

## **AN INTRODUCTION TO EATING SUSTAINABLE HEALTHY WILD CAUGHT FISH IN WA**

There are a number of great things about eating fish caught in WA, besides the simple fact that marine oils are good for you. One of these is that growing up in our unpolluted environment they arrive on your plate with an implicit organic rating, having grown up feeding itself on nature's finest and purest ingredients.

But should we be eating it? No-one denies the benefit of eating seafood, but with the world wide media blitz on unsustainable fishing practices there is growing concern about the impact of fishing on those relatively unspoiled environments, both through catching the fish of choice, the accidental catch of other species and the physical destruction of those marine environments with the fishing gear. We all want to be smart consumers and avoid contributing to all of that destruction, but how can we achieve this?

The Australian Marine Conservation Society's (AMC) seafood buyer's guide lays out some broad guidelines aimed at distinguishing short lived productive species caught with low impact gear from long-lived less productive species and higher impact fishing gear. Publishing a simple educational guide for an Australian wide audience there is probably no other approach that can be taken, and it does provide a starting point for someone wanting to think about the sustainability issues underlying the food they eat. However it is an over-simplistic approach and results in some products being promoted without justification, while other fishing communities who have worked hard over decades to address the ecological issues associated with their fisheries are penalized.

Virtually any fishery can be sustainable if fishing communities work together with government scientists and regulators to manage their impact. Too commonly this does not occur, but behind every good sustainable fishery there is a great story of people working creatively and constructively (often over many decades) to protect the natural systems they depend on. Our marine environments need these local champions, without them the processes of development we have unleashed on the land will devastate our coastal environments largely unobserved and unremarked upon. Because the reality is that our governments spend very little money on monitoring marine environments and without fishing communities we have very little awareness of what is going on below the surface. Without fishing communities it is normally a case of out of sight and out of mind.

What pains me about the broad brush approach in the AMC's guide is that some fishing communities I have known for many years and who have successfully confronted their sustainability issues can still find themselves on the wrong side of a simplistic rule that says the fish they catch are long-lived and so less likely to be managed successfully. Knowing so many success stories in the field of Australian fisheries I would like them all to be known and rewarded in the market place,

rather than penalized by overly simplistic rules. Unfortunately the fishing industry is its own worst enemy in this respect; fishermen fish, regulators regulate and researchers research. No-one has responsibility for telling their stories. So here at Jude's request I aim to tell a little of the story behind several WA fisheries that we should be rewarding for the part they play in our society and marine environment.

All of this is a long winded way of getting to a second great thing about Western Australian wild caught fish, which is that Western Australia in particular, and Australia in general, are near the top of the world when it comes to its enlightened and successful approach to sustaining fisheries. While most of our seafood is produced for export markets, if you can find locally caught products you can be confident that if the fishing community which produced it, has not already solved its ecological issues, there will be some process at work confronting and working through whatever issues remain. The rule here is that if sustainability is your priority, and you have no other information, choose local WA caught over any other product, and Australian product over any other country's product.

## SOUTH COAST ESTUARINE FISHERIES

Some of my favorite fisheries are the small scale fisheries which take place in our estuaries, bays and inlets for black bream, cobbler, sea mullet, leatherjackets, King George whiting, blue swimmer crabs, yellow-eye mullet and Australian herring. These fisheries have long, rich traditions having played an important role in keeping local communities supplied with fresh seafood since the time of first European settlement. This is a fishery that expanded westward across the south coast of Australia with European settlement of the land. Many of these fishing families can trace their fishing heritage back three or four generations and many probably originally combined both European and aboriginal ancestors. The Smith family that fishes Wilson Inlet settled in that area in the late 1800s having moved from Corner Inlet in Victoria where the family had already fished for several generations.

These fisheries use small open vessels that were traditionally sailed or rowed, but are now powered by small outboard engines. They set gillnets along the surface, or haul beach seines over shallow sandy flats to make their catch. Used in these inshore areas and with the restrictions applied, these gear types are very selective for catch that can be marketed, and have no lasting impact on the environment in which they are used. The gillnets float on the surface above the bottom and small fish swim straight through them, while the beach seine nets can only be used on sandy bottoms which they roll lightly across. While the species they target are

highly productive, their abundance being determined mainly by water flow and condition, rather than fishing pressure.

In many parts of Australia this deeply traditional fishery is facing multiple threats from declining river flows and water quality, and through the loss of access due to the incessant political lobbying by a overly powerful and ill-informed sectors of the recreational fishing industry. On the west coast of WA eutrophication (over fertilization caused by agricultural and urban run-off) has reduced these fisheries to vanishing point, the last of the Swan River fishermen is just about to be bought out, but on the south coast thirteen estuaries and inlets located between Cape Beaufort and the WA/SA border are open to commercial fishing as part of the South Coast Estuarine Fishery. These are (from west to east) Broke Inlet, Irwin Inlet, Wilson Inlet, Princess Royal Harbour, Oyster Harbour, Waychinicup Inlet, Beaufort Inlet, Gordon Inlet, Hamersley Inlet, Culham Inlet, Jerdacuttup Lakes, Oldfield Inlet and Stokes Inlet.

The South Coast fishery is managed primarily by controlling the number of fishermen. To become a new fishermen a prospective entrant must buy out an existing fisherman who must find other employment. The type and amount of nets along with the size of the mesh in the nets is also regulated to further control fishing pressure and ensure small fish can escape. Closed and open fishing seasons are also used to achieve other management aims like protecting the various species when the aggregate before or during spawning.

This fishery is an important source of local seafood for the WA community as unlike many other WA fisheries almost its entire catch is sold domestically. In 2004 on average 32 fishers were employed in the fishery each month, and the value of the fish they caught that year was \$556,000 per annum. Unfortunately it is also a declining source of local seafood because government policy is to slowly buy-back licenses so that the recreational sector can eventually have exclusive access to this community resource

The principle species you will see from this fishery in local fish shops are cobbler which is mainly from Wilson Inlet (70%), Oyster Harbour (15%), Princess Royal Harbour (10%) and Irwin Inlet (5%), black bream which are mainly caught in Stokes Inlet (50%), Beaufort Inlet (25%), Wilson Inlet (10%) and Oldfield Inlet (10%), and King George whiting which is mainly from Wilson Inlet and Oyster Harbor. All are great eating products, which are most commonly seen being sold fresh gutted and gilled or, in the case of cobbler filleted and skinned. Cobbler and black bream are relatively low cost and great value for money, while King George whiting is a more expensive fine flavored and textured species. This fishery only lands small tonnages (<150t per annum), and availability varies by year and season according to water flows, recruitment rates and the catchability of the fish, so take advantage if you see it available and in good condition.

## SHARK BAY BEACH SEINE AND MESH NET FISHERY

The Shark Bay Beach Seine and Mesh Net Fishery based at Denham is a more northerly equivalent of the estuaries, bays and inlet fisheries of southern Australia. It operates in the calm clear waters of inner Shark Bay and takes a mixed catch of whiting, sea mullet, tailor and yellowfin bream using a mixture of beach seines and haul nets. Having developed further away from the heavily settled southwest its heritage is even more mixed and interesting than its southern equivalent, but the fishing community it sustains has similarly deep roots in our early history.

Again the technologies applied are low key and environmentally benign and the management regimes are appropriate for the fishery. The principle management tools are limited access, only 10 licenses are allowed, and gear restrictions. Each fishing operation comprises one larger vessel (7-10m), a maximum of three small netting dinghies and a maximum team of three fishers to help set and haul the nets, one of whom must be own the fishing licence. The fishery is also subject to net length and mesh size controls which respectively, place further controls on fishing pressure, and ensure that small fish can escape without harm. Most of the catch is marketed through the fish processing factory in Denham, which sets weekly delivery quotas, and commercially acceptable size limits which are frequently above the legal minimum size for the species, which have been scientifically set on the size at which the fish breed.

The fishery operates across the entire area shallow sand backs which fringe inner Shark Bay and fishing pressure in any particular area is very low. The fishers patrol the clear clean waters of Shark Bay searching for schools of fish feeding or moving across sand banks that are shallow enough to be fished with their nets. Individual schools of fish are spotted by the fishers from their boats and the experienced fishers visually determine the species in the school, size of the school, and even the size of fish within the school before deciding to encircle it with their nets. The clear waters of Shark Bay mean that the fishers can be highly selective in the schools they seek to target, and avoid encircling schools of unmarketable fish or the protected species that abound in Shark Bay like turtles and dugong. In addition the short time taken to encircle a school and haul the net by hand and the shallow water means that any unwanted animals accidentally captured are rapidly released and normally unharmed by the process.

Impacts on the environment from the fishery are basically non-existent. The nets are set and hauled over shallow sand banks which are naturally dynamic and the resident fauna is adapted to cope with physical disturbances which combined with the low frequency of fishing in location ensures no lasting effect on the habitat.

The total catch for the Shark Bay Beach Seine and Mesh Net Fishery is normally around 280t, mainly whiting (37%), sea mullet (44%) tailor (8%) and yellowfin

breem (8%). The fishery, although relatively small-scale, makes a significant contribution to the Denham economy and community. An average of 18 fishers were employed in the fishery in 2004 but up to 30 locals can be employed to work the 10 licences permitted. Most of the catch is marketed through the fish processing factory in Denham which is one of the major sources of employment for the Denham community. The estimated annual value (to fishers) in 2004 was about \$900,000 a considerable reliable income for the small community like Denham.

Most of the product we see in Perth is filleted and fresh frozen in packets and of an consistently excellent standard. I particularly recommend the Shark Bay mullet. Many people tend to think of mullet as being of low quality and somewhat muddy in flavor and mullet caught in estuaries can often be that way. But mullet caught in marine environments and particularly the product from shark bay is very mildly flavored although still very rich in marine oils and it is exceptionally good value. Being sourced from a World Heritage wilderness area this must be the best value completely organic meat available anywhere, but again supplies can be irregular, that is the nature of small seasonal fisheries. So grab it whenever you see it.

#### SHARK BAY SNAPPER FISHERY

In the same area another great sustainable WA fishery is the Shark Bay Snapper Fishery (SBSF) which targets the oceanic stock of pink snapper (*Pagrus auratus*) in continental shelf waters off Shark Bay. Genetic studies have shown this stock is quite distinct from other snapper stocks found in the inner gulfs of southern Shark Bay which are the stocks that have been quite heavily depleted by many years of relatively uncontrolled recreational fishing, and are now the subject of quite stringent controls aimed at rebuilding them.

The SBSF uses mechanised handlines and baited hooks and, in addition to oceanic snapper, targets a number of other species such as jobfish (*Pristipomoides* spp., mainly goldband snapper), emperors (*Lethrinidae*) and cods (*Serranidae*). So its potential to harm to habitat with its gear is basically non-existent. Likewise the hooks are highly selective for snapper and other marketable species of fish so its accidental catch of unsalable fish or other species of marine life is basically non-existent. So its ecological footprint is very small indeed.

However with regard to the target species and its marketing the SBSF has been on something of a management journey. Fishing was originally targeted almost entirely at spawning aggregations that form each May-August and fishermen found that catch rates could be maximized during that period by using large fish

traps. This resulted in a rush of relatively low quality landings during a short period of the year which seasonally glutted local markets. Long time Perth residents will remember the seasonal appearance of vans parked on the sides of major roads selling cheap Shark Bay snapper which were typical of this period in the fishery.

The fishery was placed under strict management fishery since 1987 when a system of limited entry was instituted which set the number of tradable permits to commercially catch Shark Bay snapper was set at 51, most of which are attached to Shark Bay prawn and scallop trawlers who incidentally catch a few snapper while fishing for prawns and scallops. In 2004 only 23 vessels were targeting snapper. Since 2001 these dedicated finfish boats have been managed with an annual quota which sets the amount of fish they are each allowed to catch throughout the year. This change has caused them to think about ways of increasing the value of their individual catch, rather than ways of catching more fish. So today the catch is landed throughout the year, avoiding the annual glut which occurred in the spawning season, and in a much better quality of fish being taken to market.

Unfortunately recent improvements in the stock assessment for this fishery suggests that previous assessment of the sustainable yield for this fishery being around 600t were too high, and consequently a period of below-average recruitment in the mid- to late 1990s caused levels of spawning stock to fall below 30% of what is estimated to be the pre-fishing level. This new analysis caused the annual catch of this fishery to be reduced to around 300t per annum in 2004 so that the stock can be built back up over a 10 year period to the target of about 40% of its original level. It is to be hoped that the recent La Nina which has caused snapper stocks right around southern Australia to boom will also have worked its magic on this stock and catches will be able to be increased a little sooner than that.

Along with the other species caught while fishing for snapper the value of this fisheries catch in 2004 was \$3.3 million, most of which is landed into Carnarvon, which along with the services needed to support the fleet provides an important source of income and employment.

Most of the whole fresh snapper seen in Perth fish shops is likely to be Shark Bay Snapper although small amounts are caught right around southwestern Australia. It is no longer as cheap or seasonal as it used to be, but it is a great sustainable local product.

## SHARK BAY PRAWN FISHERY

Another well managed fishery in the pristine waters of Shark Bay is the prawn fishery. In contrast to the fisheries above which basically have no environmental footprint the prawn fishery involves the use of otter trawls which are relatively unselective and can potentially damage bottom habitats by dragging nets and trawl doors along the bottom. There is no way of entirely avoiding the issues this fishing technique raises but the WA prawn fisheries have an impressive record of minimizing and managing the impact of their fisheries.

The Shark Bay prawn fishery targets western king prawns and brown tiger prawns and a variety of smaller prawn species including coral prawns (various species) and endeavour prawns. King prawns are the dominant species, comprising about 70% of the catch. Tiger prawns make up most of the remaining 30%.

In this fishery the potential for causing environmental damage with the fishing gear is managed, although not entirely prevented, by extensive closures, which focus fishing in the deeper areas of the central bay, north of Cape Peron and in the northern area of Denham Sound, where the bottom is predominantly unconsolidated sand/shell habitats. Almost all the sponge and coral habitats of Shark Bay are contained within specific trawl closures to protect these areas. The fishery's performance in this regard is evaluated each year against strict performance criteria. In a typical year fishing is restricted to about 25% of the deeper areas available to it, well below the 40% level considered acceptable, and no trawling occurs within the small areas of partly consolidated bottom known to be within the designated trawl grounds and which support sparse coverings of coral and sponge.

The other major environmental concern about trawling is the fact that they tend to be unselective, accidentally catching and killing a wide variety of unwanted species some of which may be of conservation concern. Over the years this fishery has done a lot of work in this regard studying its incidental catch and how this can be reduced. Each vessel now carries twin devices for reducing this incidental catch of other species, a grid which deflects larger animals out the top of the net and a panel of square mesh in the cod-end of the net which lets small fish swim through the net while retaining prawns. Overall bycatch loads are now considered moderate relative to other subtropical trawl fisheries at about 4–8 times the prawn catch and is mainly dead wire weed, which breaks off the shallow seagrass bank over summer. The bycatch also still contains a number of small fish, and small blue swimmer crabs and other crustaceans which are generally released alive. Although protected species including whales, dolphins, dugongs, turtles and sea snakes are particularly abundant in Shark Bay generally, only sea snakes are seen regularly in the trawl catches in certain areas, and these are mostly returned to the sea alive.

In terms of the sustainability of the target species management is again based on a system of limiting the number (and in this case the size) of boats allowed to fish for prawns in Shark Bay and also through a complicated system of open and closed seasons and areas designed to maintain sufficient spawning stocks and make sure only larger more valuable prawns are caught. The yearly cycle of operation for the fishery is very dynamic; opening and closing dates vary each year depending on environmental conditions, moon phase and the results of surveys, which predict recruitment and growth. The timing of the opening of the season allows the harvesting of each new season's recruits and the large residual prawns from the previous season. Permanently closed nursery areas within the fishery prevent the fishing of small prawns and provide for habitat protection, while temporary area closure serve to maintain breeding stocks of tiger prawn above levels proven to give good future recruitment. Within the main fishing period, there are various subsidiary openings and closures designed to increase size, quality and market value while protecting the stocks from recruitment over-fishing. Moon closures operate for seven days around each full moon during the season, to increase economic efficiency by shifting fishing effort away from these times of reduced catch rate. While a system of voluntary closures of some areas in Denham Sound are aimed at preventing the take of small prawns early in the season and minimize the catch of juvenile snapper which aggregate to feed on them.

This fishery annually catches about 1,700 t of prawns worth about \$20-25 million each year. It directly employs about 135 skippers and crew and supports considerable processing and fleet maintenance infrastructure and staff in both Carnarvon and Fremantle. It is this fleet you will see tied up during the off-season outside Kailis' and Cicerello's in the Fremantle Fishing Harbor.

Most of the prawn catch from WA used to be exported and was almost never seen in local shops. However, over the last decade prawn farming has exploded throughout tropical coastal areas of the world and this increased production has depressed the global price of prawns closing off many international markets to Australian wild caught product. The Australian industry is now marketing more of its product domestically and the price of good prawns has never been lower. You will normally find the large cultured giant tiger prawn (*Penaeus monodon*) in the shops are still cheaper than the Australian wild caught product but if you want to eat prawns you should be mindful of the terrible destruction of mangrove forests, and high levels of chemical use to control diseases, that supports the cheap production of cultured prawns around the world.

## PILBARA TRAP FISHERY

The final WA fishery that those interested in eating sustainable Western Australian fish should be aware of is the Pilbara trap fishery.

Up until the 1970s because there was no Australian fishing fleet operating on the Northwest Shelf off the Pilbara, the Australian Government was obliged by international law to let foreign fleets utilize the fish resource of using the area, and the region was heavily trawled by a fleet of large Taiwanese pair trawlers. During the late 1970s and early 1980s a large scale research program by CSIRO documented the destruction of the sponge habitat that had occurred and the change in fish fauna that had occurred, away from large long lived and high price species of snappers and emperors ((*Lethrinus* spp. and *Lutjanus* spp.), gropers and cods (Serranids), towards short lived low value soft bottom dwelling species of Lizard fish (*Synodus* spp). In response to the results of this research the Australian Government moved to foster an Australian fishing presence in the area so that it could then exclude the foreign fishing fleet.

Consequently the area was zoned and areas were set aside for a small domestic fleet of otter board trawlers, and a small fleet of trap boats. Initially a limit of 4 tradable trawl permits and six tradable trap permits was established, but the recovery of the bottom habitat through the area was initially very slow and it was only the trawl fleet that could work its area profitably. While the quality of the bottom habitat remained poor and the fish assemblage remained degraded the trap permits were economically marginal, and the number of active trap boats declined to just two. In 2000 a system of tradable effort quotas was introduced so that catches and fishing pressure could be maintained at the relatively low levels that then existed. Under this system the active fishermen must either maintain their previous levels of fishing days or buy and sell fishing days from other members in the fleet. This effectively prevents fishing pressure from escalating without scientific assessments to show that the resource can support increased fishing.

Over the last decade the quality of habitat has continued to recover from the impact of the Taiwanese pair trawling, and especially in the area of the trap fishery has now probably returned to something like its pristine state. With the recovery of the sponge gardens, especially in the areas that are only trapped and are not trawled, the fish assemblage has continued to improve, both in terms of the types of species, and in the number of fish, their size and value. The improvements in the bottom habitat are so marked in the areas without trawling that the two trap operators who now land a larger, and more valuable catch than the four trawlers who fish an equivalent area.

The Pilbara trap fishery now lands around 400t of fish annually mainly comprising six species; bluespot emperor, spangled emperor, red emperor, Rankin cod, red snapper and goldband snapper.

There is no unwanted incidental catch of unsalable species and no interactions with marine mammals, turtles or seabirds.

This is a great success story for fisheries and ecosystem management and we should all be celebrating it by enjoying the product from this fishery. One of the trap operators supplies his entire catch exclusively to Sealanes, I am not sure where the other half of the catch goes. It is a great product. Because of the warm water the fish live in they keep really well on ice and arrive back in Perth in great shape. There is also a wide range of species from the expensive red emperor down to the smaller relatively inexpensive blue spot which Sealanes market as baby norwest snapper.