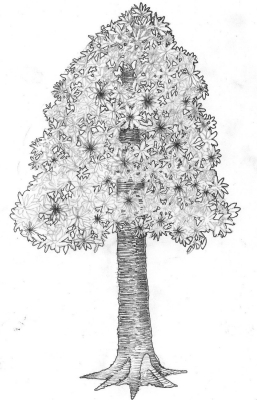


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Empty Oceans

Empty Nets.

**An evaluation of NSW fisheries
catch statistics from 1940 to 2000**

25 February 2006

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Empty Oceans, Empty Nets: An analysis of NSW fisheries catch statistics from 1940 to 2000

25 February 2006

Introduction

By 2000, with few exceptions, populations, or stocks, of many targeted fishes and incidental catches of by-product fishes in the fisheries of NSW were in serious decline in NSW waters. Some had been so for decades, and remain so. In order to maintain overall catch levels, declines in populations of over-exploited species have in turn lead to increased pressure on apparently healthy stocks of other fishes.

The few stocks that are not still in decline are being severely overfished. This cannot continue. Although the numbers of fishing licenses in NSW have been reduced by 50% since the late nineties, substantial further reductions in fishing effort are required. In some cases, certain fishing methods should be banned or phased-out all together.

Documents made available to the public as part of environmental impact assessments of discrete fisheries have presented only a limited picture of a larger problem of resource over-exploitation over the past 65 years. Much of this over-exploitation has been hidden by NSW Fisheries (now part of the Dept. of Primary Industries), who admit that there is “an inadequate knowledge base on which to determine effective management action” (*Ocean Trap and Line Fishery Draft Assessment*, 95) to ensure that fisheries are sustainable.

Equally, while the Environmental Impact Statement for the Ocean Trawl Fishery (OTF) notes that ‘It is concerning that a large proportion of the primary and key secondary finfish species have shown declines or have started to decline in the OTF in the last decade’ (Vol. 1, 114), it admits that “There is very little specific knowledge on the ecological processes that are important for the ecological sustainability of primary and key secondary species.” (Vol. 1, 187).

The accepted failure of NSW Fisheries to secure our fish stocks through appropriate Management Strategies may be due to these assessments narrowly focusing on the impacts of one fishery at a time. The Environmental Impact Statements so far prepared have consistently failed to consider the cumulative impact on species targeted by multiple fisheries – and there are many in this position. This piecemeal resource assessment approach evades conclusions that are otherwise obvious. In this way, ecosystem-based fisheries management eludes implementation.

As most targeted fishes are caught by more than one fishery using different gear and methods, the whole picture has not been assessed. This is NSW Fisheries’ gravest omission; neglecting cross-fishery impacts. In other words, the populations of species of fish and the trophic structures underpinning them are neither understood nor described.

We have used two of the seven environmental assessments produced by NSW Fisheries in the last three years to demonstrate the tunnel-vision afflicting fisheries

management in NSW and the dire consequences that this approach is having on the commercial and biological viability of many popular fish species and marine ecosystems. We have also presented charts of the total reported catches between 1940 and 2000 in an attempt to describe long-term population declines and unsustainable catches.

The Hunter Community Environment Centre (HCEC) maintains that the Ocean Trawl and Ocean Trap and Line Fisheries have the greatest environmental impact in terms of the number of species landed, the obscurity, quantity and diversity of bycatch, and, in the former, habitat destruction.

In terms of habitat damage, the Ocean Trawl Fishery, combining the Ocean Prawn and Ocean Fish Trawl Fisheries, has had the greatest impacts, scouring the ocean floor across sponge gardens, sandy substrates and macro algae.

The Ocean Trap and Line Fishery (OTLF) may have had the most impact on marine trophic structures, in terms of its ability to “fish down the food chain”. It targets, lands and markets in the order of 200 different species -- though many in relatively small quantities -- and is exceedingly wasteful. The recently released Environmental Impact Statement for the fishery quotes research that estimating a discard rate of up to 48% for the OTLF. This means that nearly half again the amount of fish landed, are caught and discarded -- with unknown but supposedly high mortality. The OTLF indiscriminately targets entire suites of species and incidentally catches endangered species like the Grey Nurse Shark and Southern Bluefin Tuna. It largely targets higher trophic level species -- predators -- but no assessment has been made by NSW Fisheries on the effect of this on ecological structures.

We are not alone in believing that the management strategy with the greatest chance of securing the recovery of fish stocks to levels we could safely fish while still supplying adequate fresh fish to the NSW public, is to remove fishing from at least 20% of all marine habitats, thus protecting marine resources, fish nurseries, highly productive ecosystems, and benthic structures. This would ensure that ecological features and values essential to sustain the fisheries are not inadvertently damaged and that stocks are not fished out.

As NSW Fisheries have no immediate solutions to fisheries decline in NSW, other than Marine Parks with high levels of Sanctuary Zone protection, or large Aquatic Reserves, it is curious that such obvious management solutions should be so difficult to establish.

Despite implementing some limited and tokenistic seasonal closures, in the face of the collapse of a number of important stocks, NSW Fisheries have not suggested the establishment of no-take Marine Protected Areas (such as sanctuary zones) as an effective fisheries management option in any of its seven fisheries assessments. This denies the existence of hundreds of examples of such protected areas from around the world which demonstrate the success of such management options. It also ignores the findings of many marine ecologists and resource economists who have suggested sanctuary zones as the preferred fishery management option. Rather, NSW Fisheries uses data limitations to dismiss most of the very obvious and dramatic declines presented in the Figures presented below.

The Figures that follow have been derived from data made obtained by the HCEC from NSW Fisheries under Freedom of Information laws, and generally present a long time-frame -- since records began in the 1940s. We accept that recording methods have changed over that time, and so some fluctuations in landed catches can be attributed to changing reporting methods and jurisdictional boundaries with the Commonwealth-managed fisheries. This is most marked in the early nineties, following the Offshore Constitutional Settlement Agreement with the Commonwealth and the introduction of the

Fisheries Management Act and is relevant for deep-sea species like Broadbill Swordfish (Figure 51) and Blue Grenadier (Figure 52). Other changes that need to be taken into account are changes in reporting requirements over time.

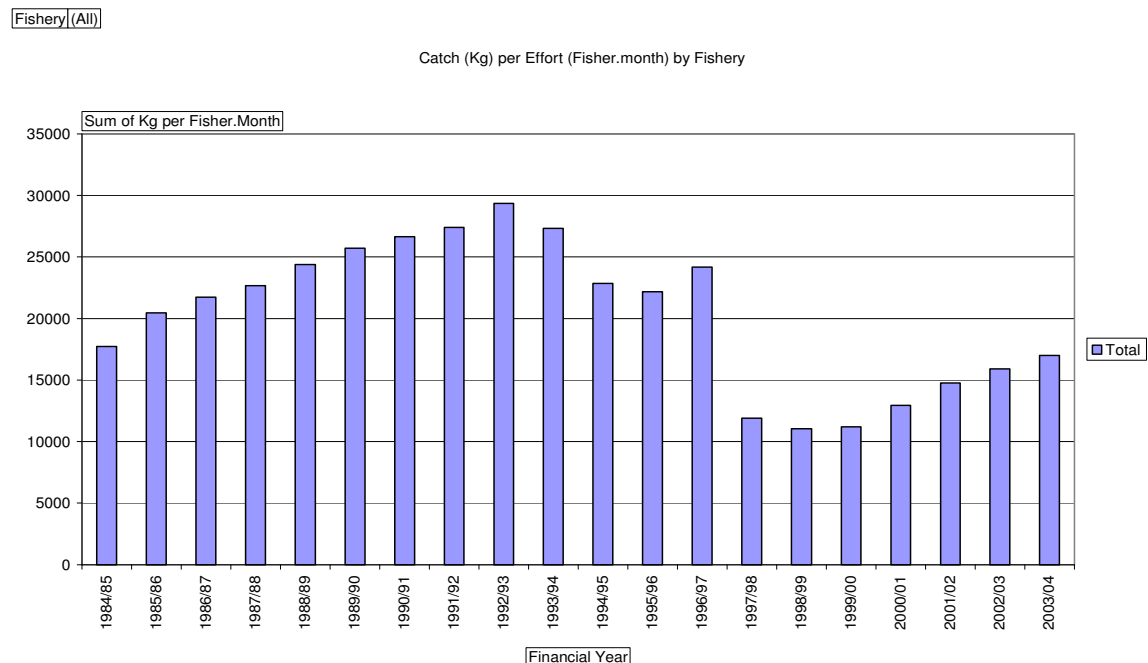
It could be sad however, that these anomalies are to some extent counter-acted by technological changes following adoption of sonar, satellite navigation, and sea temperature data, which have made it easier to target fish in areas that previously were not available to be fished, and would therefore be expected to lead to an *increase* in catch per unit effort (CPUE).

Catch per unit effort

Figure 1 shows the total CPUE for the combined NSW Fishery. It shows how difficult it has been for fishers to maintain a sustainable catch with the same effort. This was apparently due to massive and unsustainable catches of many species taken in the 1980s and 1990s. The peak year in the figure below is 1993, and in that year significant changes were made to the areas under the control of NSW Fisheries following the signing of the Offshore Constitutional Settlement. This may account for some change in CPUE, following the loss of productive areas in the State's South. However, the decline represented below is dramatic enough to warrant serious attention.

Furthermore, the declines evident in Figure 1 are supported by the Draft Environmental Assessment of the OTLF, which admits that there has been a decline in CPUE across the fishery for almost all species (119). Given that most of the 200 species landed by the OTLF are also caught by other fisheries, this is a good indication that CPUE is generally in decline, and that NSW Fisheries are aware that it is.

Figure 1. Catch per unit effort (kg per fisher month) for NSW combined fisheries 1984 - 2004



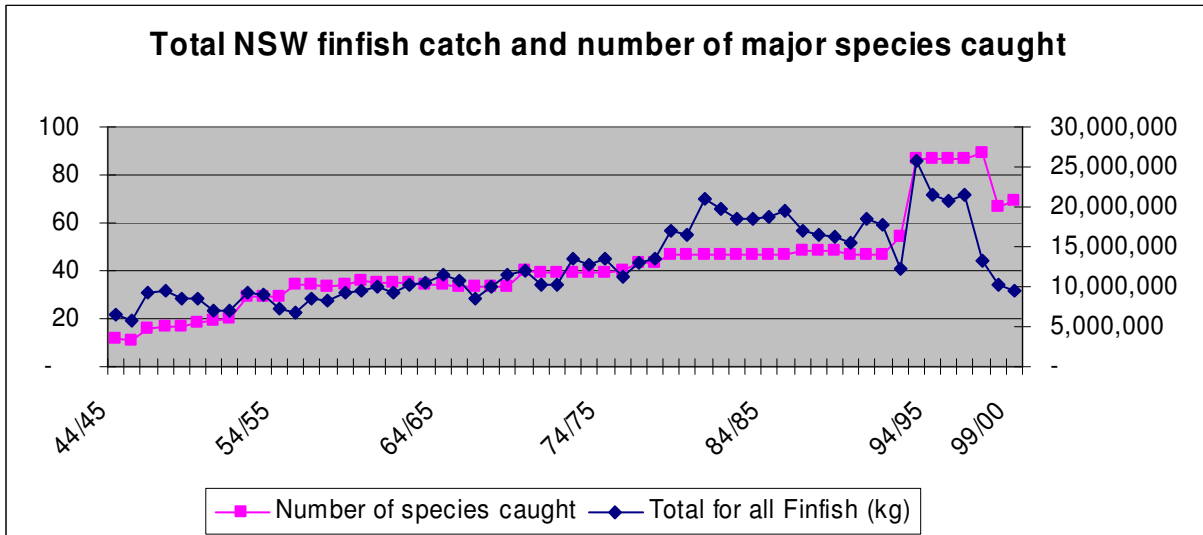
Since the introduction of restricted NSW fisheries in 1997, the number of fishing businesses in the industry has been reduced from about 2,800 to about 1,300 in 2004. This has been achieved through transfer and amalgamation programs and Marine Park and Recreational Fishing Haven buyout processes. However, it is generally recognised within the industry that further reduction in effort is required and the preferred approach is through a buyout program. The following Figures support this case in stark terms.

“Target Switching”

The following NSW Fishery catch statistics unpack the history of mismanagement of the NSW fishery resource. Of particular concern is the issue of the targeting small and previously untargeted fish populations from the early to mid '90s. This is when the real rot started to set in, after stocks of more popular fishes started to decline, the fishing industry began marketing and targeting new species.

In 1944, 12 finfish species made up almost the entire described NSW landed finfish catch. Many more were caught in small quantities and listed as “other” on reporting forms, but the variety of fish marketed to seafood consumers was far more limited than it is today. The number of species targeted and landed (and reported) paralleled the increase total catch until the early 80s, when total catch increased significantly to just over 20,000 tonnes (from about 6,000 tonnes in the mid 40s) of 50 named primary finfish species.

Figure 2. Total NSW commercial finfish catch (on right in kg) and number of species caught (left)



However, the total catch of finfish -- of about the same number of named species -- declined from the mid '80s (just over 22,000 tonnes) to the mid '90s (about 12,000 tonnes).

A decline in total landed catch of finfish in NSW has been occurring since about 1993, when substantial numbers of species were required to make the increased catch. The catch went from about 12,500 tonnes to about 25,000 tonnes in a single year (1994/95). This corresponded to an increase in the named primary species landed from almost 50 to about 88. In some respects, this can be attributed to the addition, in the mid-nineties, of new catch classifications, but those changes cannot fully account for these trends. These 76 species of fish that have been added to NSW Fisheries' reporting since 1940 were once “other”, but have increasingly become industry staples. Changes to reporting sheets, naming more and more species, are, in fact, testament to this history of “target switching.”

This number of targeted species remained steady until 1997/98, however, total catch declined rapidly back to the 1994/95 level of just over 12,500 tonnes. The decline in total catch continued to 2000 when it was reduced back to levels of the late 1940s to early 1970s of under 10,000 tonnes. The decline of species available to fulfil this catch

decreased as well, but still significantly higher (about 70 species) than the numbers of primary and key secondary fishes caught in the 1970s, of about 40 finfish species.

Even so, the number of actual species caught is actually much larger, over 300 species, and the “other fish” category remains substantial, reportedly including some species for which fishers don’t even have names.

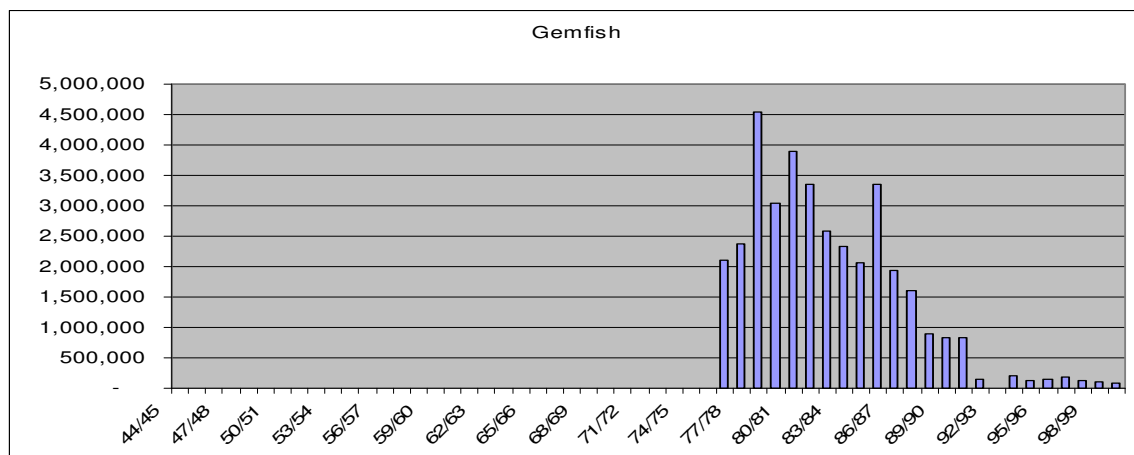
The unsustainability of NSW fisheries is stark. Impositions of trip limits have generally been a case of “closing the stable door after the horse has bolted”; a Total Allowable Catch has not been implemented; stocks have declined and the fishing industry has continually targeted and marketed many more fish species to fill the declining catch of the more popular fish.

In the Ocean Trap and Line Fishery (OTLF) for example, Bonito (Figure 7) is not recorded as being caught at all before the late 1980s. At that time, the quantity of Silver Trevally (Figure 17) reported landed was already declining. At the same time, the catch of Blue-eyed Trevalla rose dramatically from around 150t to over 300t per year. The quantity landed of Bar Cod (Figure 10), a species about which we know very little, is now also increasing.

The eastern Gemfish population is now economically extinct, but they still catch them as it is impossible not to in the predominantly indiscriminate multi-species fishery that we have in NSW. Once caught, the mortality rate is high, so fishers quite rightly sell them rather than throw dead fish overboard. An even more disturbing pattern is the “upgrading” of byproduct. For example, fishers are allowed to land 50kg of Gemfish per trip. Once fishers reach this limit, they continue to incidentally catch Gemfish. If the individuals caught later are larger, the original 50kg is thrown overboard. HCEC has heard anecdotal evidence that this may occur more than half-a-dozen times on a single trip. The cumulative impact of this hidden exploitation and the indiscriminate nature of some fishing methods used in NSW may lead to the eastern population of Gemfish being threatened with actual extinction.

The targeting of Gemfish (Figure 5) coincided with the increased total finfish catch of the late 1970s and early 1980s when total finfish catch went from about 15,000 tonnes to about 22,000 tonnes and the offshore trawl fishery was substantially developed. The Gemfish catch peaked in 1979/80 with about 4,500 tonnes landed. This declined steadily until the late 1980s when only about 800 tonnes was caught. The populations’ demise, however, was not accepted by NSW Fisheries until about 1993, when a closure was announced. This failed to substantially increase their numbers.

Figure 5. Commercial catch (kg) of Gemfish between 1940 and 2000.



Rowling and Makin (2001) state in desperation and despite unsuccessfully nominating the eastern Gemfish population for listing as threatened species on the *Fisheries Management Act (NSW) and Environmental Protection and Biodiversity Conservation Act (Cth)*:

It is concluded that the current spawning population of eastern gemfish has collapsed to a dangerously low level, and trawling continues to catch large numbers of juvenile fish before they have a chance to mature and contribute to the spawning population. There are strong indications that recent management practices have seen a further reduction in the population of mature eastern gemfish...

The fate of the Gemfish is the most dramatic, and is undisputed by NSW Fisheries. It is however, a future that is possible for many other targeted fish populations. While they have acknowledged some of these trends, for example, for the Silver Trevally, Leatherjackets and Rubberlip Morwong, not enough has been done to address the problem before these species suffer the fate of the Gemfish.

Assessment: Ocean Trap and Line Fishery (OTLF)

The draft assessment for the OTLF (Anon, 2005) blatantly disregards the Department's legal obligation to follow the precautionary principle, stating that "The application of this "precautionary-at-all-times" approach would mean that all species for which biological knowledge gaps exist (which would apply to most species of economic importance in NSW) would be assessed as having a high level of risk" (Anon, 2005, p 67). The application of this principle, and therefore the determination of high risk for all species, is currently demanded by both NSW and Federal law.

The precautionary principle has effectively been re-invented by NSW Fisheries as a "precautionary where necessary" approach. The central tenet of the precautionary principle is that precaution is "necessary" when too little is known to be able to state that precaution is not necessary. Part 16, Section 391 of the *EPBC Act* clearly states that the Federal Minister for the Environment *must* consider precautionary principle in making decisions. Since the OTLF requires approval from the Federal Department of Environment and Heritage in order to export its catch, this is a grave omission.

In the risk evaluation of the environmental "assessment" of the Ocean Trap and Line Fishery, of the primary and key secondary species given impact profiles by NSW Fisheries, eleven were given risk assessment scores above 6 – rated as "high risk". These are;

1. Leatherjackets (mixed) (Figure 6),
2. Australian bonito (Figure 7),
3. Rubberlip Morwong (Figure 8),
4. Bar cod (Figure 10),
5. Gummy Shark (Figure 11),
6. "other shark" (Figure 12),
7. Wobbegongs (Figure 14),
8. Pearl Perch (Figure 15),
9. Hapuku (Figure 16),
10. Bass groper, (not appearing in this report) and
11. Black-spot pigfish. (not appearing in this report) (Anon, 2005).

Apart from Bar Cod and Pearl Perch, which we believe may be being severely overfished, all these are in decline.

Figure 6. Commercial catch (kg) of Leatherjacket between 1944 to 2000.

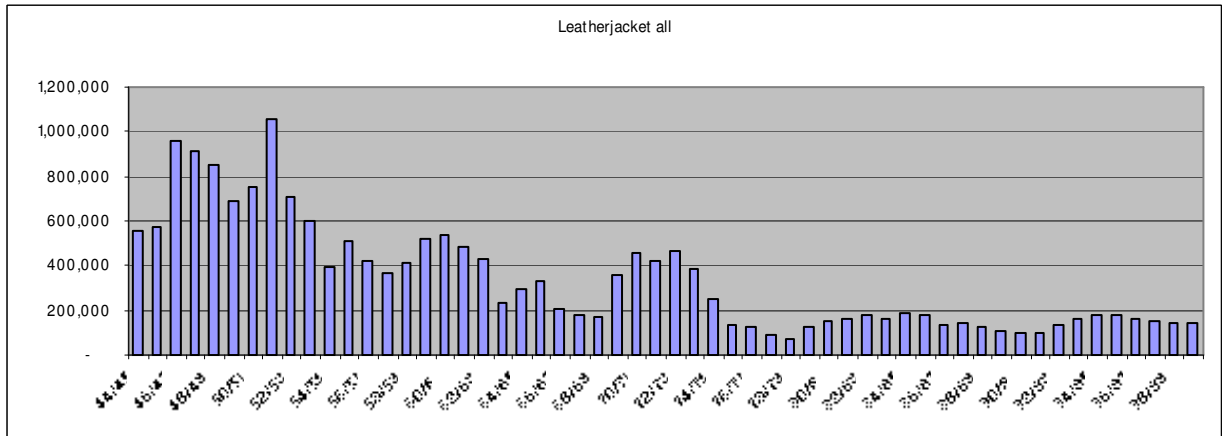


Figure 7. Commercial catch (kg) of Bonito between 1940 and 2000

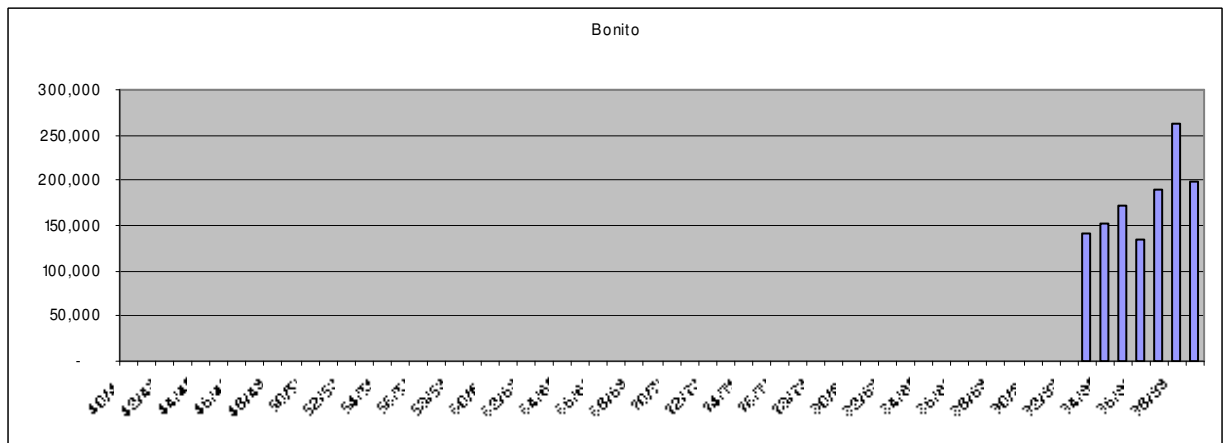


Figure 8. Commercial catch (kg) of Rubberlip morwong from 1940 to 2000

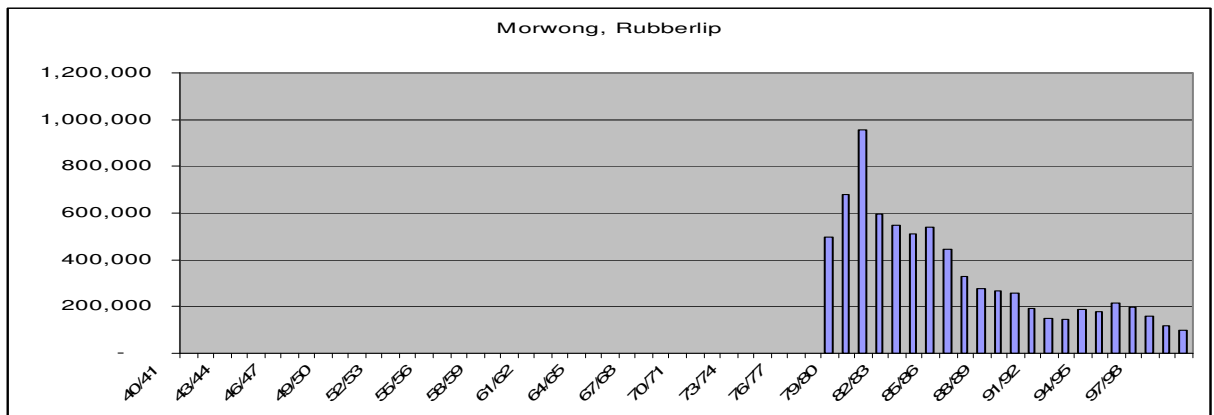


Figure 9. Commercial catch (kg) of all Morwong between 1944 and 2000.

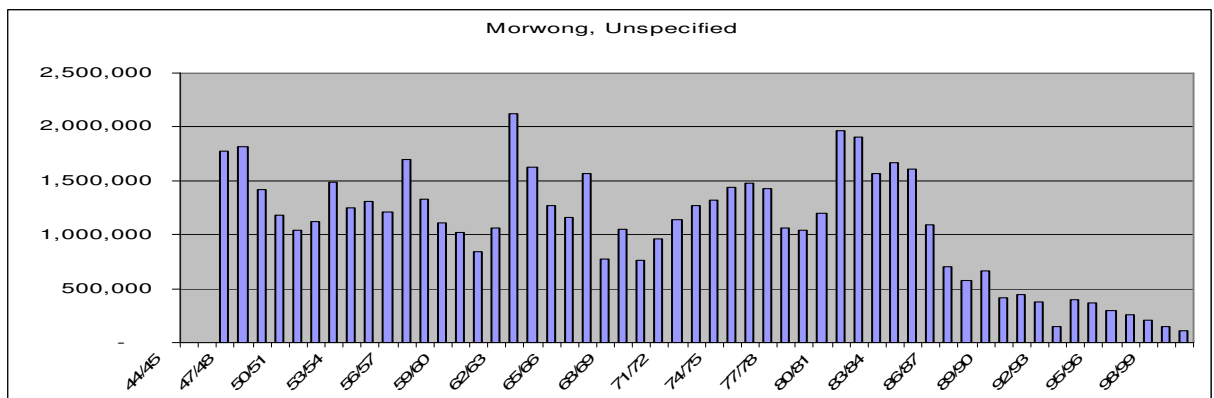


Figure 10. Commercial catch (kg) of Bar Cod between 1940 and 2000

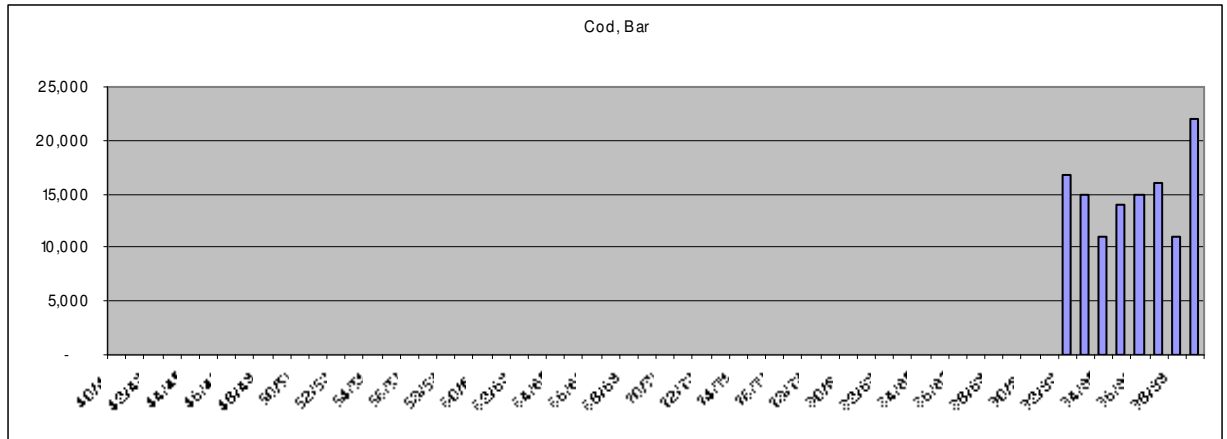


Figure 11. Commercial catch (kg) of Gummy Shark between 1940 and 2000

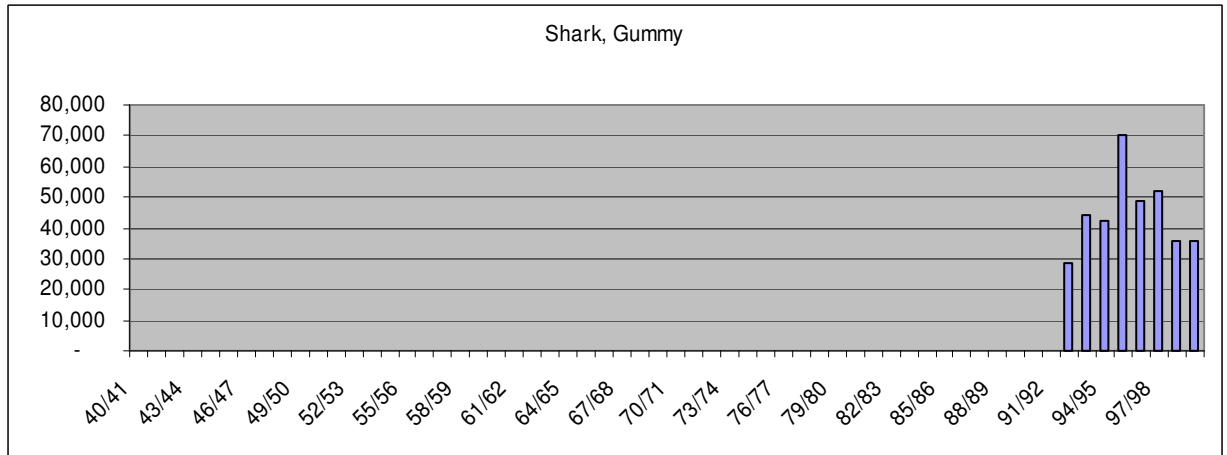


Figure 12. Commercial catch (kg) of other Shark (unspecified) between 1940 and 2000

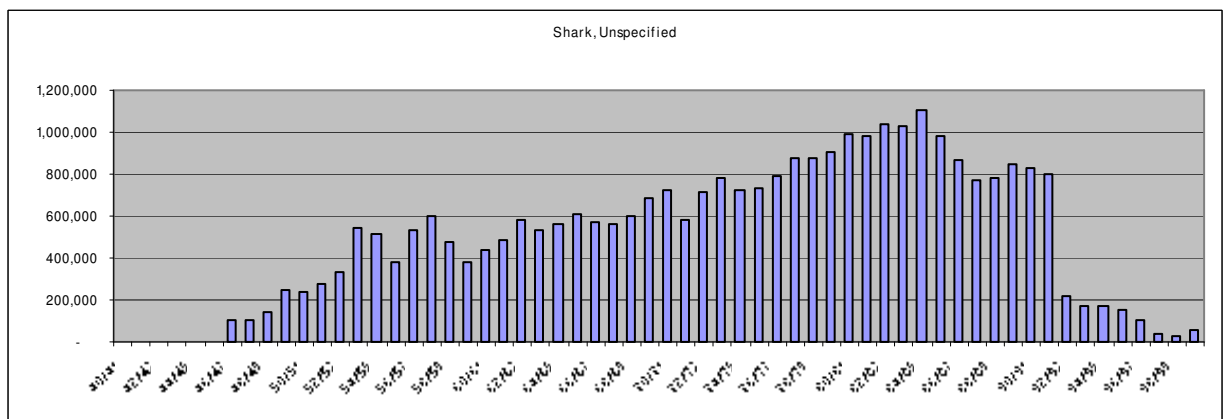


Figure 13. Commercial catch (kg) of all Shark species between 1940 and 2000

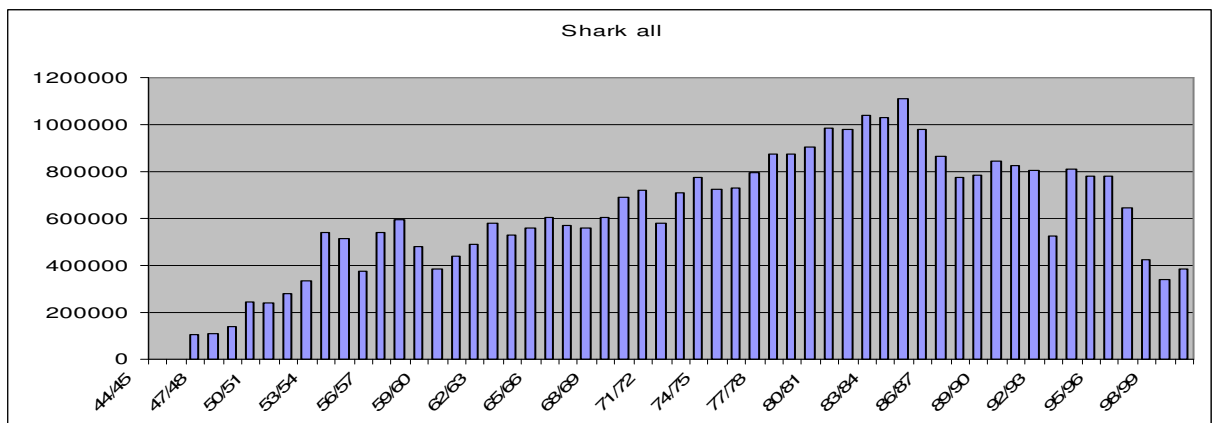


Figure 14. Commercial catch (kg) of Carpet Shark (mainly wobbegong) between 1940 and 2000

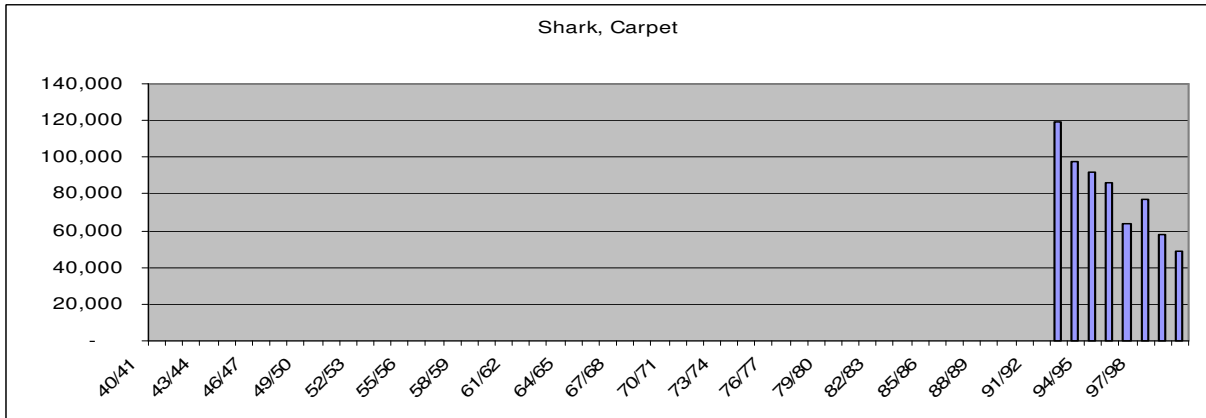


Figure 15. Commercial catch (kg) of Pearl Perch between 1940 and 2000

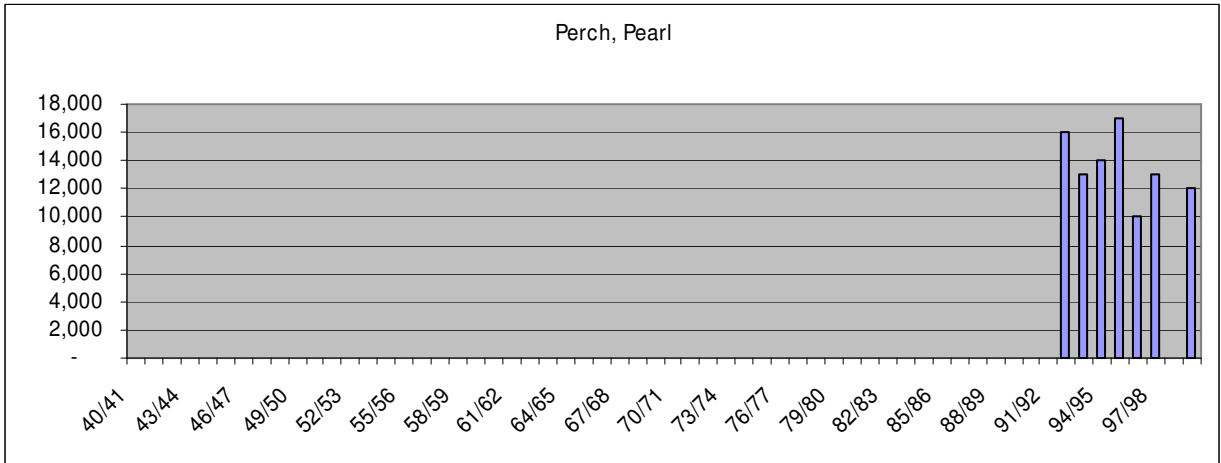
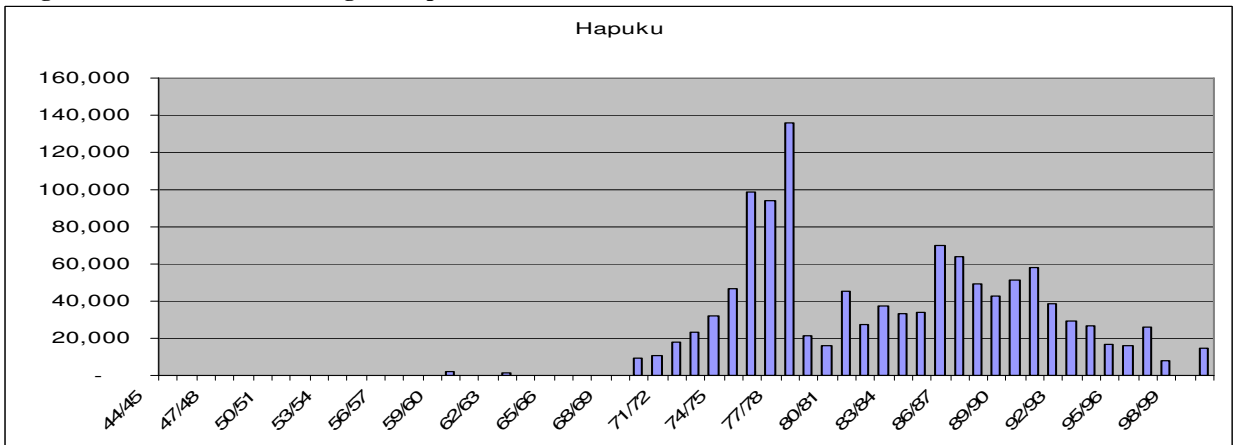


Figure 16. Commercial catch (kg) of Hapuku between 1940 and 2000



The assessments and EISs NSW Fisheries has produced to date do not engender confidence that they can manage the industry on a sustainable basis. While the above populations of target species have been flagged for concern, the OTLF has continually had to apply for extensions for the release of a draft Management Strategy (which is, at the time of writing, on public exhibition). The granting of interim approval by the Commonwealth was extraordinarily lenient, considering the impact of the fishery on the endangered Grey Nurse Shark. The FMS on exhibition has not provided the looked-for improvement.

The Draft Assessment for the Ocean Trap and Line Fishery (OTLF) itself nailed the problem in stating that; “There are a number of substantial knowledge gaps that hinder the OTLF from being managed and fished in an ecologically sustainable manner” (Anon, 2005, p 146).

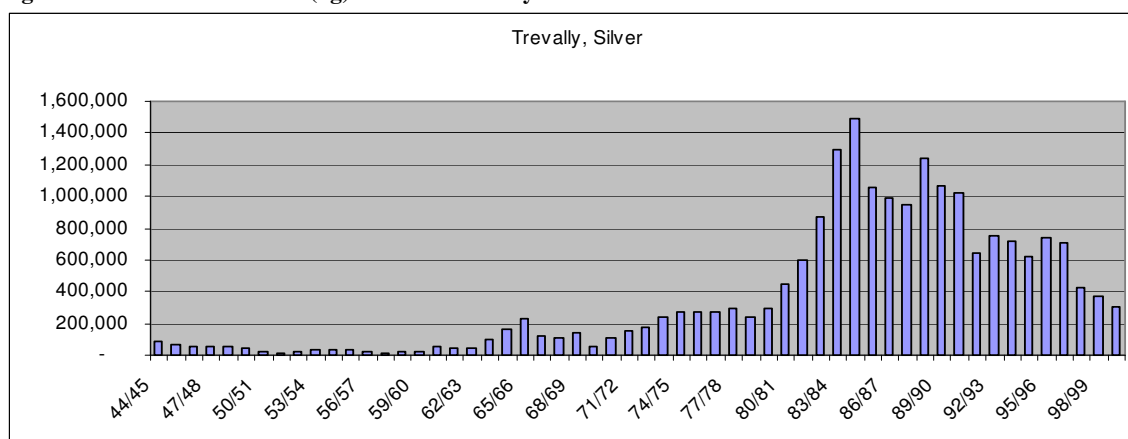
Almost 9% of production in the OTLF is sharks other than Gummy sharks and Wobbegongs. Commercial exploitation of Sharks and Rays is of serious concern due to their low fecundity (fertility). The International Union for the Conservation of Nature (IUCN) lists 34 of Australia’s 175 species of sharks and rays as being globally threatened, and a further 52 near threatened (Cavanagh *et al*, 2003)

Passive line methods in the OTLF result in a reported catch of 145,823 kg of sharks and the elimination of indiscriminate gear like passive lines and trawl nets would substantially enhance the ability of the industry to achieve sustainability.

The OTLF lands more than 200 species and takes the largest share for 21 of the 25 primary and key secondary species of the NSW industry. It also takes a large share of the total catch for species at significant risk of commercial extinction – like Silver Trevally – but the segmented approach to fisheries management taken by the NSW government has led to a severe under-estimation of the cumulative impact of all fisheries on the Silver Trevally and other species.

Though it was anticipated that other fisheries also taking Silver Trevally would comply with the Recovery Plan suggested by the Ocean Trawl Fisheries Management Strategy, there is little acknowledgment in the OTLF assessment draft of the gravity of the population decline being experienced by Silver Trevally. The OTLF takes around 101t of Silver trevally per year. The OTF EIS stated that landings of Silver Trevally in that fishery have experienced a ‘steady decline since mid 1980s to approximately 10% of its peak’ (Anon, 2005, Table B2.5).

Figure 17. Commercial catch (kg) of Silver Trevally between 1944 and 2000



Primary species landed by the OTLF for the year 2001/02 were;

1. Snapper (206 t valued at \$1.8M) – Figure 18,
2. Yellowtail Kingfish (252 t valued at \$1.8M) – Figure 19,
3. Spanner Crab (150 t valued at \$1.1M) – Figure 20, ,
4. Leatherjacket mixed species (213 t valued at \$0.4M) – Figure 6,
5. Bar Cod (29 t valued at \$0.3M) – Figure 10,
6. Bream (34 t valued at \$0.3M) – Figure 23,
7. Silver Trevally (101 t valued at \$0.3M) – Figure 17,
8. Rubberlip morwong (56 t valued at \$0.2M) – Figure 8 and 9 and
9. Gummy shark (36 t valued at \$0.1M) – Figure 11.

All of these populations of fishes in NSW appear to be in serious decline, or are severely overfished. The fishery also targets Bonito (101 t valued at \$0.6M) – Figure 21 and Blue-eye Cod (92 t valued at \$0.8M) – Figure 21.

Figure 18. Commercial catch (kg) of Snapper between 1944 and 2000

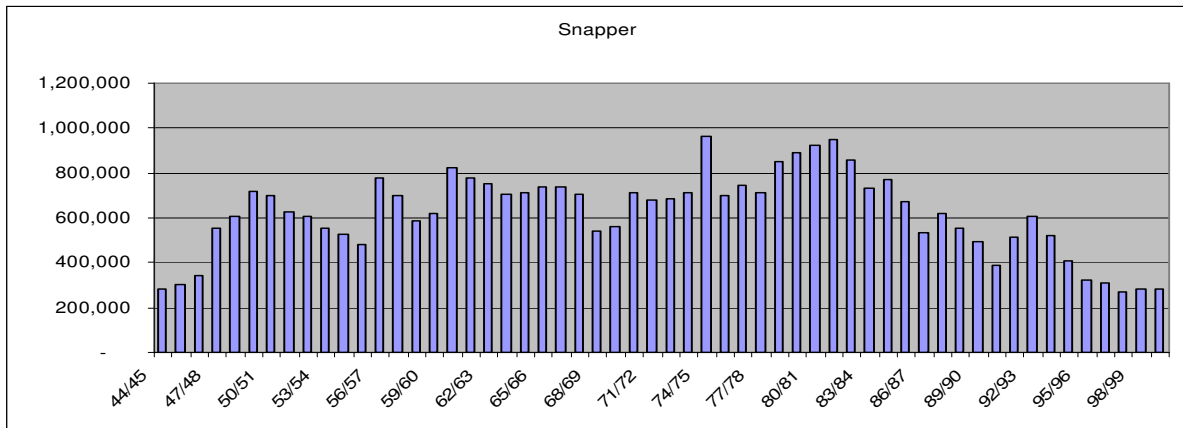


Figure 19. Commercial catch (kg) of Yellowtail Kingfish between 1944 and 2000

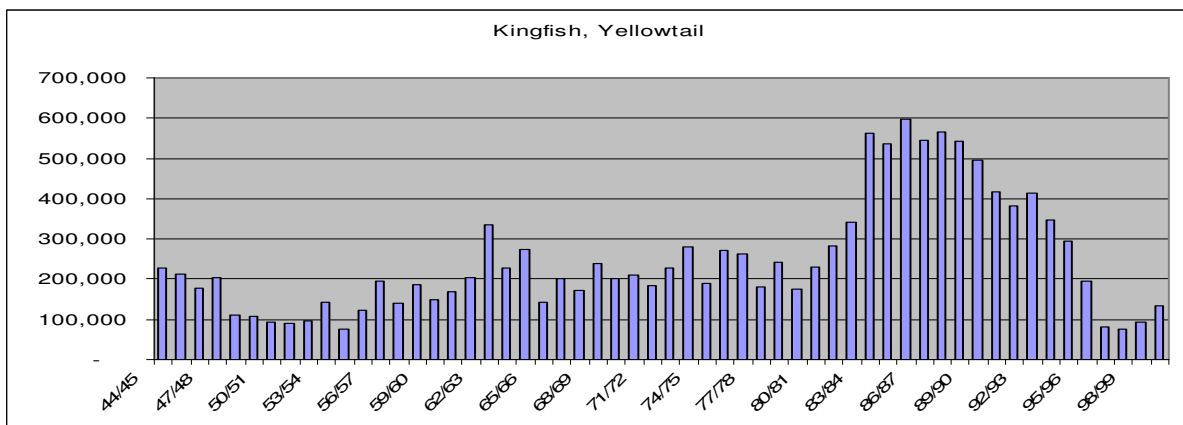


Figure 20. Commercial catch (kg) of Spanner Crab between 1940 and 2000

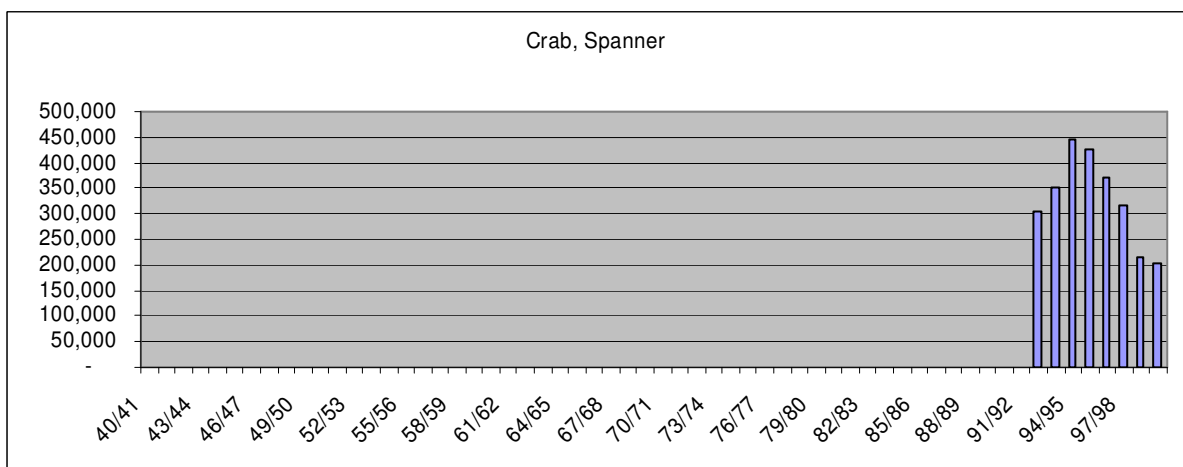


Figure 21. Commercial catch (kg) of Blue Eye Cod from 1940 to 2000

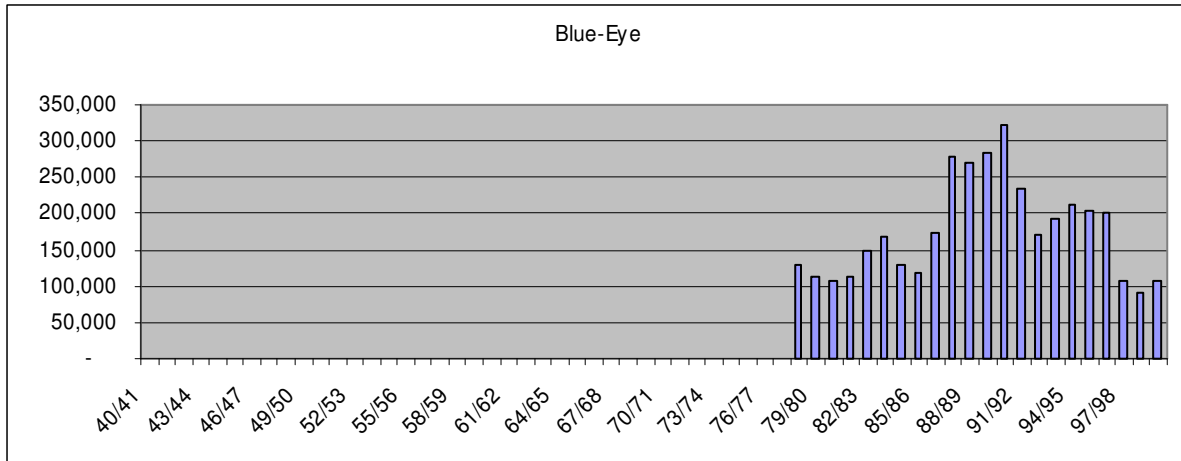


Figure 22. Commercial catch (kg) of Bonito from 1940 to 2000

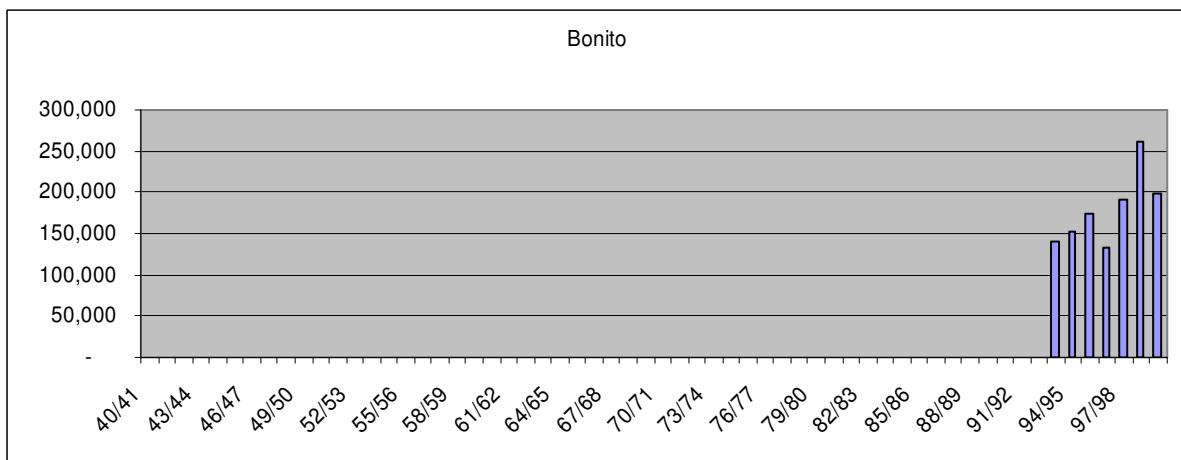
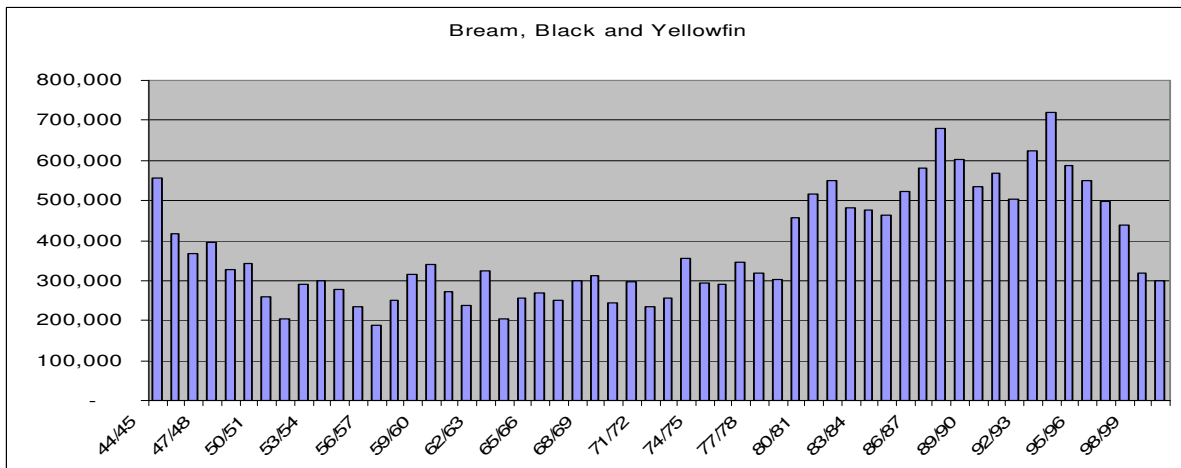


Figure 23. Commercial catch (kg) of Bream from 1944 to 2000



Assessment: Ocean Trawl Fishery (OTF)

The Ocean Trawl Fishery (OTF), comprising the Ocean Prawn Trawl and the Ocean Fish Trawl fisheries, is enormously diverse in its ecological impacts. During the 1990's, 'more than 300 species of fish and about 80 species of mobile invertebrates were recorded in fish and prawn trawl catches during observer studies and research trawls' (Anon, 2004b, Vol. 1, p 52) – of that, only 120 fish and 20 invertebrate species are marketed. One of the major ecological impacts of this Fishery is the bycatch -- which is

enormous. The EIS admits that 'Non-retained finfish species caught as bycatch usually do not survive trawling and handling' (Anon, 2004b, p 127).

The other main issue is habitat destruction, but Fisheries NSW remain unable to quantify the problem. The EIS demonstrates how much more research needs to be conducted into the long-term environmental damage inflicted by the fishery:

While considerable research has been undertaken into both the fish trawl and prawn trawl components of the fishery, current levels of knowledge are not sufficient to ensure the sustainable management of the ocean trawl fishery. Few of the primary and key secondary species have had an adequate assessment of their stock status, and the collection of monitoring data and development of stock assessments is a high priority for most of these species (Anon, 2004b, p 87).

The destruction of habitats by trawling is left largely unaddressed by the management strategy. It is noted by the EIS that a 'significant component' of the catches are sessile invertebrate species (sponges, bryozoans and sea pens) but that the impacts of trawling on these species has not been studied. Assemblages and communities that rely on less well-understood habitats cannot be accommodated by the assessment style adopted by the EIS method adopted by NSW Fisheries.

The diverse range of organisms that are directly impacted by this fishery are listed in various tables in the EIS and its appendices.

The EIS documented the catch levels for the 90 species that make up 99% of the catch. It included eight named species of shark as well as the 'shark unspecified' category. The category 'Shark unspecified' (Figure 12) and 'fish, unspecified' (Figure 3 and 4) make it difficult to accurately assess the impact of the fishery on vulnerable species: for the 00/01 year, 24,069 kilos of 'unspecified' ocean fish were recoded caught by prawn trawl nets (Anon, 2004b, p 65) and very little attempt was made by the EIS to understand the composition of this generic category. The extraordinary number of species reported caught in trawl operations of a great concern, especially considering that offshore operations are likely to catch species that are long-lived and slow to reproduce. It was noted that 'the identification of some species is difficult and reported catches might include other species' (Anon, 2004b, p 66) and that 'the data are as reported by fishers and have not been validated, and reported weights have not been corrected for processing prior to landing' (Anon, 2004b, p 66).

Among the list of species that comprise the remaining 1% of landings across the trawl sector are Gemfish - acknowledged to have collapsed in the Commonwealth South East Fishery (Figure 5), five more species of shark, including 'dogfish unspecified' -see Figure 24- and several other species that are targeted by other fisheries and considered over-fished like Orange Roughy (Figure 25) and Garfish (Figure 26) (Anon, 2004b, p 54).

Figure 24. Commercial catch (kg) of Dogfish Shark (Endeavour/Greeneye) from 1940 to 2000.

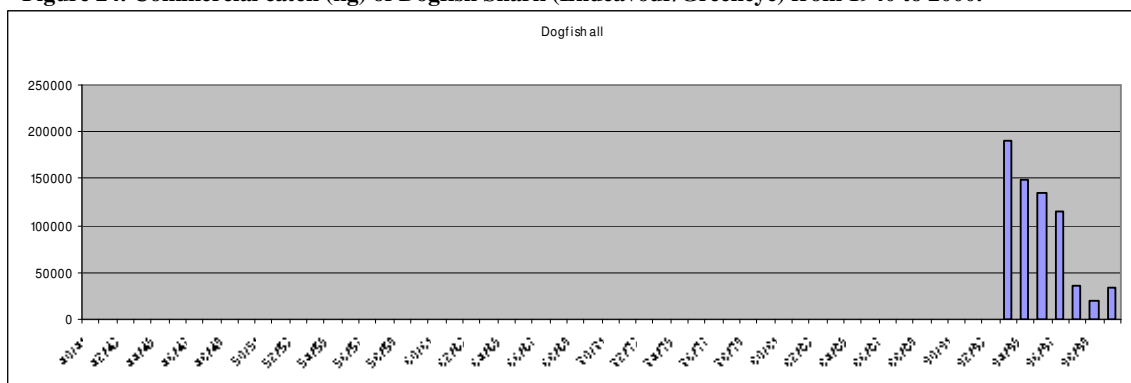


Figure 25. Commercial catch (kg) of Orange Perch from 1940 to 2000

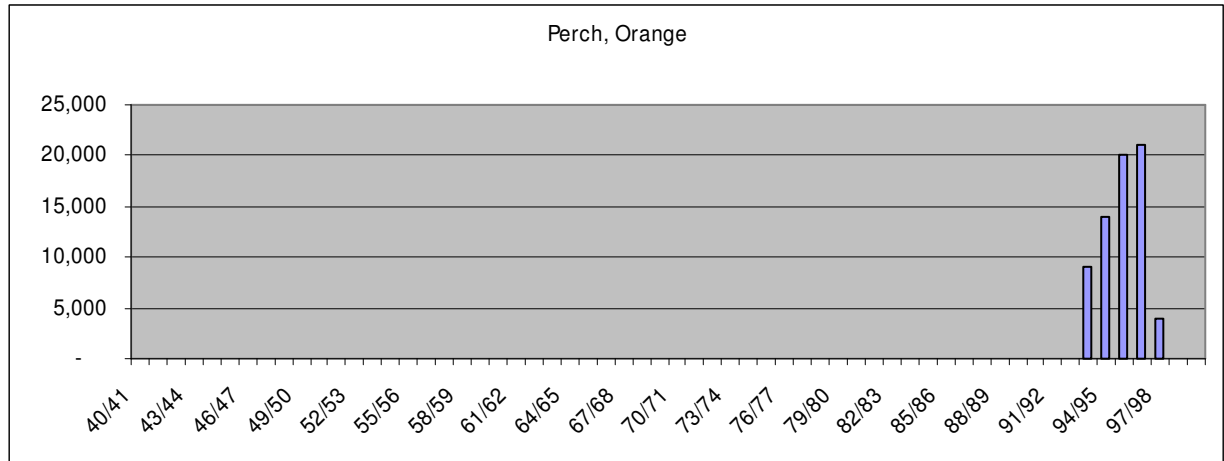


Figure 26. Commercial catch (kg) of all Garfish spp. From 1944 to 2000

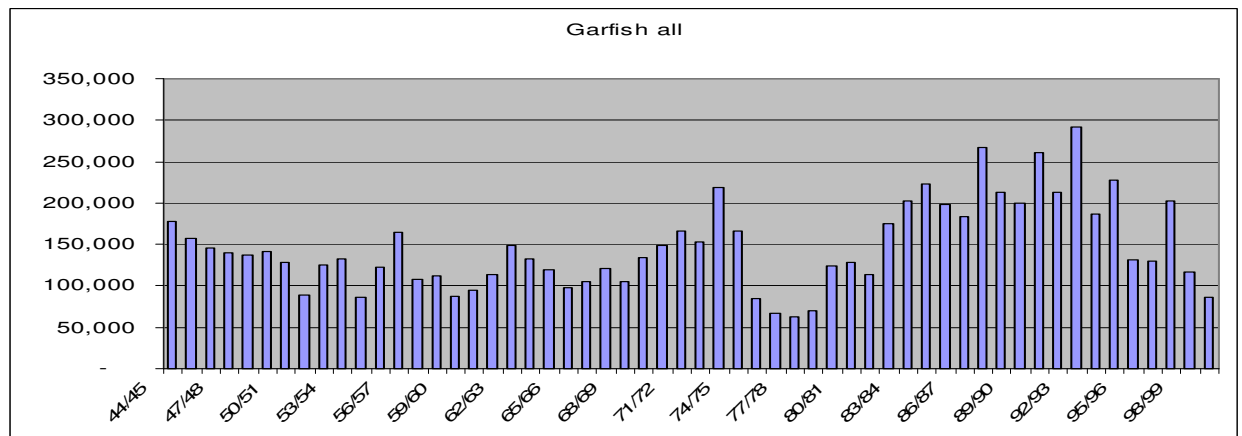
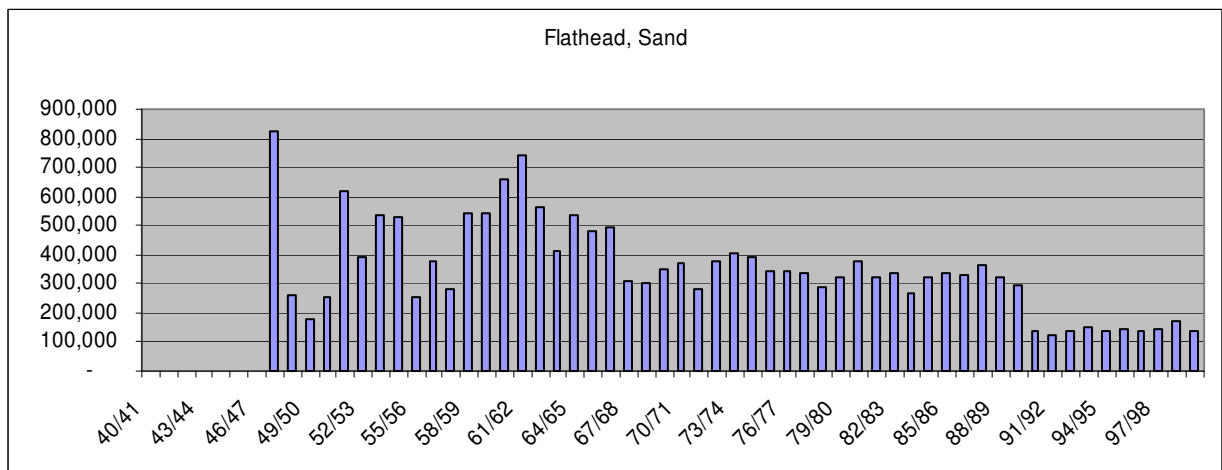


Figure 27. Commercial catch (kg) of Sand Flathead from 1940 to 2000.



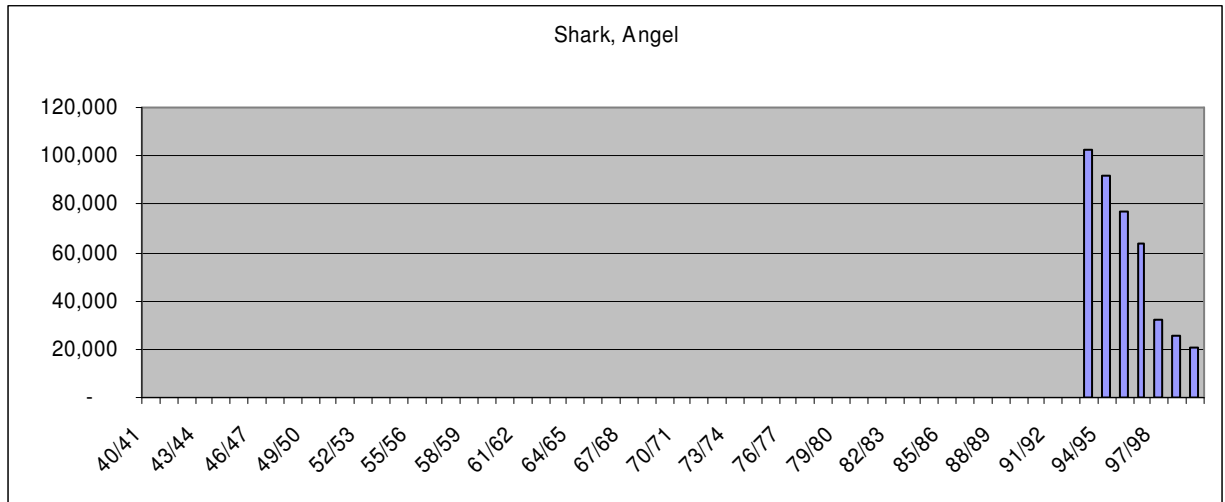
From the evidence in Appendix B, the historic catch data and the EIS itself, several species are shown to be of particular concern.

- a) Bream, Black and Yellowfin (Figure 23): The catch statistics show that the commercial catch of Bream for the entire state peaked in 94/95, and it has been sharply declining ever since. This species is caught by many methods, in many different habitats in NSW commercially, and by recreational fishers.
- b) Silver Trevally (Figure 16): Of the at-risk species, the Silver Trevally is the best understood and has received the most attention from NSW Fisheries. There has been a

dramatic decline in the commercial catch of this species and aggregations of Silver Trevally are targeted by trawl fishers.

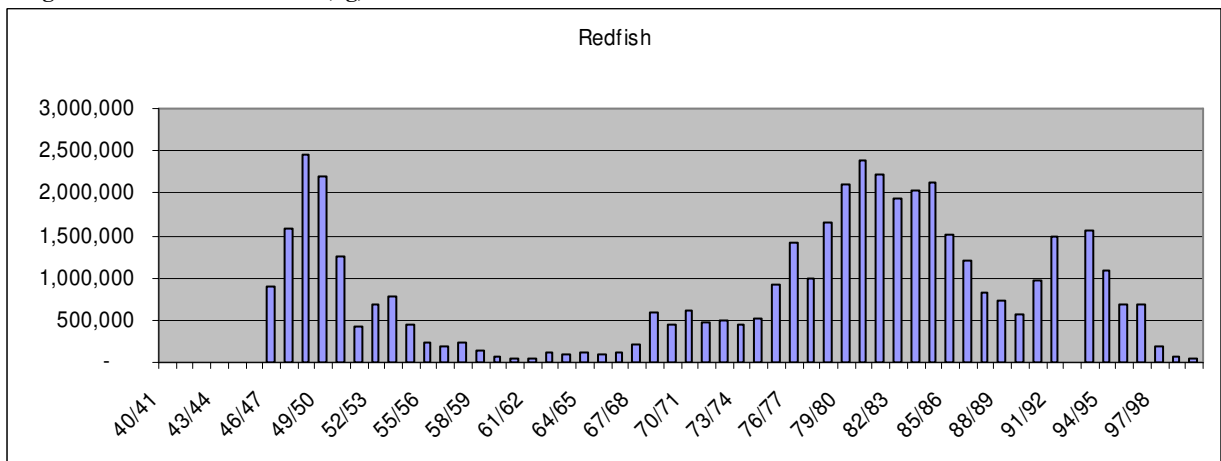
- c) All elasmobranch (sharks) caught by the OTF, but especially those that are listed by the IUCN as at risk or threatened. These are, several members of the 'dogfish group', which are estimated to be 20% of the 'mixed shark' landing category, among which Harrison's dogfish, Eastern Longnose spurdog and the Southern dogfish are considered threatened by the IUCN (see Figure 12); the two Wobbegong species (see Figure 14) and the Eastern Angel shark (Figure 28) are over-exploited by several fisheries, and in the case of the Angel Shark, little acknowledgement has been made by NSW Fisheries.

Figure 28. Commercial catch (kg) of Angel Shark between 1940 and 2000.



- d) Redfish (Figure 29): 'declining since mid 1980s by approximately 50% of peak in mid 1980s' (OTF EIS) and also the species with the largest quantity of discards (presumably undersized). The decline for the NSW population of Redfish is more in the order of 90% from the peak in the mid 80s.

Figure 29. Commercial catch (kg) of Redfish between 1940 and 2000



Assessment: Recreational Fishing

In NSW there are close to a million recreational fishers (about 17.1% of the NSW population), who fish mainly in saltwater using line methods 90% of the time (Scandol, 2003). As no reliable catch data have generally been available, NSW Fisheries do not account for these fishers when determining risk to stocks. As almost all the stocks targeted by recreational anglers are in serious decline, this is a serious omission. NSW

Fisheries has conducted surveys of recreational fishers in an attempt to quantify the extent of exploitation.

In terms of quantities and species caught, one survey discovered that:

Recreational fishers in NSW harvested approximately 13 million finfish (e.g. bream, whiting, flathead), 1.3 million baitfish (e.g. pilchards, yellowtail), 500,000 crabs and lobsters, 16 million prawns and yabbies, 1.2 million shellfish (e.g. abalone, pippi, oysters), 160,000 squid and cuttlefish and 300,000 miscellaneous. Flathead (Platycephalidae), bream (Sparidae), whiting (Sillaginidae), European carp (*Cyprinus carpio*), tailor (*Pomatomus saltatrix*) and luderick (*Girella tricuspidata*) were the most prominent species in the NSW recreational catch. Generally, these species were relatively abundant and broadly distributed, particularly in coastal and estuarine waters adjacent to large urban populations species (Scandol, 2003).

Another study estimates the total recreational and sports anglers in Australia at closer to five million and raises the issue that,

It is suspected that recreational and charter boat fishing practises can cause at least localised depletions of fish populations. This may be more pronounced when the species involved are territorial by nature and/or have a relatively small home range (e.g. some grouper species), or are easily accessed by fishers (e.g. inshore species which can be fished from shore). (Newton, 1999).

Although the NSW study found that spear fishing and hand harvesting combined accounted for only 1% of the state's recreational fishing effort (Scandol, 2003), there is evidence that spear fishing activities in 1960s and 1970s have had a significant effect on the abundance of at least two rocky reef species in NSW waters, namely the grey nurse shark (Pollard, 1990b; Smith and Pollard, 1996), which has not recovered since, and the eastern blue groper (Smith *et al.*, 1996) which is on the way to recovery.

On the surface, it appears that the numbers of fish taken by recreational anglers are negligible when one compares the annual catch of individual species by recreational fishers with that of the commercial sector. However, a great deal of the recreational fishing effort seems to be concentrated on specific species and areas – which is cause for concern. Henry and Lyle (2003) cite conversations with NSW Fisheries indicating that “for some highly populated metropolitan areas (e.g. Botany Bay, Sydney Harbour and Broken Bay, NSW), total catches by recreational fishers probably exceed the catches of commercial fishers”.

In March 2001, the NSW Government introduced the Recreational Fishing License. The introduction of this much needed management strategy was met with strong resistance from recreational fishing groups, who resented governmental meddling in their god given right to pursue and kill fish, championing the slogan *I fish and I vote*.

In NSW, recreational fishing is a significant industry, comparable in size to some of the smaller commercial fisheries – arguably, for the economy, bigger. Scandol (2003) concluded that in this state,

The total recreational catch was about 30% of the total commercial catch. Of greatest concern is that at least 6 of the prominent species harvested by both fishing groups were taken in greater numbers by recreational fishers.

In NSW the following species are caught in greater quantities by recreational anglers than professional fishers (Anon, 2005b);

1. Yellowtail Kingfish (Figure 19),

2. Mulloway – (Figure 30),
3. Bream (Figure 23),
4. Dolphinfish (Figure 31),
5. Teraglin (Figure 32)
6. Pearl Perch, and
7. Black-Spotted Pigfish

All of these stocks are in decline and some may be overfished.

Figure 30. Commercial catch (kg) of Mulloway between 1940 and 2000

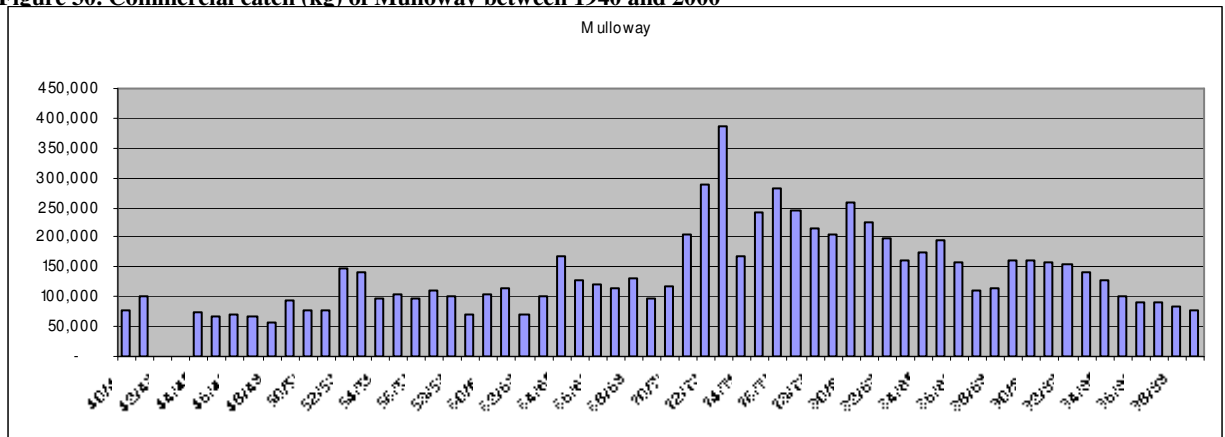


Figure 31. Commercial catch (kg) of Dolphinfish between 1940 and 2000

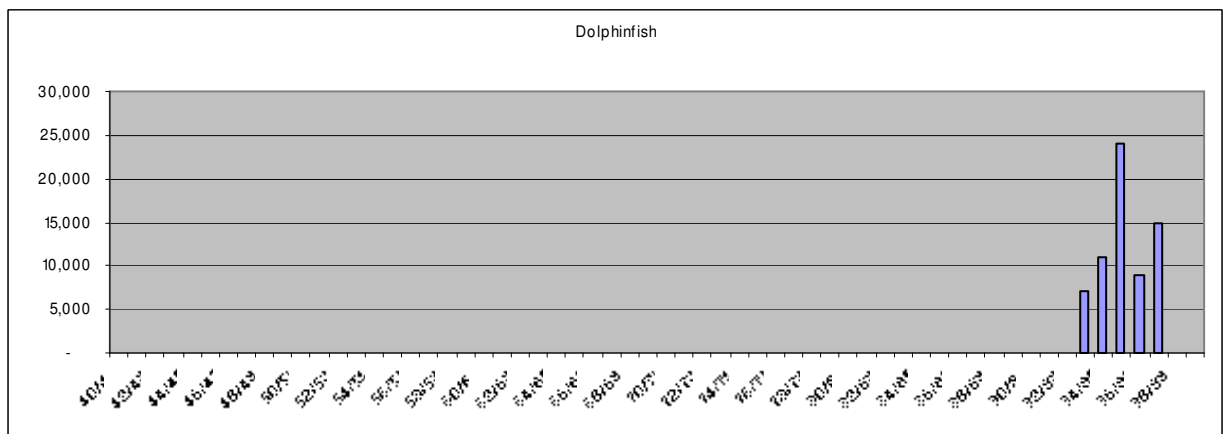
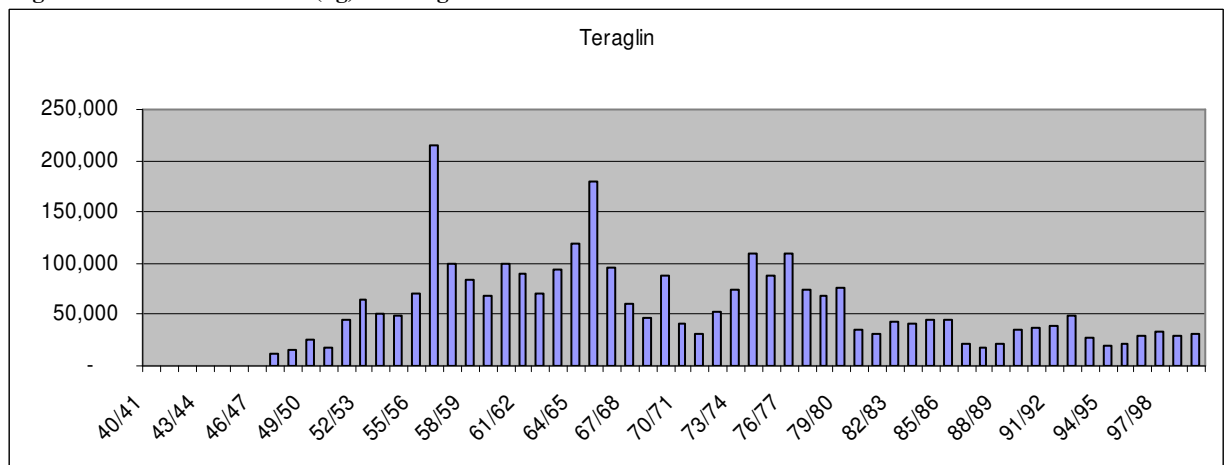


Figure 32. Commercial catch (kg) of Teraglin between 1940 and 2000



Recreation fishers also probably also catch and keep more of the following;

1. Dusky flathead (Figure 33),
2. Sole and Flounder (Figure 35),

3. Silver Trevally (Figure 16),
4. Rubberlip Morwong (Figures 8 and 9),
5. Samson Fish (Figure 38),
6. Sweep (Figure 39), and
7. Taylor (Figure 40),

And almost as many Blue swimmer crabs (Figure 36), and Jackass Morwong (Figure 37), (NCC, 2006).

Figure 33. Commercial catch (kg) of Dusky Flathead between 1940 and 2000

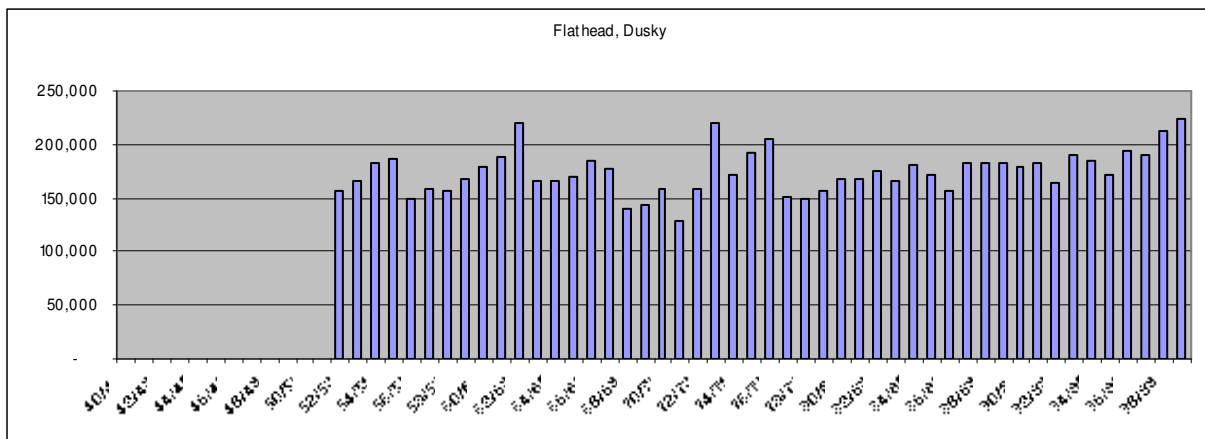


Figure 34. Commercial catch (kg) of all flathead between 1944 and 2000

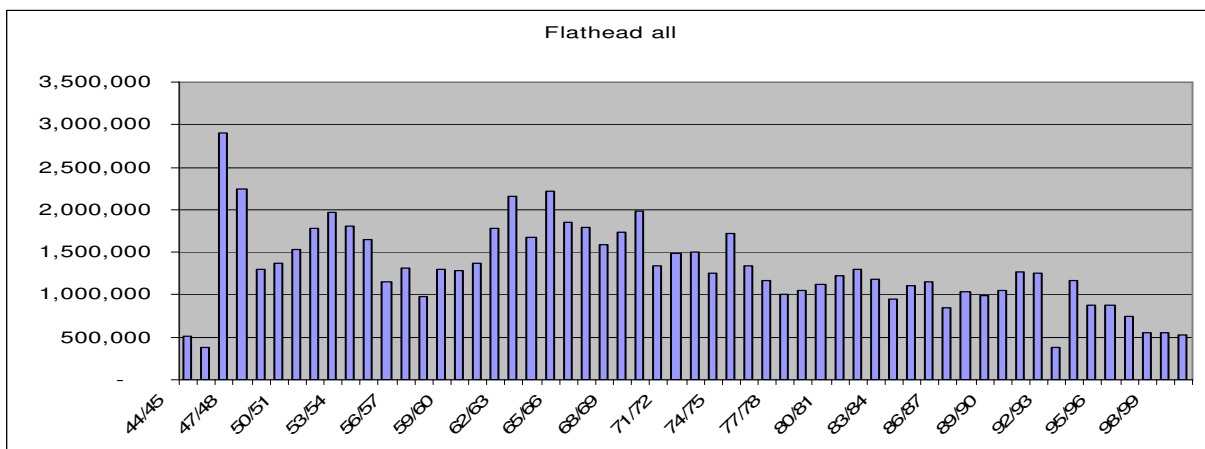


Figure 35 Commercial catch (kg) of Sole and Flounder between 1940 and 2000

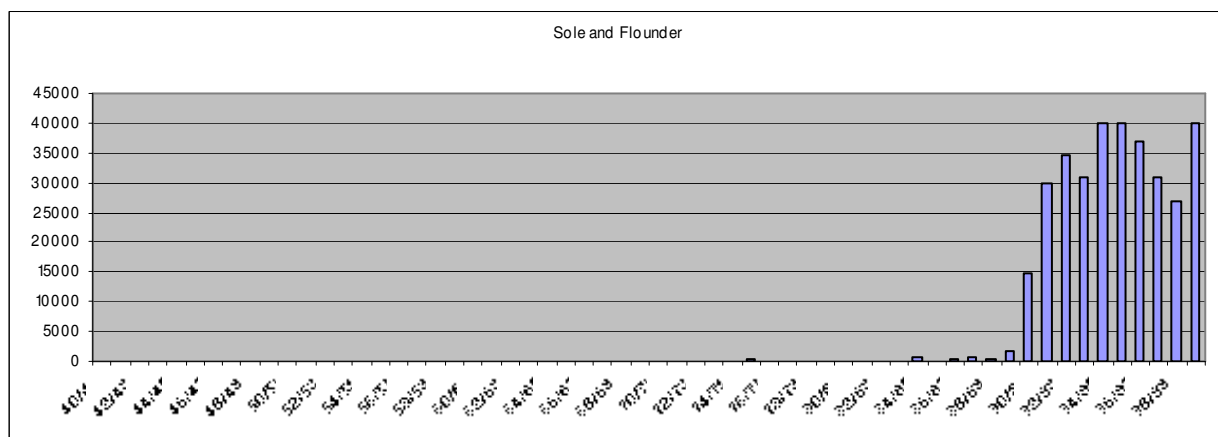


Figure 36. Commercial catch (kg) Blue Swimmer Crabs between 1940 and 2000

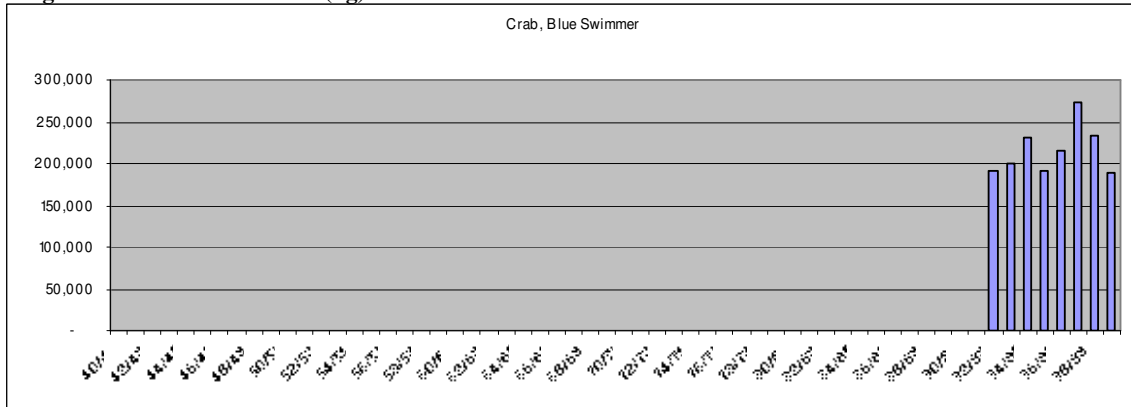


Figure 37. Commercial catch (kg) of Jackass Morwong between 1940 and 2000

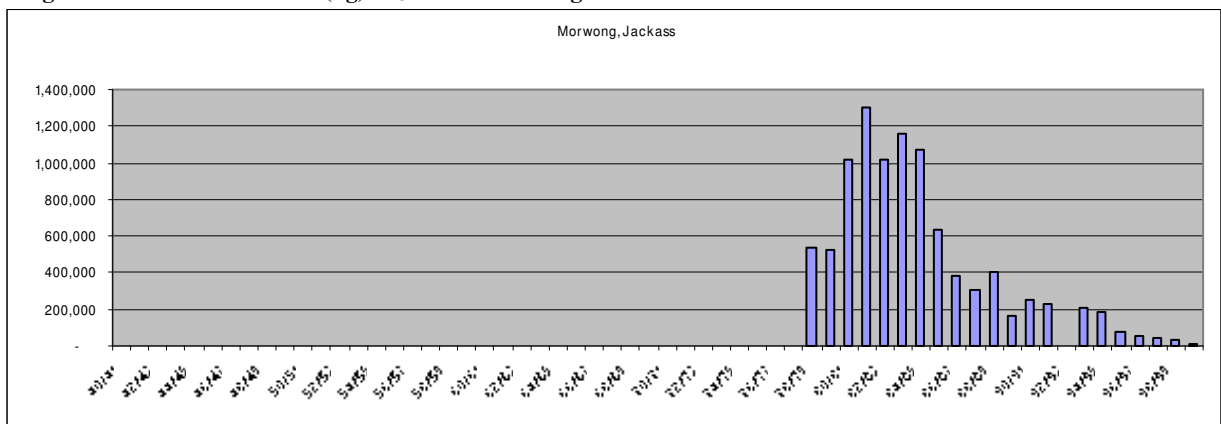


Figure 38. Commercial catch (kg) of Samson Fish between 1940 and 2000

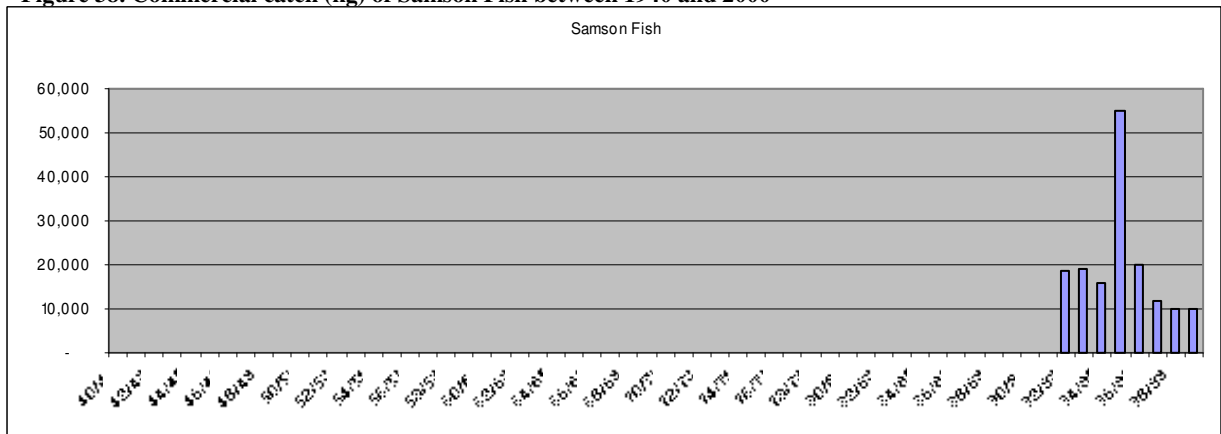


Figure 39. Commercial catch (kg) of Sweep between 1940 and 2000

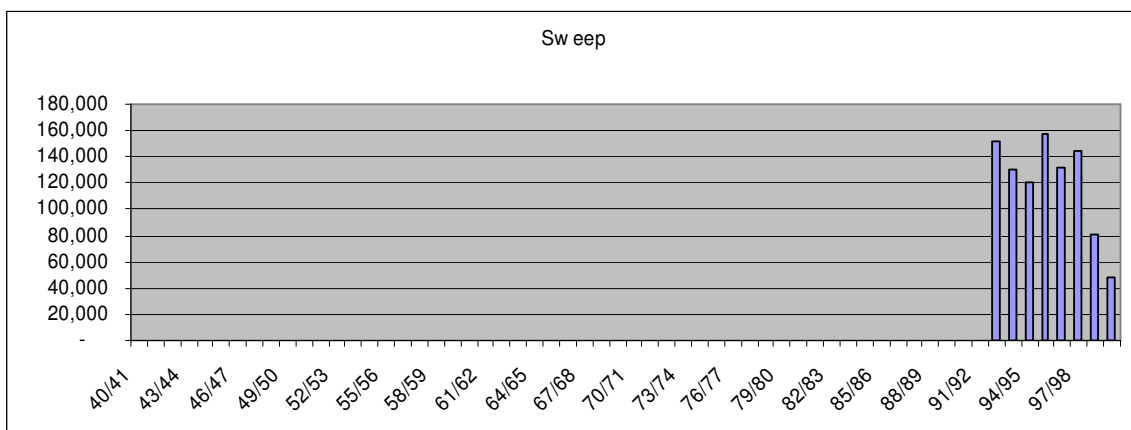
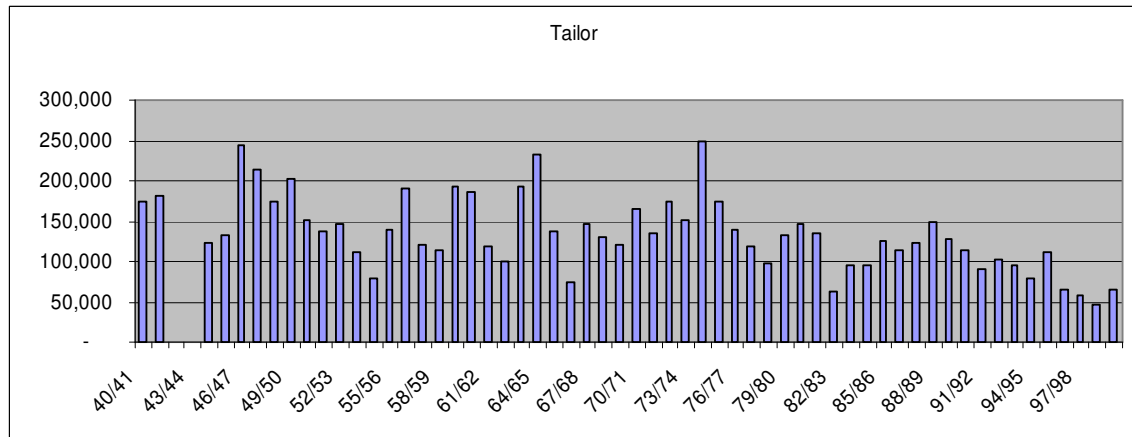


Figure 40. Commercial catch (kg) of Tailor between 1940 and 2000

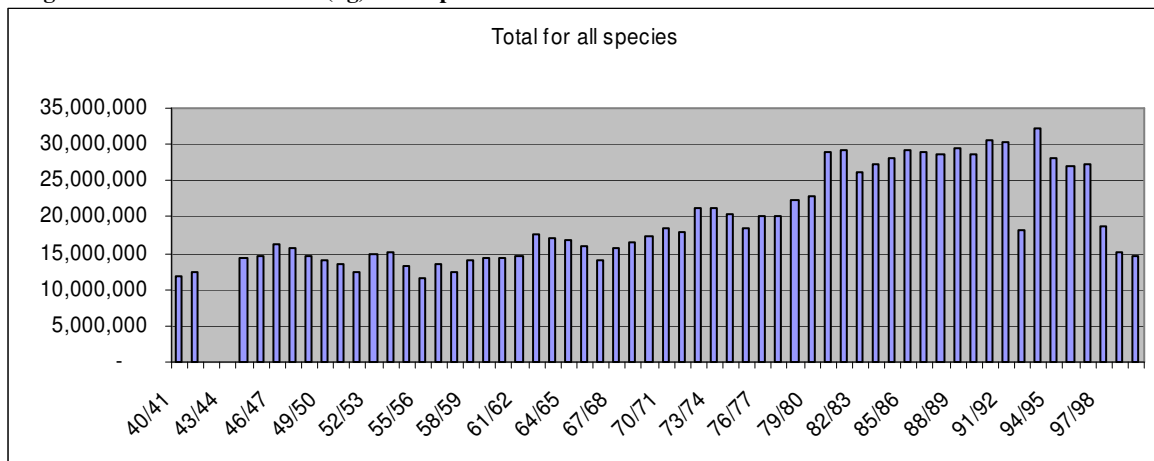


Assessment: Other populations of fishes in serious decline

Some of the above statistics, and those that follow, illustrate the seriousness of the decline in fish stocks in NSW. That almost all of these declines remain unaddressed by NSW Fisheries is a gross negligence. They include some of the most popular table fish as well as some of the most valuable fishery populations. These trends may yet be reversible. However, as is patently clear from the experience with the NSW gemfish population, small and species-specific fishery closures alone cannot turn the trends around. This is due to the nature of many of our fisheries. Apart from targeted fisheries such as beach hauling, where single species are often caught, mixed fisheries such as the Trawling and commercial Trap and Line fisheries are disturbingly unselective.

Figure 41 shows the entire NSW catch including crustacea and molluscs (not including oysters). This shows severe overfishing in the 1980s and 90s followed by a decline in total catch.

Figure 41. Commercial catch (kg) of all species from 1944 to 2000



To redress the decline of most of NSW fish populations, the only rational alternative to closing down sections of the industry altogether are;

1. Phasing-out unselective and destructive methods like passive set-lining and demersal trawling
2. Establishing very large no-take sanctuaries and
3. Substantial reduction of fishing effort through equitable buyout arrangements.

- Greater control and regulation, including more modest bag-limits, of the recreational catch

Closing sections of the commercial industry alone, would not substantially redress much of the decline, as the growing number of recreational anglers would probably continue overfishing the recovering stocks, keeping the spawning populations at low levels.

Figure 42. Commercial catch (kg) of John Dory between 1944 and 2000

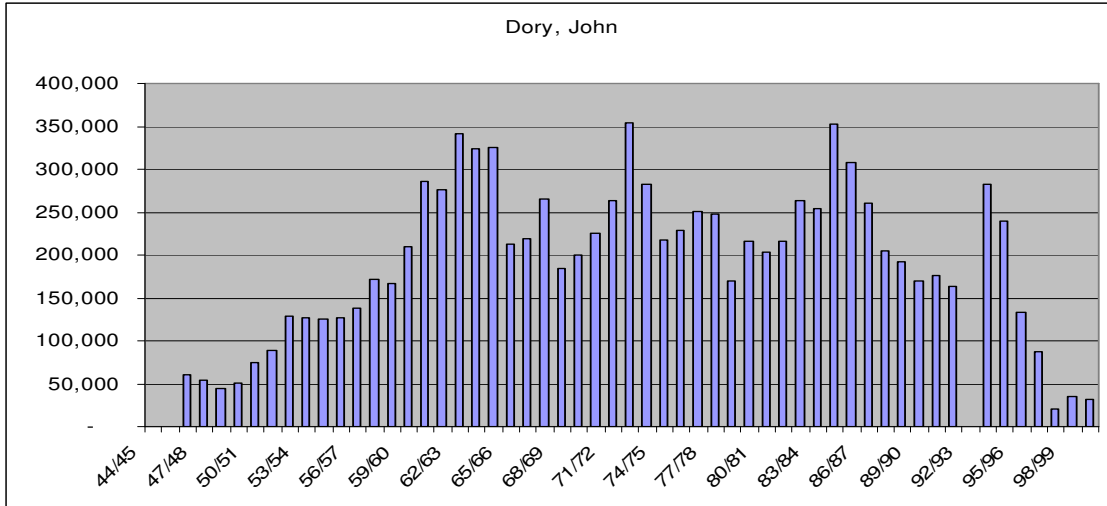


Figure 43. Commercial catch (kg) of Mirror Dory between 1944 and 2000

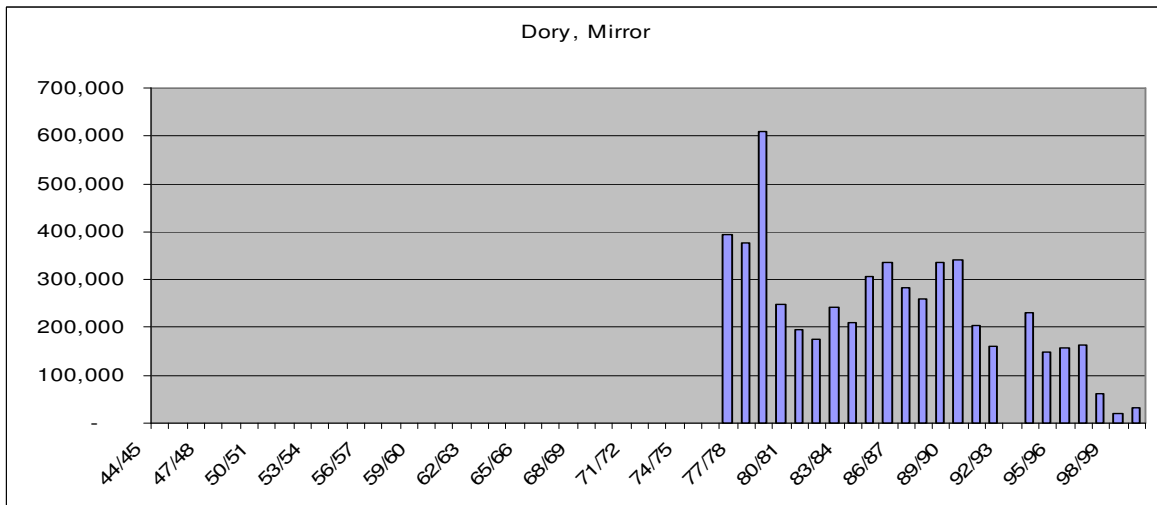


Figure 44. Commercial catch (kg) of Ling between 1944 and 2000

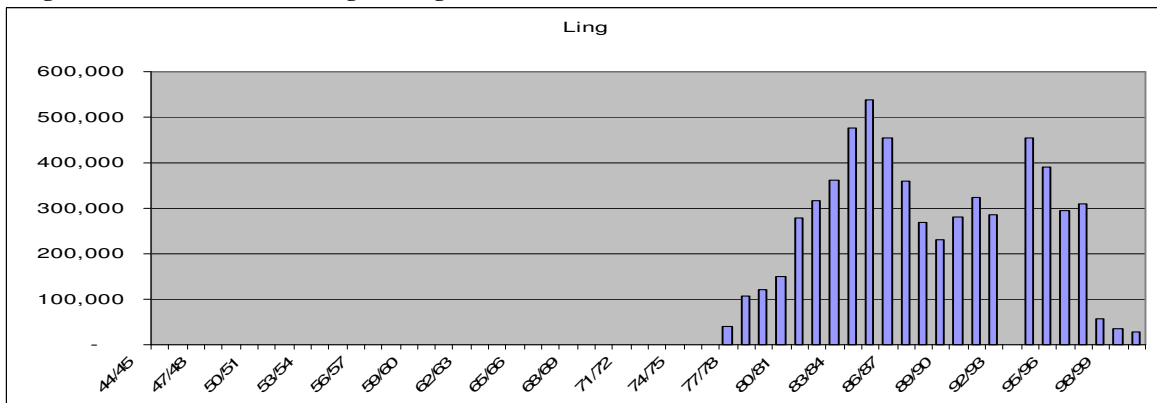


Figure 45. Commercial catch (kg) of Pilchard between 1944 and 2000

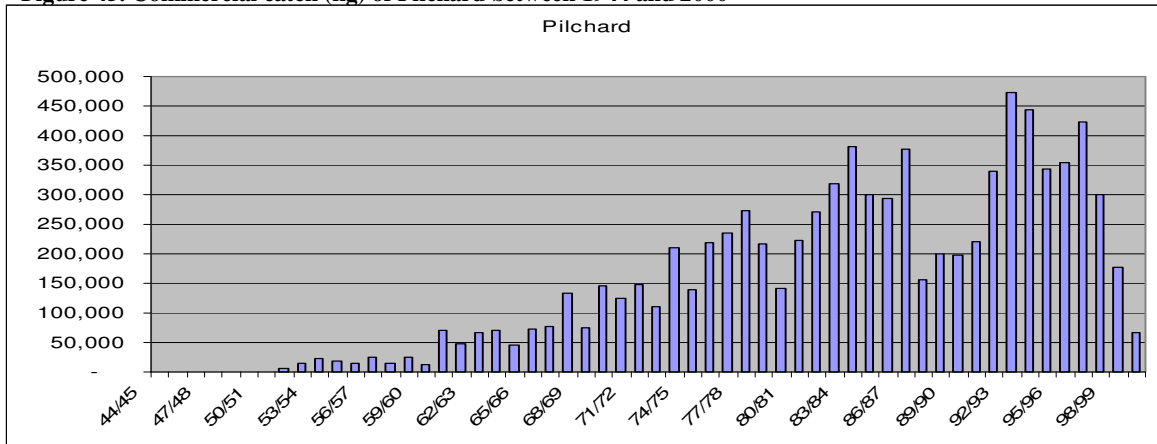


Figure 46. Commercial catch (kg) of Red Gurnard between 1940 and 2000

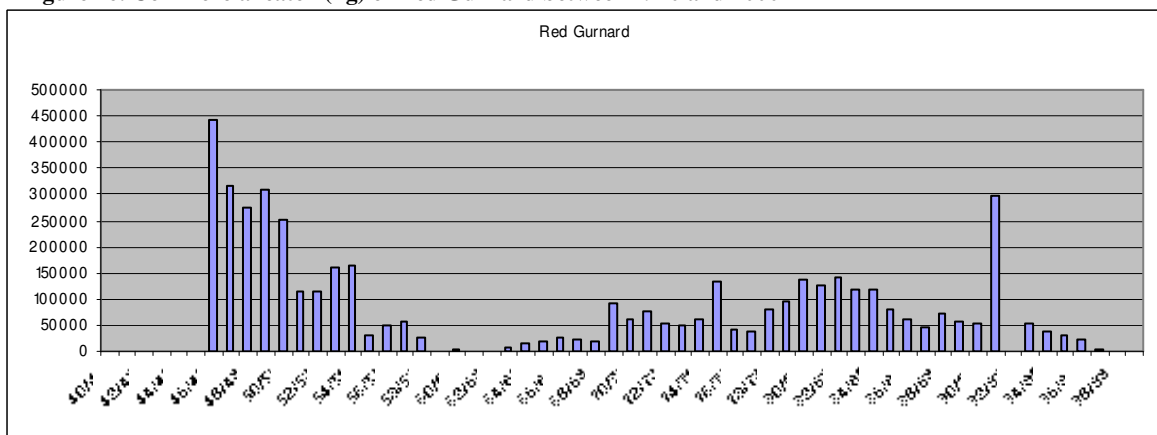


Figure 47. Commercial catch (kg) of Royal Red Prawn between 1940 and 2000

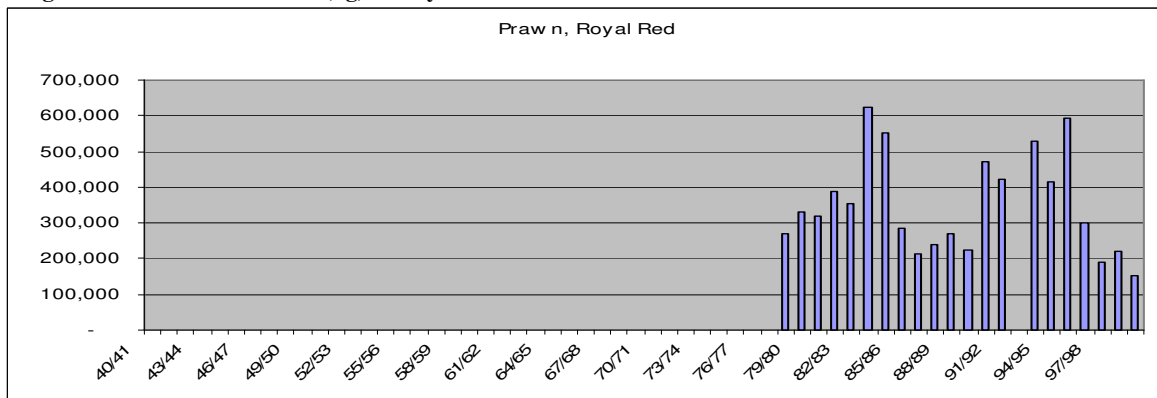


Figure 49. Commercial catch (kg) of Sand Crab between 1940 and 2000

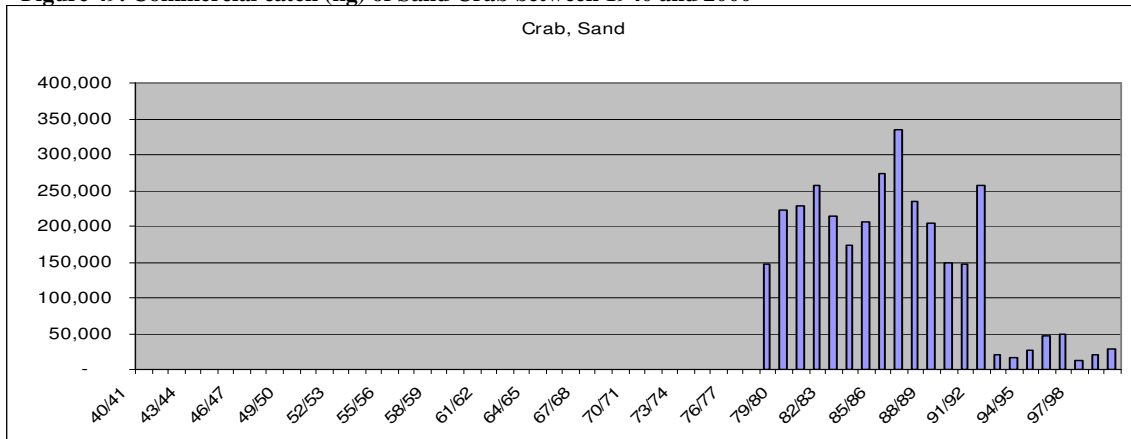


Figure 50. Commercial catch (kg) of Ocean Perch between 1944 and 2000

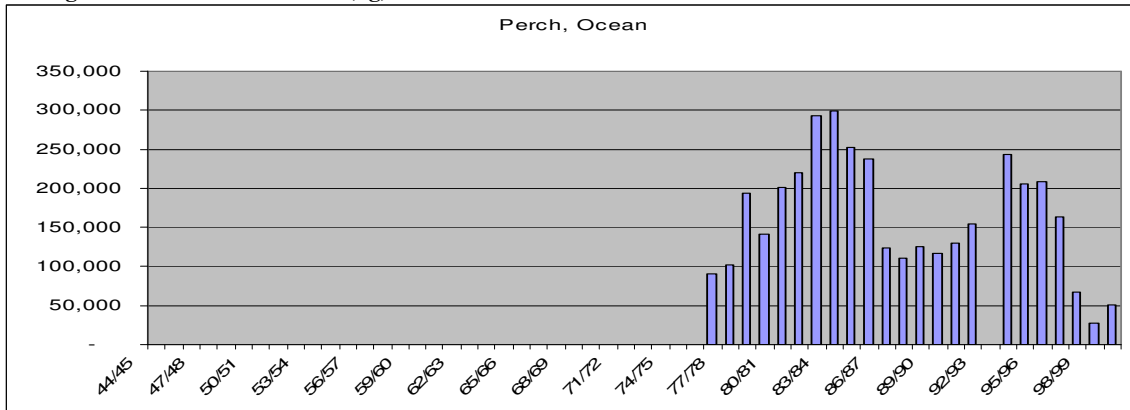


Figure 51. Commercial catch (kg) of Broadbill Swordfish between 1944 and 2000

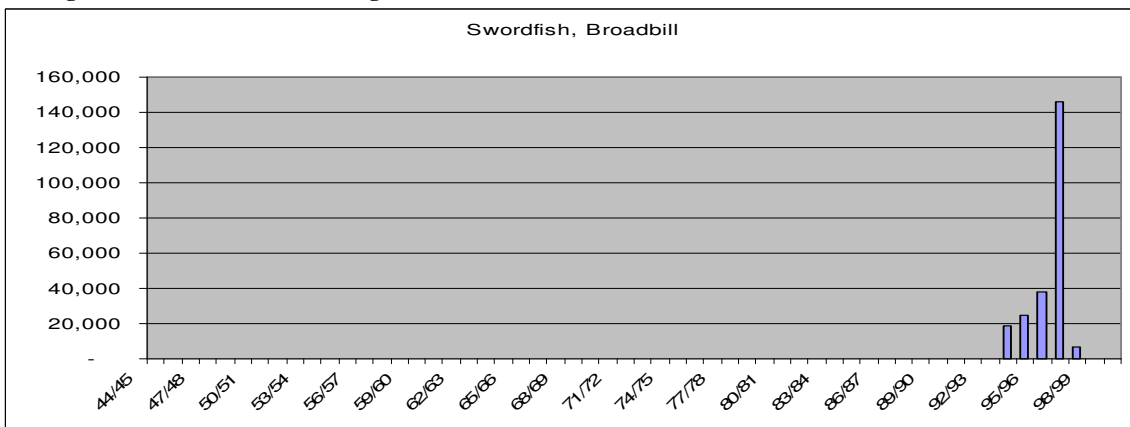


Figure 52. Commercial catch (kg) of Blue Grenadier between 1944 and 2000

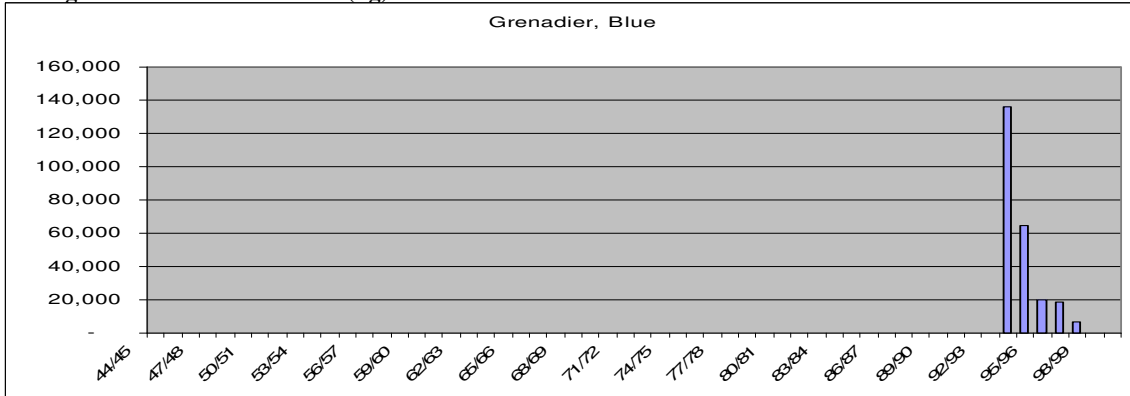


Figure 53. Commercial catch (kg) of Tiger Flathead between 1940 and 2000.

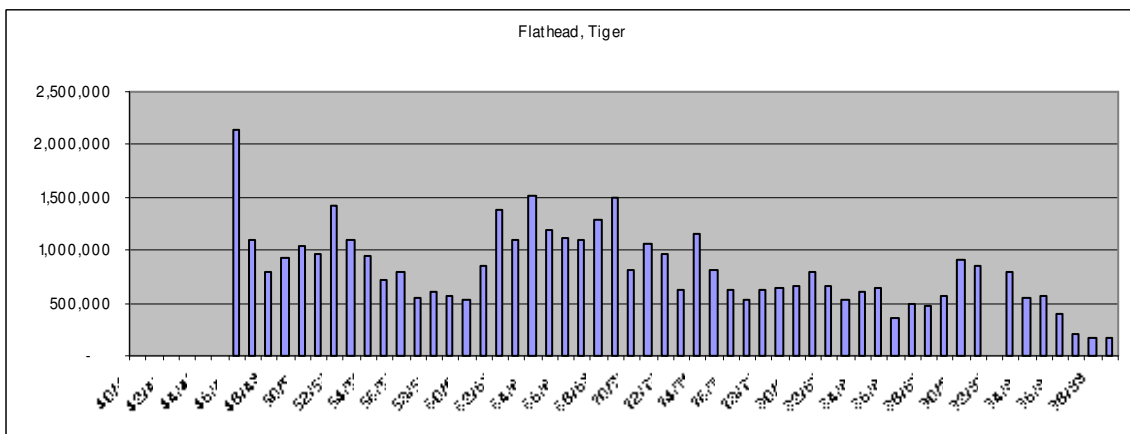


Figure 54. Commercial catch (kg) of Silver Dory between 1940 and 2000

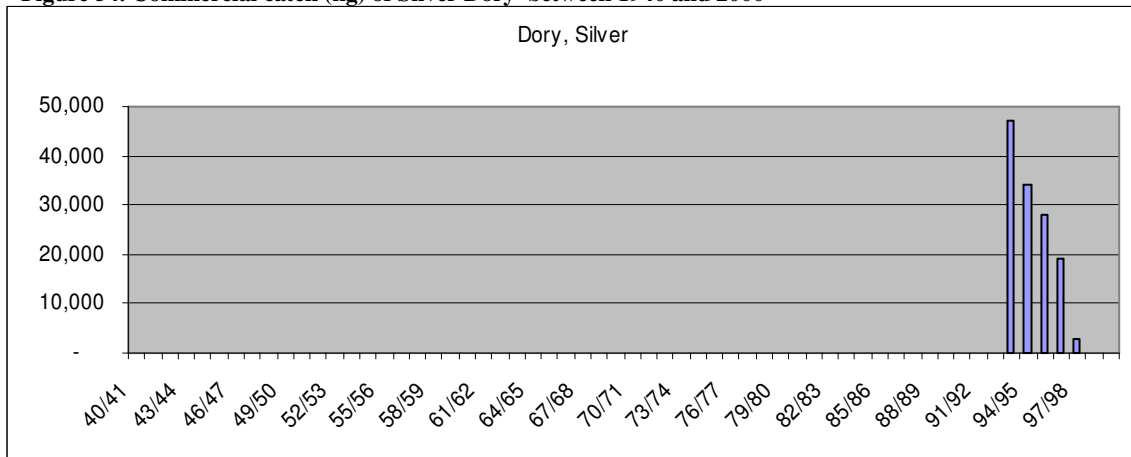


Figure 55. Commercial catch (kg) of Tarwhine between 1940 and 2000

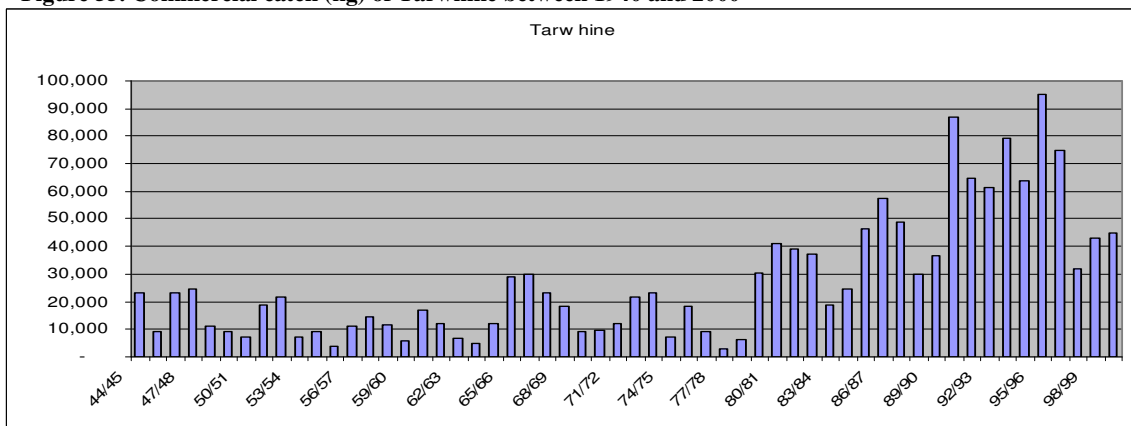


Figure 56. Commercial catch (kg) of Albacore between 1940 and 2000

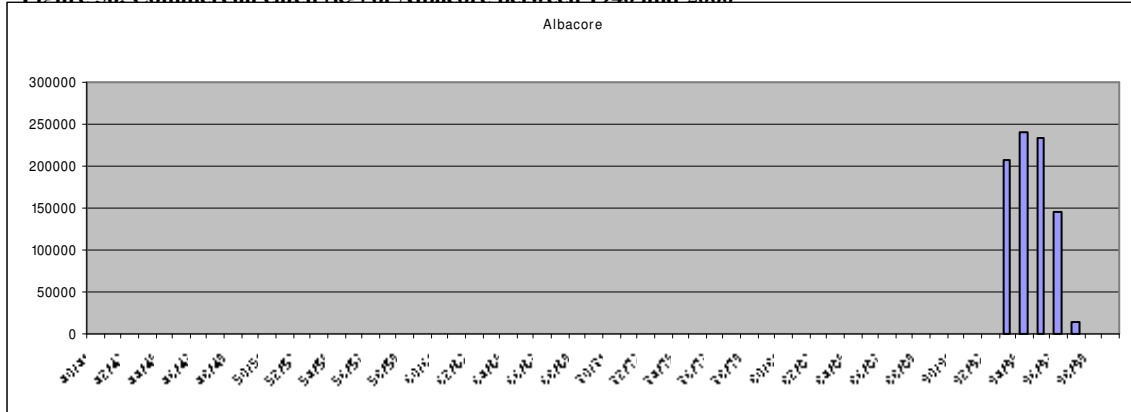


Figure 57. Commercial catch (kg) of Latchet between 1940 and 2000

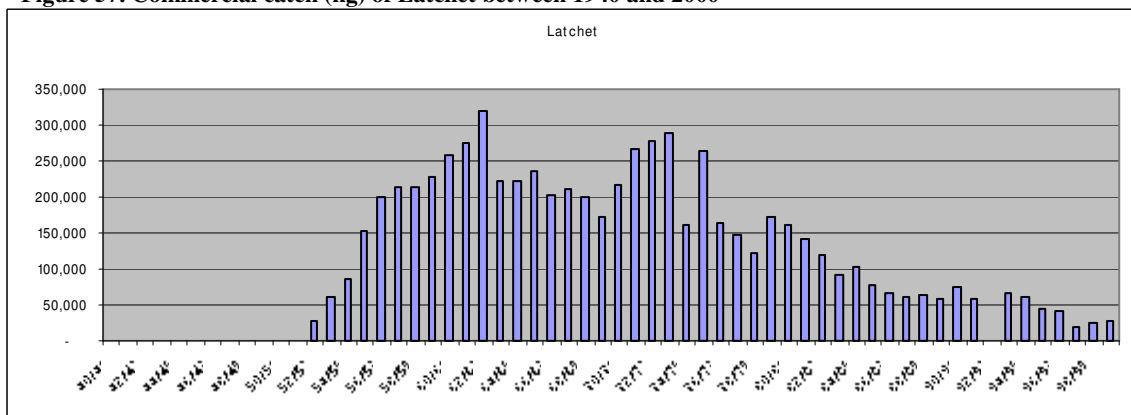


Figure 58. Commercial catch (kg) of Mackerel Jack (kg) between 1940 and 2000

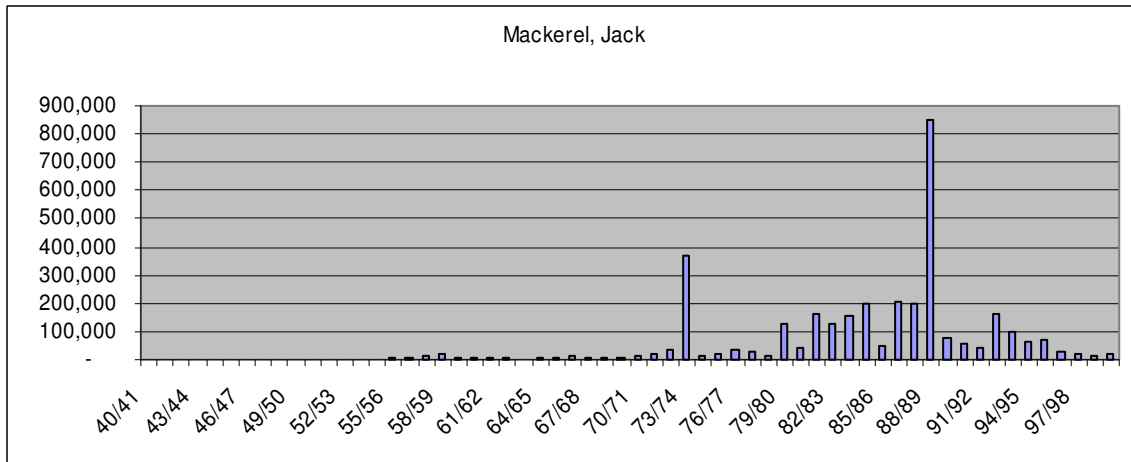


Figure 59. Commercial catch (kg) of Spanish Mackerel between 1940 and 2000.

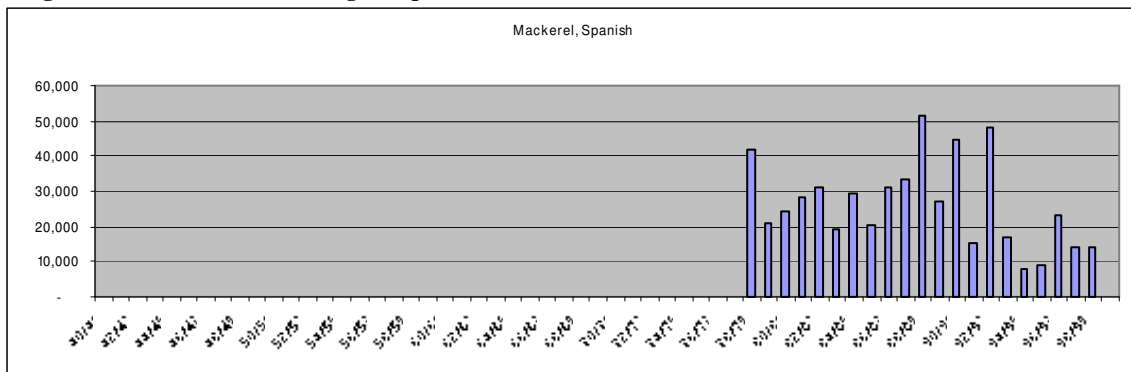
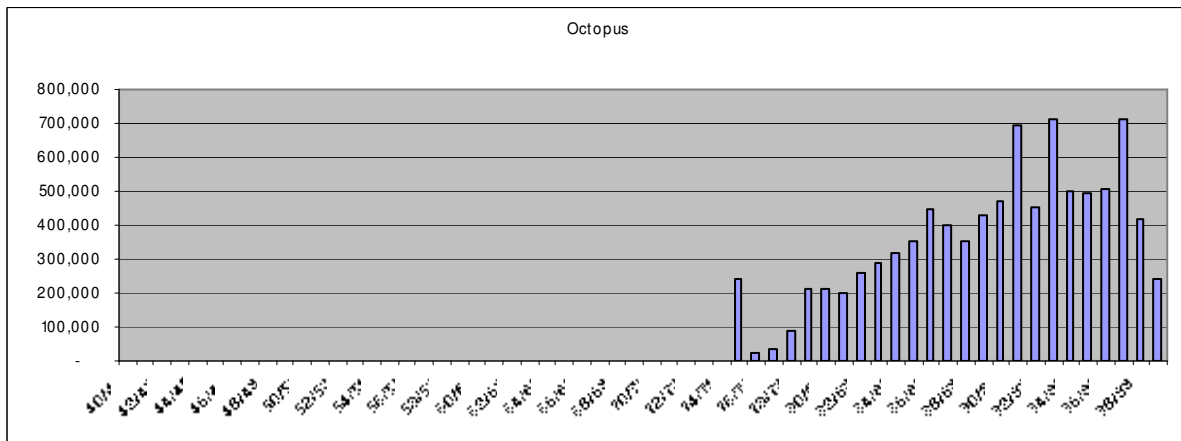


Figure 60. Commercial Catch (kg) of Cuttlefish between 1940 and 2000



Assessment: Unsustainable catches

The decline of the many of the fish species caught in NSW marine waters has led to stocks of other species becoming overfished, some of these are included below. Of serious concern is the commercial overfishing for baitfish such as Yellowtail (Figure 64).

Figure 61. Commercial catch (kg) of all Whiting spp. between 1944 and 2000

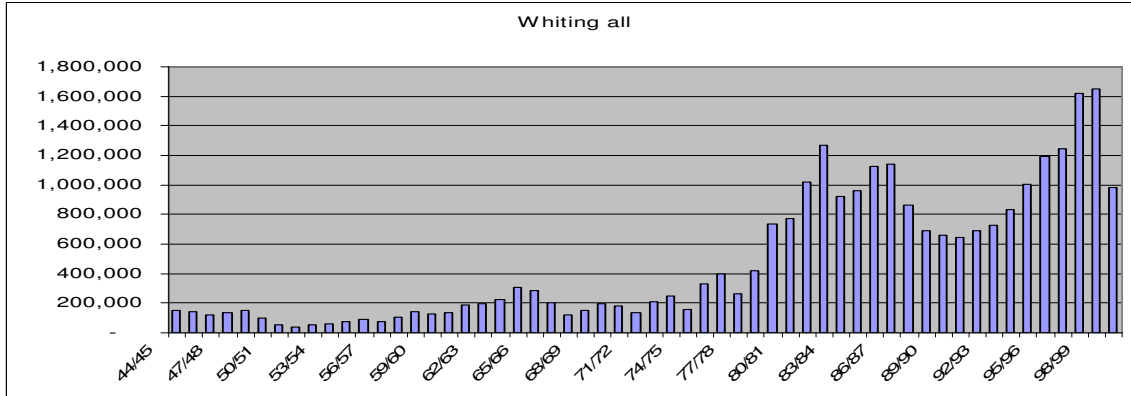


Figure 62. Commercial catch (kg) of Blue Mackerel between 1940 and 2000

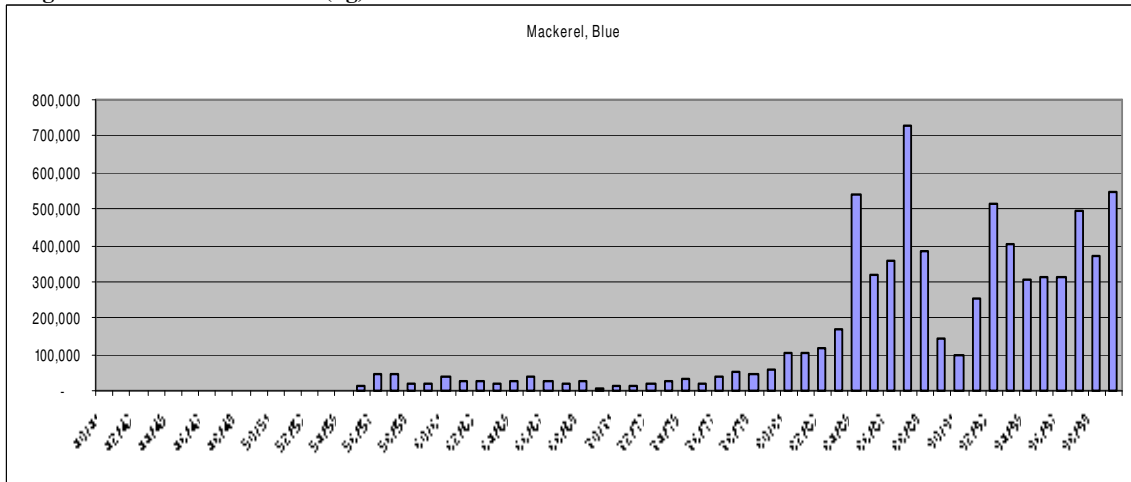


Figure 63. Commercial catch (kg) of Yellowtail between 1940 and 2000

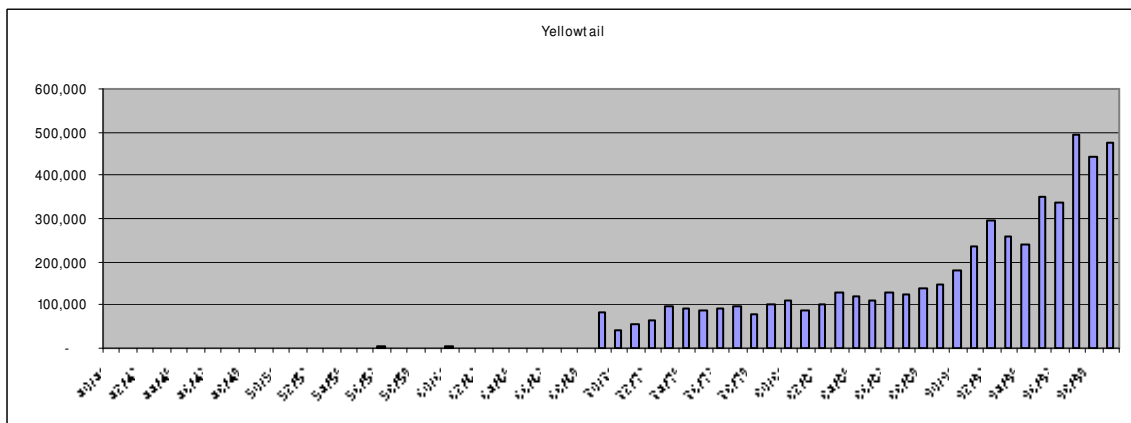
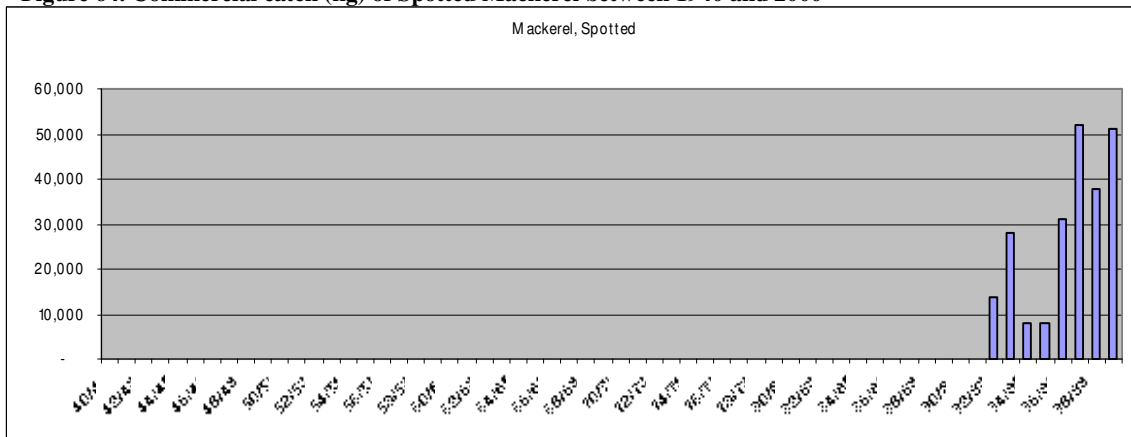


Figure 64. Commercial catch (kg) of Spotted Mackerel between 1940 and 2000



Conclusion

The public agency management of commercial fishing industry in NSW is at the stage that Forestry in NSW was when we were clearfelling rainforest. It is at least 25 years behind, and may take a further 25 years to catch up with current fishing trends and the introduction of effective management controls. Whether the much touted ecosystem-based management will eventuate, is unclear. Much of the problem stems from fishers themselves, who NSW Fisheries are at odds to control.

Commercial and recreational fishers squabble about who is to blame for the across-the-board population declines being experienced for economically important species. Groups within the commercial fishing sector blame each other. Most fishers seem reluctant to accept any accountability for their impact. Fishers have been of late blaming pollution and water quality (which are obviously also, critically important for marine biodiversity); anything to deflect the blame and avoid having to look at their own impacts and mismanagement. Fisheries stewardship by either commercial or recreational fishers seems a distant fantasy.

Allusions in the OTLF Draft Assessment to “interactions” between trap and line fishers and trawl and lobster fishers, involving “interactions” of gear, is a delicate understatement of a massive problem of wrangling and tactical resource over-exploitation to hog resources that characterises the commercial fishing industry in NSW.

This is probably largely a failure on NSW Fisheries’ part to educate fishers and establish a stewardship environment. Unless and until such stewardship is evident in the NSW fishing industries, a firm hand must be taken of the manner the industry operates.

As has been demonstrated with the native timber industry, a *laissez faire* approach to the management of resource exploitation is unworkable to sustain the resource for the public good. The options for the management of fisheries are limited by the fishers’ need to profit from the exploitation.

The current round of Marine Park declarations and the ongoing Zoning Plan process is a perfect opportunity to redesign the industry to become sustainable and profitable once again.

The number of fishers – or at least, the overall catch – must be significantly reduced. This will become prohibitive if the Government must buy out latent fishing endorsements held by fishers who rarely if ever fish commercially. This latent effort is a looming problem, threatening to dramatically exacerbate overfishing problems if it is ever activated, and must be dealt with in a blunt and immediate manner. Part time commercial fishing must become a thing of the past. If a holder of a commercial fishing licence has not landed a commercial catch within the last 12 months he or she must forgo their licence. This would remove the current trend of latent fishing effort being the focus of much of the scarce buyout funding available. If these fishers are not dealt with immediately and permanently, when fishing endorsement buyouts take place, those who have not been fishing all of a sudden find it profitable once again to start fishing. The buyout thereby becomes ineffective in reducing the total catch.

Those fishers who have landed a commercial catch in the previous 12 months should be given the opportunity to tender for buyout, in line with Commonwealth procedures. This means that targeted and focused buyouts can be undertaken to remove unsustainable effort in areas that are in most need of such reductions.

Trawling and passive line methods should be phased out in NSW waters. Trawling devastates benthic habitats and removes undersized fish, larvae and juveniles, which unavoidably impacts on itself and other fisheries. Whiting grounds could remain available to trawling in certain areas with gear that specifically targets the species. However, the catch of all whiting species must be capped at about 600 tonnes per annum.

Passive line methods also must be phased out, as they indiscriminately kill unintended targets such as Grey Nurse Shark, and other near threatened sharks, threatened teleost fish such as the Black Cod, and possibly sea birds, turtles, etc. The method is also very wasteful, as the mortality is high.

Finally, the areas dedicated for sanctuary protection within Marine Parks must be substantial. At least 20% of each bioregion must be protected from fishing to allow recovery of the species that have been severely depleted by the mismanagement of our fisheries over such an extended period. Once these species have recovered they must be protected from environmental catastrophes and stochastic events to ensure the NSW fishery can supply a variety of fresh fish to the NSW public in perpetuity.

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