduce bycatch, then please contact the SA SeaNet Fisheries Extension Officer, Cherie Heyes on (08) 8234 8622 or by Email, seanet@safic.com.au.



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