

**ASSESSING FISHING
TRENDS IN THE
ST HELENS TO CAPE
HILLSBOROUGH
NET FREE ZONE
2015-2020**



INTRODUCTION AND ACKNOWLEDGEMENTS

Mackay Recreational Fishers Alliance Inc (MRFA) was the principal proponent in the establishment of the St Helens to Cape Hillsborough Net Free Zone (NFZ). This not for profit organization aims to quantify changes in the NFZ by conducting a series of data collection exercises over a number of years with each survey aiming at approximately 1,500 hours of fishing effort collected from participating fishers. An initial survey was conducted prior to the declaration of the Net Free Zone (NFZ) in October 2015. Further surveys were conducted from February-April in 2016, 2017, 2018, 2019 and 2020. The last 5 surveys were conducted at the same time of year each year to coincide with the opening of the Barramundi season and be representative of similar climatic conditions.

Initial funding for this project was provided by Reef Catchments, through funding from the Australian Government's National Landcare Programme.

Luke Galea has coordinated the collection of data on catch and effort through boat ramp surveys and collecting trip details and his efforts are acknowledged. The Management Committee of MFRA would also like to thank Tackleworld Mackay for being an integral part of the data collection process and the hundreds of volunteers that have provided details of their fishing trips. Without their "Citizen Science" efforts this report would not be possible.



REPORT

This report has been prepared by Infofish Australia Pty Ltd for the Mackay Recreational Fishers Alliance Inc – June 2020.

SCOPE

Data were assessed in relation to:

- ✦ Change in catch rates
- ✦ Change in fish kept and legal fish
- ✦ Change in size composition
- ✦ Change in time taken to catch a legal fish

DATA SOURCES

Data used in this report were collected by MRFA during the following periods:

- ✦ Catch and effort surveys by MRFA from 3/10/2015-1/11/2015 (Survey 1 - 2015)
- ✦ Catch and effort surveys by MRFA from 3/2/2016-23/4/2016 (Survey 2 - 2016)
- ✦ Catch and effort surveys by MRFA from 23/1/2017-23/4/2017 (Survey 3 - 2017)
- ✦ Catch and effort surveys by MRFA from 1/2/2018-26/4/2018 (Survey 4 - 2018)
- ✦ Catch and effort surveys by MRFA from 1/2/2019-30/4/2019 (Survey 5 - 2019)
- ✦ Catch and effort surveys by MRFA from 1/2/2020-30/4/2020 (Survey 6 – 2020)
- ✦ Data are stored in the Infofish Australia database at <http://crystalbowl.infofishaustralia.com.au/>

ST HELENS TO CAPE HILLSBOROUGH NET FREE ZONE

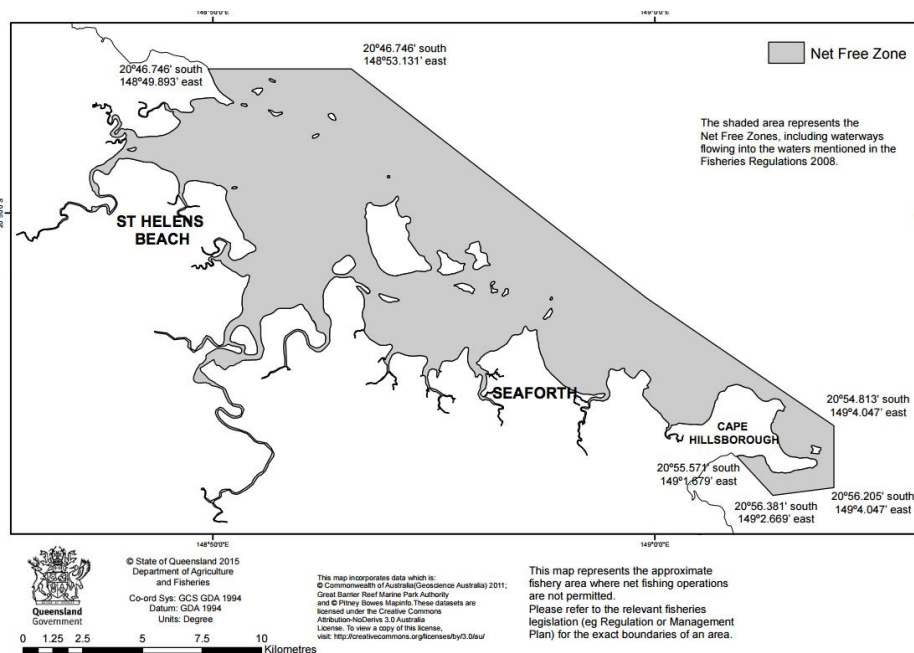


Figure 1: St Helens to Cape Hillsborough Net Free Zone

EXECUTIVE SUMMARY

The purpose of this report is to record changes in fish stocks in the St Helens to Cape Hillsborough Net Free Zone (NFZ). From 2015-2020 the Mackay Recreational Fishers Alliance (MRFA) have conducted 6 surveys of recreational fishers who fish within the NFZ. Data were collected to assess changes in the numbers and sizes of fish caught as well as the effort required to catch a fish or legal fish. These data provide an assessment of changes in the NFZ since its introduction.

The first survey in the NFZ was conducted in October 2015, prior to the establishment of the NFZ. Since then, an additional 5 surveys have been carried out from February-April in 2016, 2017, 2018, 2019 and 2020. For consistency, survey effort has been kept to approximately 1,500 hours per year. Surveys were carried out at key boat ramps within the NFZ (namely Victor Creek, Murray Creek and St Helens Beach) and were also emailed to fishers who are well-known to fish in the area. Fishing effort has been relatively consistent across all years, with mostly 2 fishers fishing 5.8 – 8.0 hours per trip on average.

Target fish species were Barramundi, Javelin (Grunter), Whiting, Bream and Golden Snapper (Fingermark). These species were chosen given their significance to recreational fishers and their representation in the catch. Catch rates were calculated as number of fish/fisher/trip.

With 6 years of data the effects of the NFZ are now apparent with initial increased catch rates that have stabilised, more legal fish, increased fish sizes and more trophy sized fish. There has been a comeback of King and Blue Threadfin and changing attitudes by fishers in releasing more and more legal fish with 52.5% of all legal fish being released in 2020.

The overall catch rate of 3.7 fish/fisher/trip in 2020 is down compared with 2019 and 2018 at 5.0 fish/fisher/trip. The kept fish rate was 1.1 fish/fisher/trip in 2020 compared with 0.9 in 2019 and a high of 1.7 fish/fisher/trip in 2017. Across the 6 years, the results show an ongoing reduction in time taken to catch a legal fish from 7.6 hours in 2015 to 2.7 hours in 2017, 2018 and 2019. It rose slightly to 3.1 hours in 2020. The overall catch rate has declined but it is likely to have been influenced by the continued increasing focus on Barramundi resulting in fewer larger fish being caught and lower bycatch.

Barramundi continue to increase as the prime target and most caught species comprising 45.0% of the overall catch in 2020. This year 84.5% of Barramundi caught were legal size over 580mm while 42.8% were kept. The proportion of legal fish released has increased over the 5 years and was not related to the possession limit.

Whiting and Golden Snapper were the most kept species. Whiting in the catch have fluctuated with just 11 fish caught and kept in 2020. Overall, of the 220 legal Whiting caught over the 6 years 217 (98.6%) were kept. For Golden Snapper from 2015-2017 over 75% of legal fish were kept and in 2015 and 2017 it was over 90%. However, in 2018 and 2019 legal fish kept fell to 58.0% and rose slightly to 61.1% in 2020.

The number and percentage of Bream kept has fallen over the 6 years with just 6 (14.0%) of 43 legal sized fish kept in 2020, while trophy fish over 350mm was 13.9% in 2020. This suggests that other species are preferred to be kept now that legal sized fish are more available.

Both King and Blue Threadfin have gone from very low numbers and an incidental catch in 2015 to be key targets and comprising 7.5% and 7.4% of the catch in 2019 respectively

however fell to 2.9% and 1.6% in 2020. As well King Threadfin have gone from none caught in 2015 to 15.8% trophy fish over 1m in 2019.

METHODS

Standardised forms were used to collect catch and effort data from fishers fishing the NFZ.

The following data were collected in relation to each fishing trip:

- ✦ Date
- ✦ Start and finish times of the fishing trips (actual time fished excluding travel time)
- ✦ All fish caught by species
- ✦ All fish kept by species
- ✦ Total length of fish (mm)
- ✦ Boat ramp used
- ✦ Home of fishers

Boat ramp surveys were undertaken at key boat ramps within the NFZ, those being Victor Creek, Murray Creek and St Helens Creek. Forms were also provided to volunteers by email or directly through Tackeworld Mackay, to fishers to fill in for trips undertaken at times when the boat ramp were not manned by MRFA volunteers. The aim was to collect around 100 surveys totaling around 1,500 fishing hours from fishers with a range of fishing preferences. The aim was also to survey fishers with similar profiles in each survey period.

Surveys in 2016-2020 were undertaken at the start of the Barramundi season as that species is a prime target in the area. Trip details were then entered in the Infofish 2019 database using the standard Infofish Suntag Trip Sheet.

Catch rates were calculated as fish/fisher/trip.



SUMMARY OF DATA COLLECTED AND CATCH RATES

Table 1 provides a summary of the key statistics from the surveys from 2015-2020. Figure 2 shows the average number of fishers and the average hours fished. There was an increase in the length of fishing trips. From 5.8 hours in 2015 to 8.0 hours in 2019 and a slight drop to 7.5 hours in 2020 while the number of fishers per trip has remained steady at around 2 from 2015 to 2019 and a drop to 1.7 in 2020.

Table 1: Summary of data from the surveys 2015-2020

	2015	2016	2017	2018	2019	2020
TOTAL TRIPS	95	93	110	95	110	109
FISHING DAYS	21	52	54	54	53	59
FISHER DAYS	230	242	214	196	212	190
FISHING HOURS	1348.67	1541.83	1485.17	1467.75	1697.75	1471.3
FISH CAUGHT	553	570	939	820	914	645
FISH KEPT	117	251	320	280	177	224
FISH LEGAL	177	339	598	548	622	472
FISH/FISHER/TRIP	2.52	3.14	4.72	5.06	5.02	3.69
KEPT/FISHER/TRIP	0.49	1.64	1.67	1.60	0.90	1.12
% LEGAL	32.0	60.2	63.8	66.8	68.1	73.2
HRS/LEGAL FISH	7.62	4.55	2.48	2.68	2.73	3.12

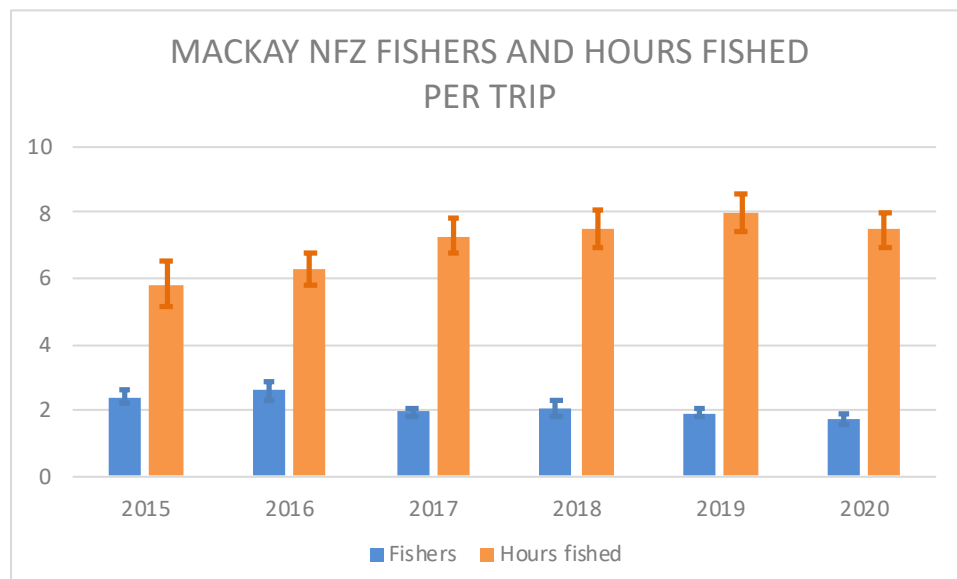


Figure 2: Average fishers and average hours fished from 2015-2020 (bars are 95% confidence)

The catch rate as fish/fisher/trip increased, rising from 2.5 in 2015 to 5.1 in 2018 (101% increase), remained steady at 5.0 in 2019 and fell to 3.7 in 2020. For kept fish there was a significant increase from 2015 to 2016 from 0.5 to 1.6 fish/fisher/trip and remained steady through to 2018. The kept catch rate fell to 0.9 in 2019 and 2.1 in 2020 with more fishers releasing legal fish that they could keep. Figures 3 and 4 show the overall and kept catch rate from 2015-2020.

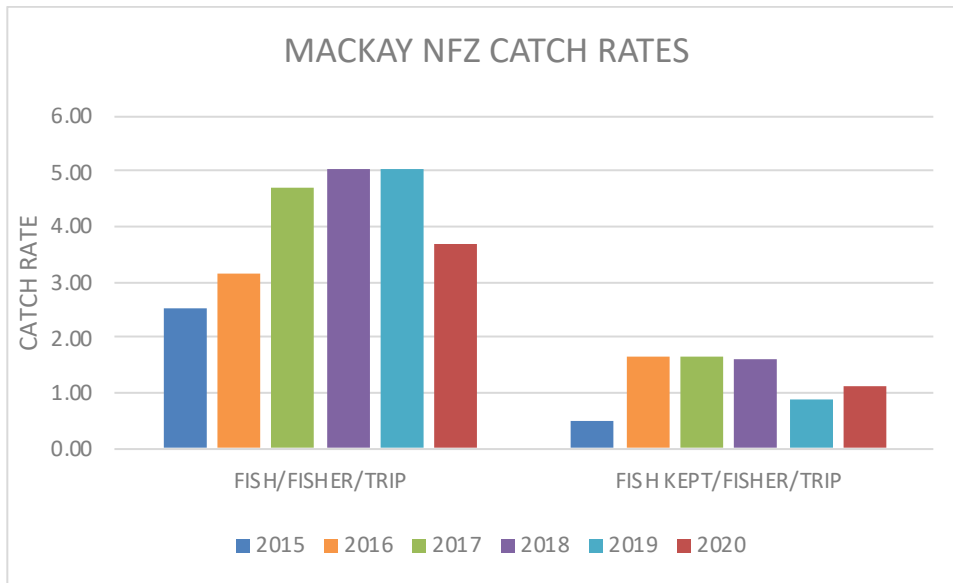


Figure 3: Catch rates as fish/fisher/trip from 2015-2020

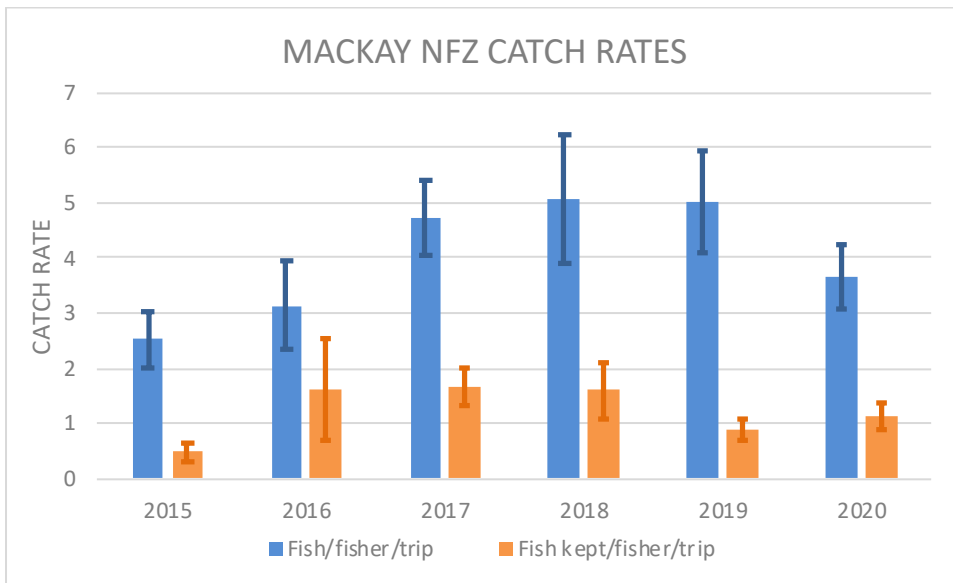


Figure 4: Catch rates as fish/fisher/trip from 2015-2020 (bars are 95% confidence)

While the catch rate for kept fish has remained steady from 2016-2018 the percentage of legal fish in the catch has continued to increase. The percentage of legal fish in 2015 was 32.0% and jumped to 60.2% in 2016 and has risen steadily to 73.2% in 2020. The percentage of legal fish in the catch continues to increase and fishers are continuing to release an increased proportion of legal fish.

Figure 5 shows the percentage of legal fish in the catch while figure 6 shows the number of hours required to catch a legal fish. The hours required to catch a legal fish fell steadily from 7.6 hours in 2015 to 2.7 hours in 2017, remained steady at 2.7 in 2018 and 2019 and increased slightly to 3.1 hours in 2020. This is likely to be the result of targeting larger fish with fewer fish being caught.

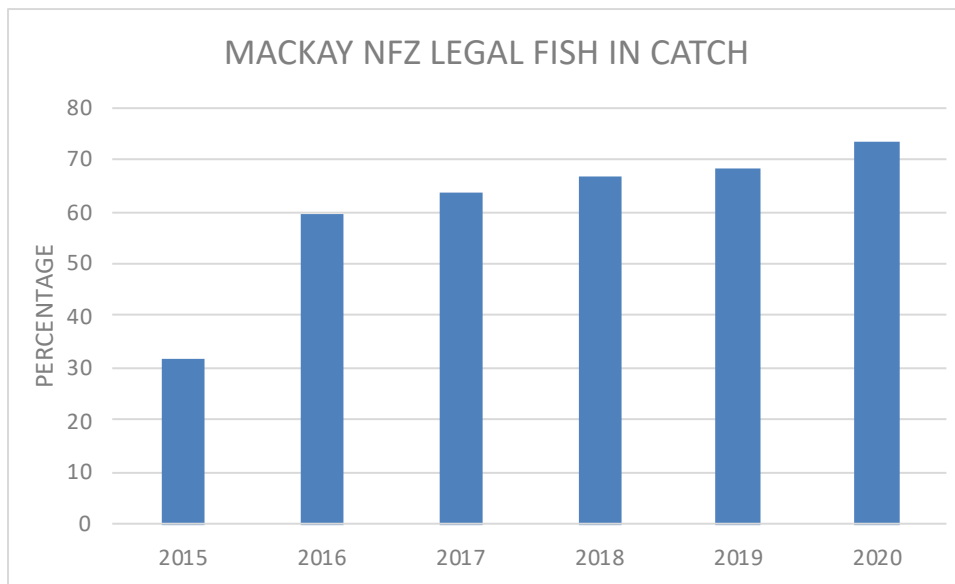


Figure 5: Percentage of legal fish in the catch

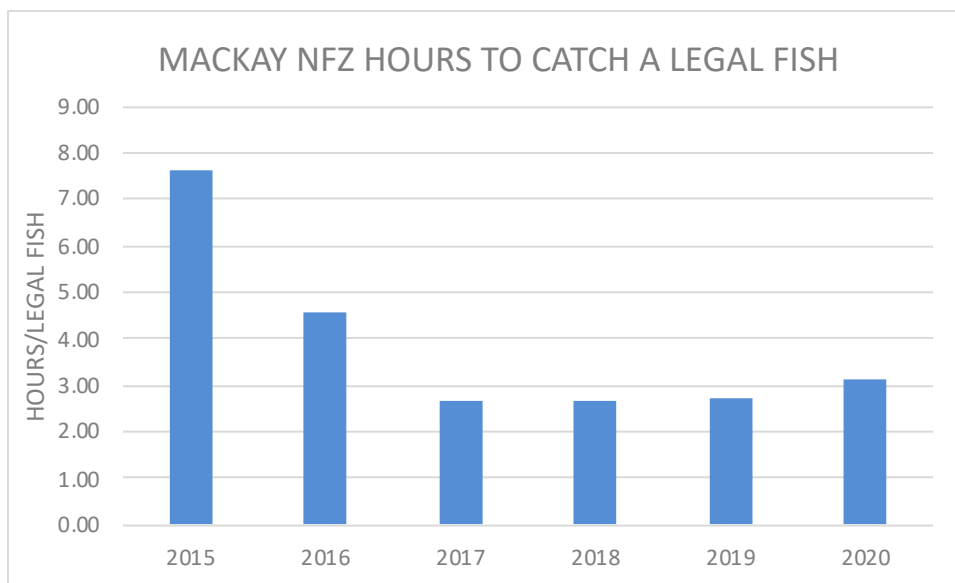


Figure 6: Hours to catch a legal fish

SPECIES IN CATCH

The following were considered to be the key target species:

- ✦ Barramundi
- ✦ Javelin (Barred and possibly some Speckled Javelin) (Grunter)
- ✦ Whiting (likely to be several species)
- ✦ Bream (Yellowfin and Pikey)
- ✦ Golden Snapper (Fingermark)
- ✦ Flathead (Dusky and Bartail Flathead)
- ✦ Mangrove Jack
- ✦ King Threadfin
- ✦ Blue Threadfin

All these species were caught in all years except King Threadfin which were not recorded in 2015. Rockcod (Goldspotted and Blackspotted) were also recorded in all years however very few were kept (around 1-2%) so were not considered a target species.

In 2015 Bream were the most caught species and were 28.4% (157) of the catch however fell in following years and were 9.6% (62) in 2020. Barramundi were 13.0% (72) of the catch in 2015 and have risen steadily to 45.0% (290) in 2020. Barramundi has become the most sought after target species. The percentage of Javelin also increased from 12.1% (67) in 2015 to 17.4% (112) in 2020. Whiting were low in 2015 at 2.2% (12) and rose to over 10% from 2016-2018 and fell to 1-2% in 2019 and 2020. *Figure 7* shows the numbers of the 5 key species in the catch from 2015-2020 while *figure 8* shows the percentage of each species.

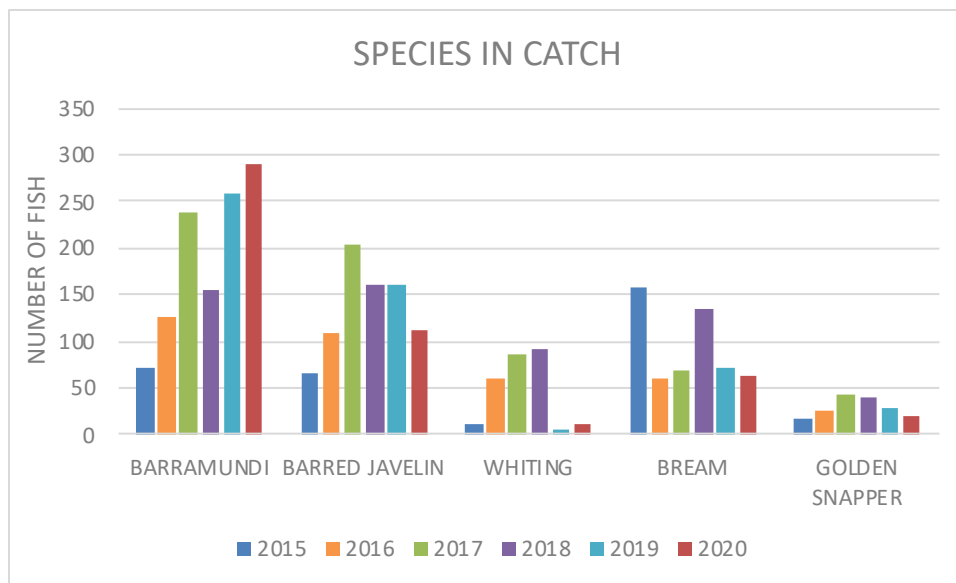


Figure 7: Numbers of key species in catch from 2015-2020

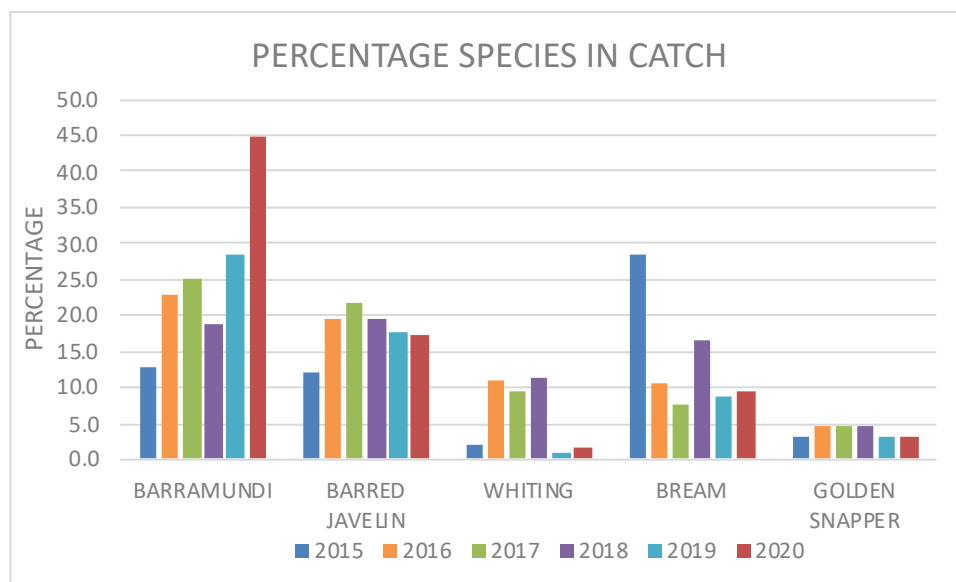


Figure 8: Percentage of key species in catch from 2015-2020

SPECIES KEPT IN CATCH

Of the 5 key species Whiting and Golden Snapper were the most kept species. The percentage of Whiting kept ranged from 58.3% in 2015 to 100% in 2020. In 2020 the number of Whiting was low with 11 caught and kept (100%). The percentage of Golden Snapper kept ranged from 88.9% in 2015 to 55.0% in 2020. The percentage of Barramundi kept has fallen from 65.3% in 2015 to 42.8% in 2020.

Figure 9 shows the numbers of fish kept while figure 10 shows the percentage of fish kept compared with the total number of that species caught.

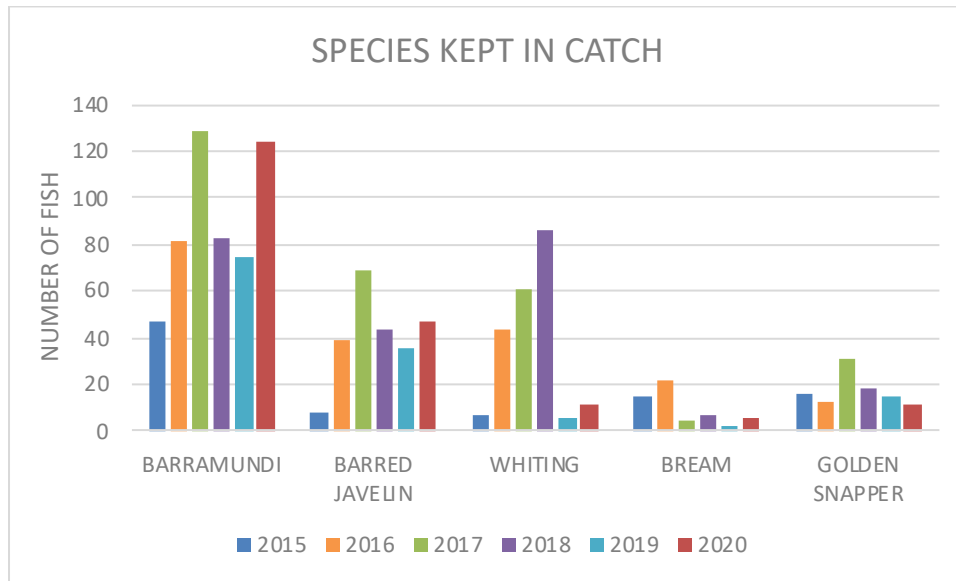


Figure 9: Numbers kept of each key species in the catch from 2015-2020

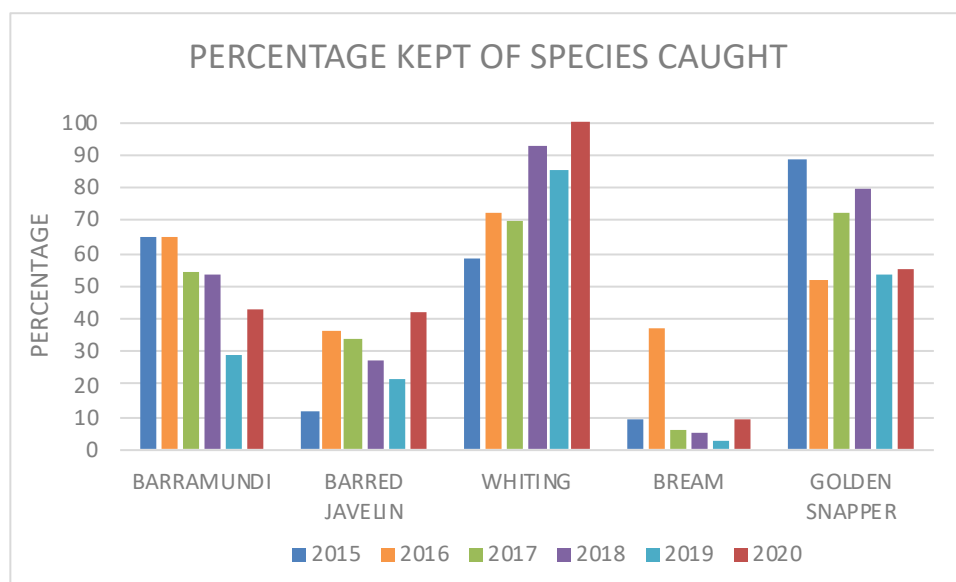


Figure 10: Percentage kept of key species in catch from 2015-2020

LEGAL BARRAMUNDI IN CATCH

Barramundi are now the most targeted and the most caught species and dominate the catch. In 2015 there were 48 Barramundi caught that were legal fish and 47 (97.9%) kept (all kept except 1 fish). From 2016-2019 there has been a reduction in the proportion of legal size Barramundi that were kept. In 2020 there were 245 legal fish with 124 (50.6%) kept which is a slight increase in the percentage of fish kept.

Figure 11 shows the numbers of legal Barramundi and the numbers kept while figure 12 shows the percentage of legal Barramundi caught that were kept from 2015-2020.

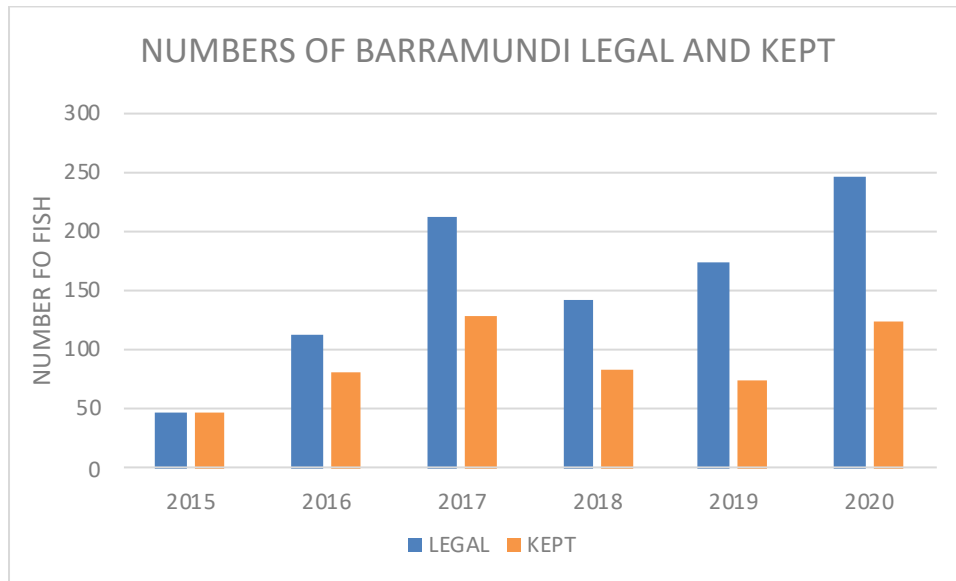


Figure 11: Numbers of Barramundi caught that were legal and kept

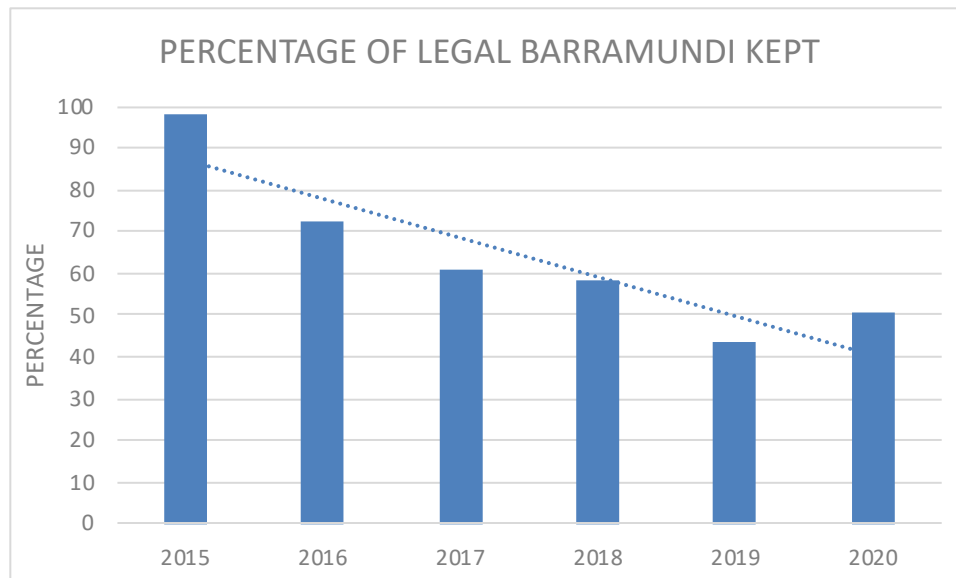


Figure 12: Percentage of legal Barramundi kept

LEGAL JAVELIN IN CATCH

Javelin (Grunter) was also a key target species and a valued food fish. In 2015 there were 8 legal Javelin and all were kept. In 2016 there were 40 legal Javelin and 39 (97.5%) were kept. From 2017 to 2019 the percentage of legal fish kept has fallen and was 40.2% (35 of 87 fish) in 2019. In 2020 the percentage of legal fish kept rose again to 67.1%.

Figure 13 shows the numbers of legal Javelin and the numbers kept while figure 14 shows the percentage of legal Javelin (Grunter) that were kept from 2015-2020.

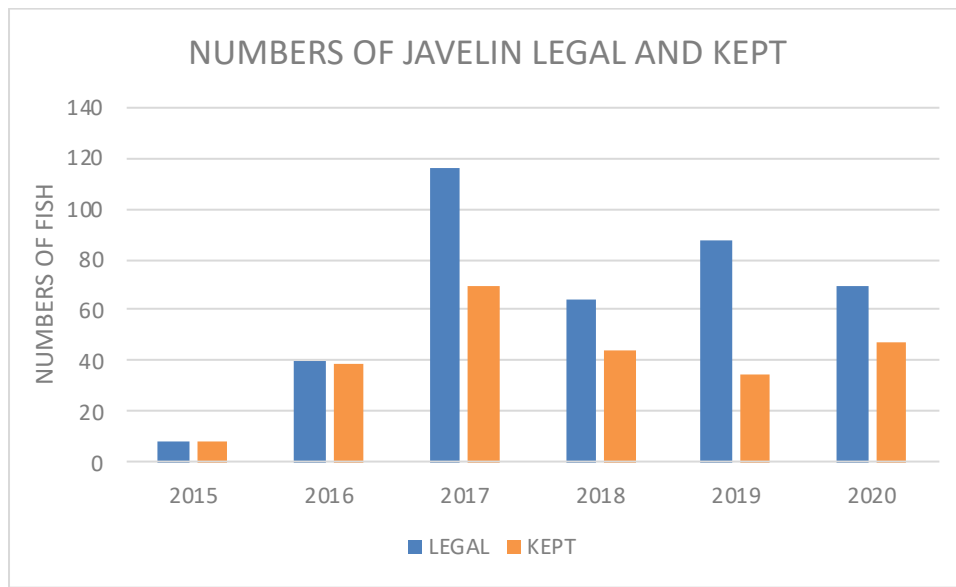


Figure 13: Numbers of Javelin (Grunter) caught that were legal and kept

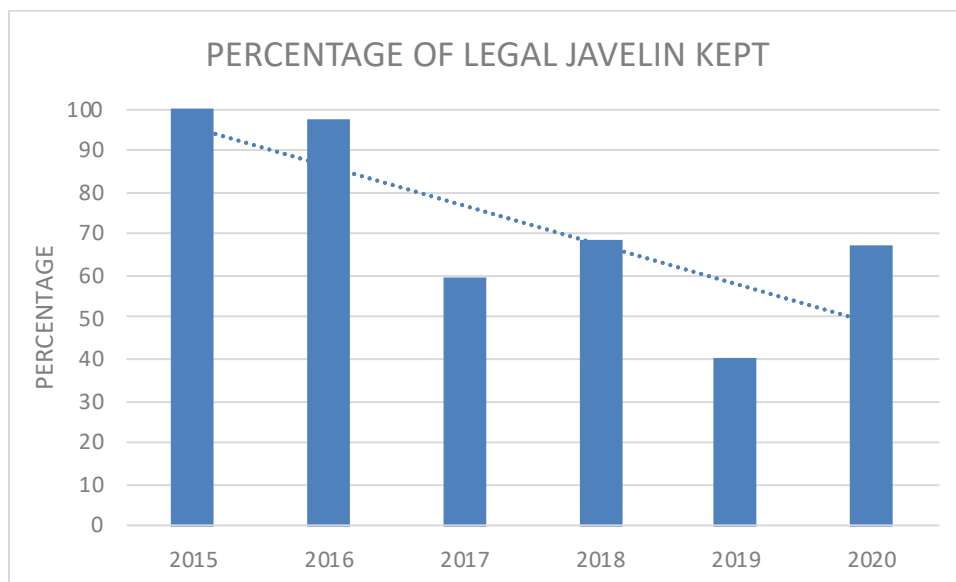


Figure 14: Percentage of legal Javelin (Grunter) kept

LEGAL WHITING IN CATCH

Whiting were the most kept species in all surveys with 217 of the 220 legal fish kept however only low numbers of Whiting were caught in 2015, 2019 and 2020. It is probable that with increased catch rates for the other key species that there is less targeting of Whiting. *Figure 15* show the number of legal and kept Whiting and *figure 16* shows the percentage of Whiting that were kept.

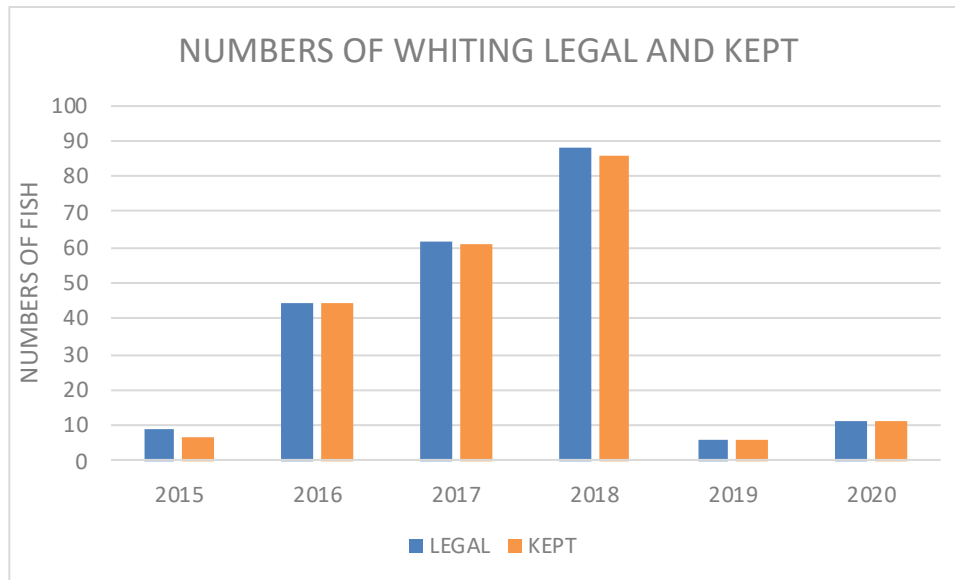


Figure 15: Numbers of Whiting caught that were legal and kept

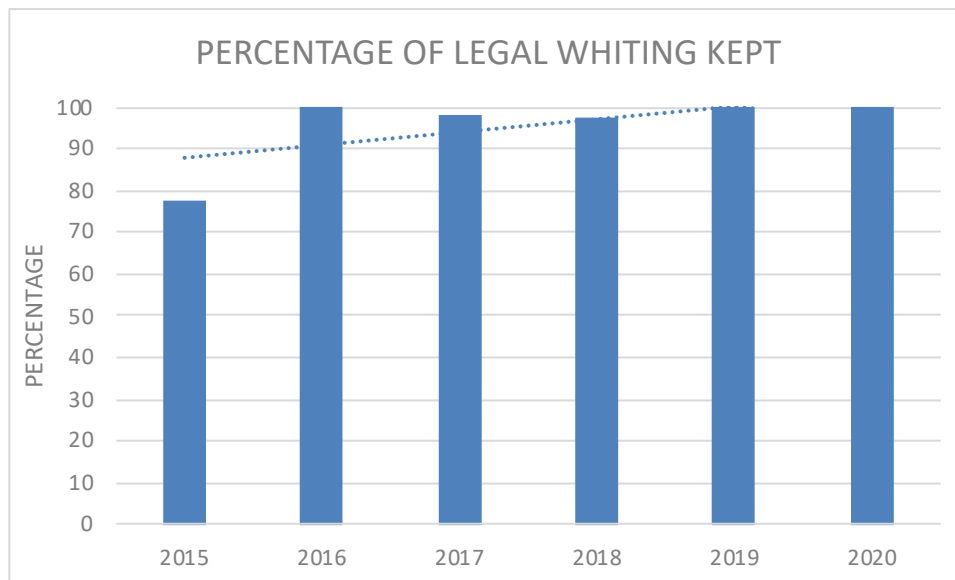


Figure 16: Percentage of legal Whiting kept

LEGAL BREAM IN CATCH

Bream and Whiting are considered to be bread and butter species but unlike Whiting where most legal fish are kept most legal Bream are released. The numbers of legal Bream kept peaked in 2016 with 22 (52.4%) kept however fell to 2 (3.6%) in 2019 and 6 (14.0%) in 2020. It is possible that fewer Bream are being kept as other species are being preferred. *Figure 17* shows the numbers of legal Bream and the numbers kept and *figure 18* shows the percentage of legal Bream that were kept.

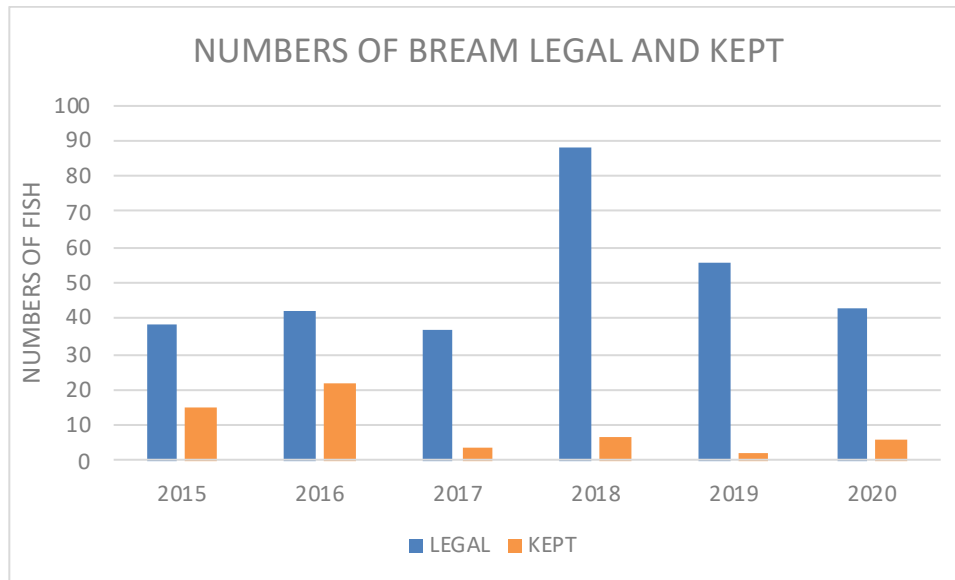


Figure 17: Numbers of Bream caught that were legal and kept

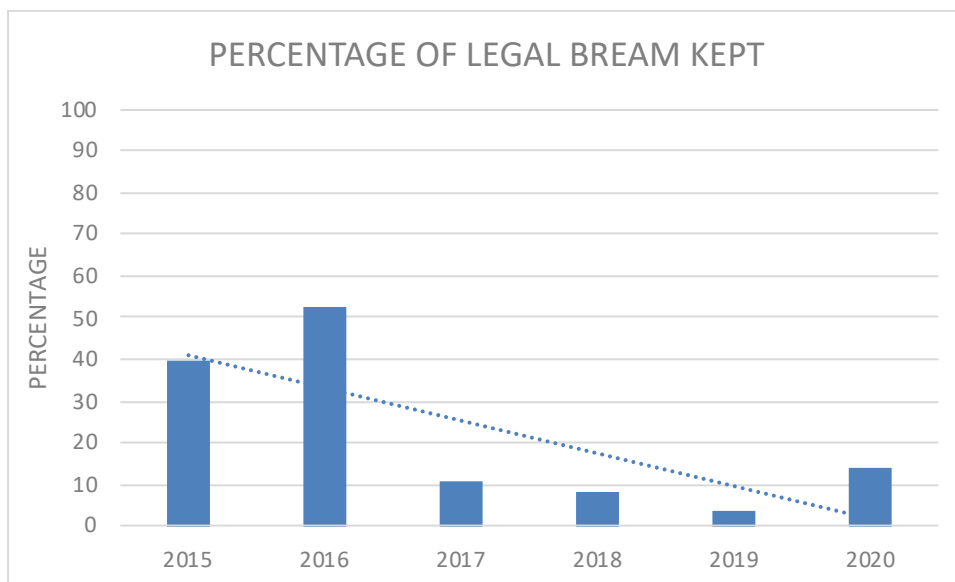


Figure 18: Percentage of legal Bream kept

LEGAL GOLDEN SNAPPER IN CATCH

Golden Snapper was a target species, particularly for the more skilled fishers. While they are caught in lower numbers than other species legal fish were mostly kept. From 2015-2017 over 75% of legal fish were kept and in 2015 and 2017 it was over 90%. However, in 2018 and 2019 legal fish kept fell to 58.0% and rose slightly to 61.1% in 2020. *Figure 19* shows the numbers of Golden Snapper that were legal and the numbers that were kept and *figure 20* shows the percentage of legal Golden Snapper that were kept.

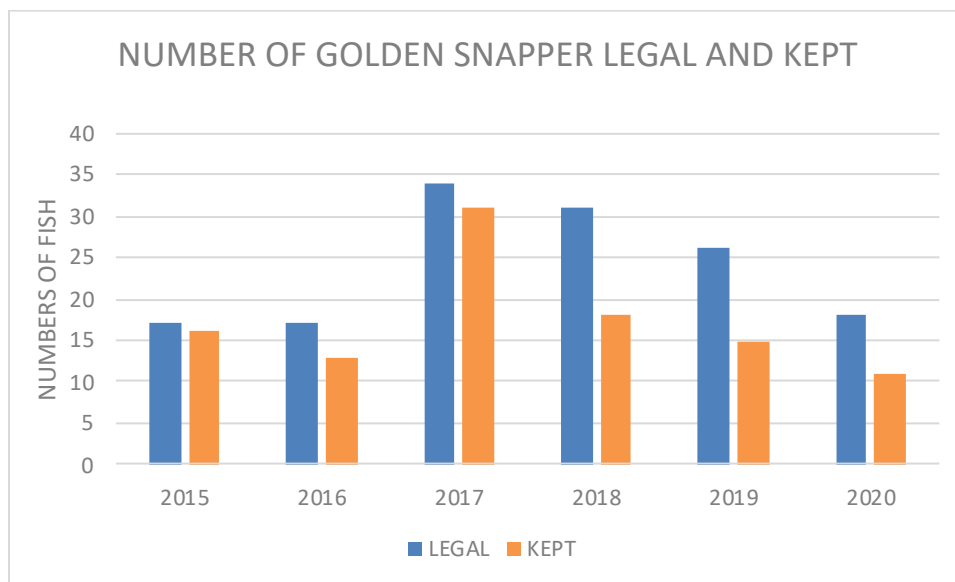


Figure 19: Numbers of Golden Snapper (Fingermark) caught that were legal and kept

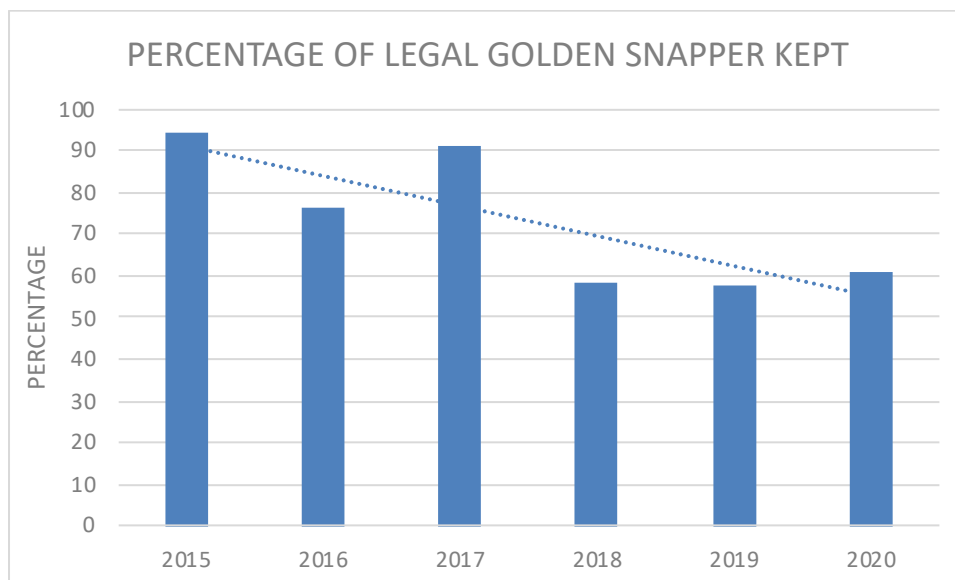


Figure 20: Percentage of legal Golden Snapper (Fingermark) kept

THREADFIN IN CATCH

At the introduction of the NFZ Threadfin were caught as an incidental species rather than being a target however are now considered to be a target. King Threadfin were not recorded in 2015 and rose steadily to 7.5% (69) in 2019 however fell to 2.9% (19) in 2020. Blue Threadfin were 0.7% (4) in 2015 and rose to 7.4% (68) in 2019 however fell to 1.6% (10) in 2020. *Figures 21 and 22* show the numbers of Threadfin caught and kept from 2015-2020.

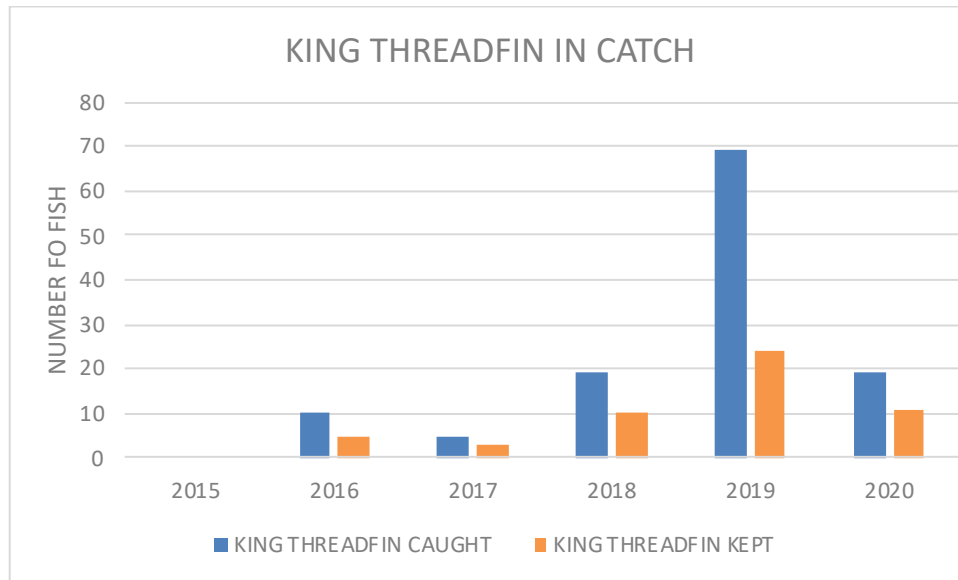


Figure 21: King Threadfin caught and kept from 2015-2020

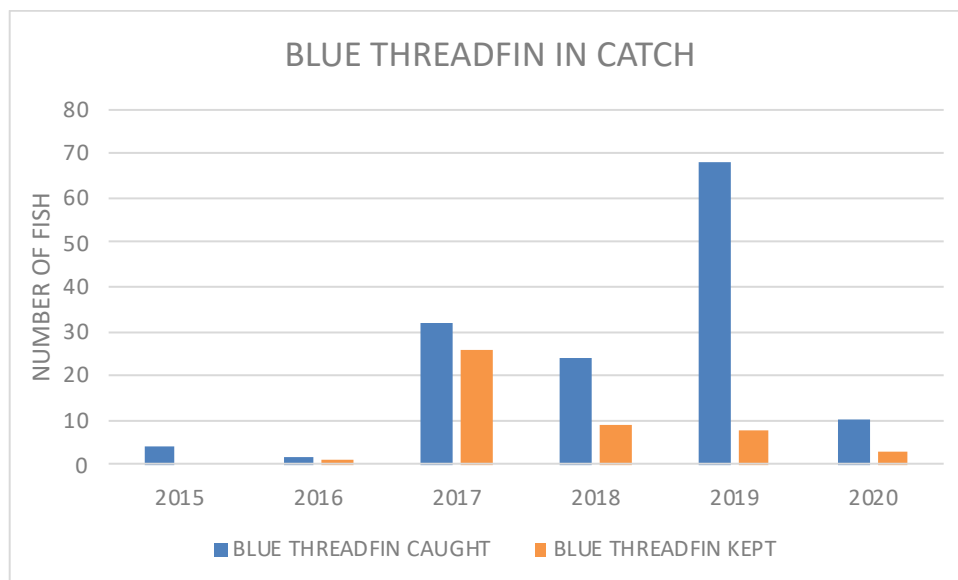


Figure 22: Blue Threadfin caught and kept from 2015-2020

CHANGES IN LEGAL FISH

For the 5 key species the percentage change in the number of legal fish between surveys was assessed. The change between 2020-2019 is shown in *figure 23*. Barramundi, Javelin and Whiting show increases of over 10%. The data on Whiting needs to be treated with caution due to the low numbers of fish recorded in both years.

Figure 24 comparing 2020 with 2015 shows that the numbers of legal fish have increased for all key species except Golden Snapper (-4.4%). Javelin have shown the largest increase of 50.6%.

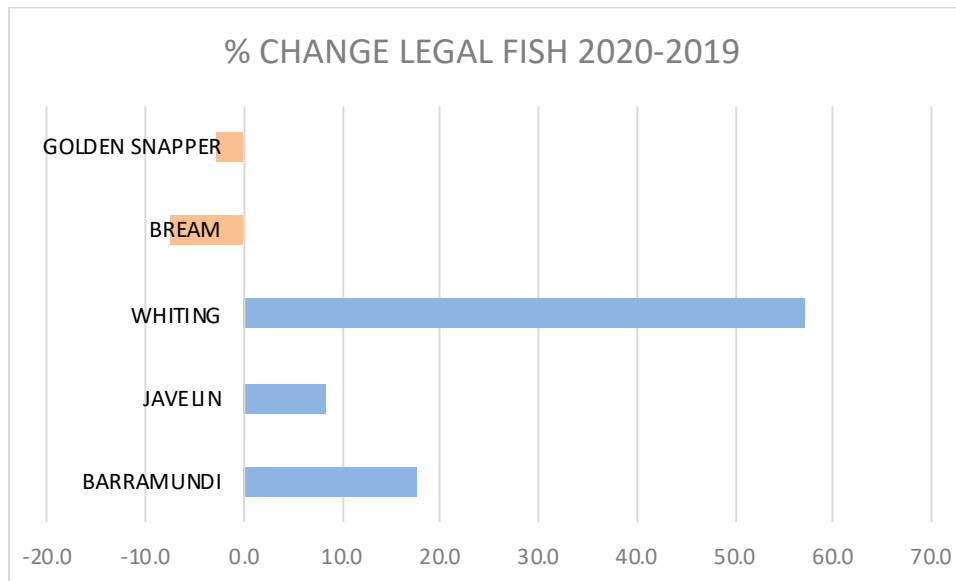


Figure 23: Percentage change in length of legal fish between 2020-2019

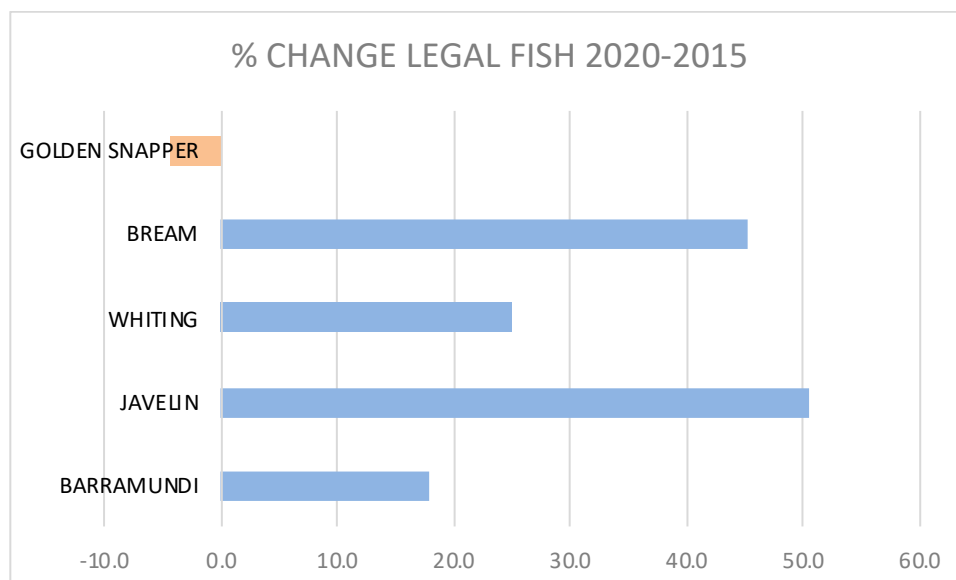


Figure 24: Percentage change in legal fish between 2020-2015

BARRAMUNDI SIZES

There were sufficient length data for 3 of the key species to compare the average lengths from 2015-2020. These were Barramundi, Bream and Javelin.

Figure 25 shows the average length of Barramundi from 2015-2020 and the minimum and maximum lengths. The average length in 2015 was 624mm and rose to 771mm in 2016 and was 713mm in 2020. The average length fell in 2019 to 666mm influenced by an increase in undersized recruits.

Figure 26 shows the numbers and percentage of trophy Barramundi over 1m recorded each year. No trophy fish were recorded in 2015 while there were 28, 27 and 21 recorded in 2016, 2017 and 2018. Trophy fish fell to 2 in 2019 but rose again to 22 in 2020.

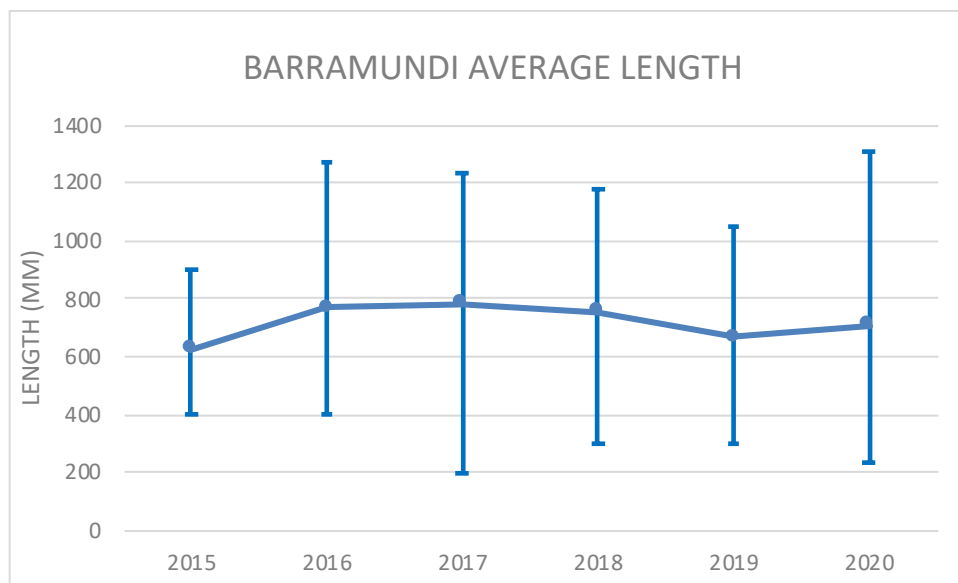


Figure 25: Average length of Barramundi from 2015-2020 (bars show the minimum and maximum lengths)

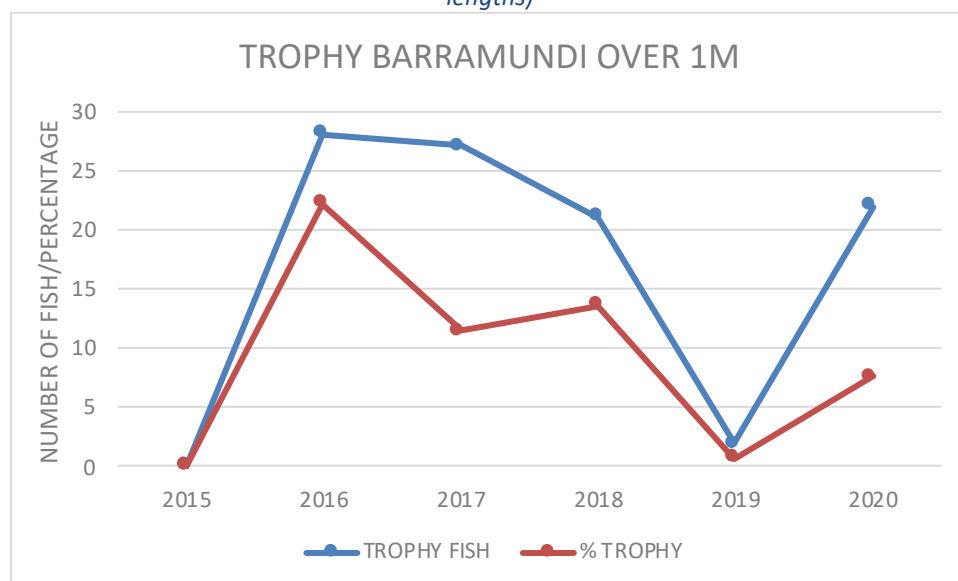


Figure 26: Numbers and percentage of trophy Barramundi over 1m

JAVELIN SIZES

Figure 27 shows the average length of Javelin (Grunter) measured and the minimum and maximum lengths. The average length in 2015 was 319mm and rose to 464mm in 2020.

Figure 28 shows the number and percentage of trophy Javelin (Grunter) over 600mm recorded in each survey. Of the 67 Javelin recorded in 2015 there was 1 (1.5%) trophy fish while in 2020 there were 112 fish recorded and there were 23 (20.5%) trophy fish recorded.

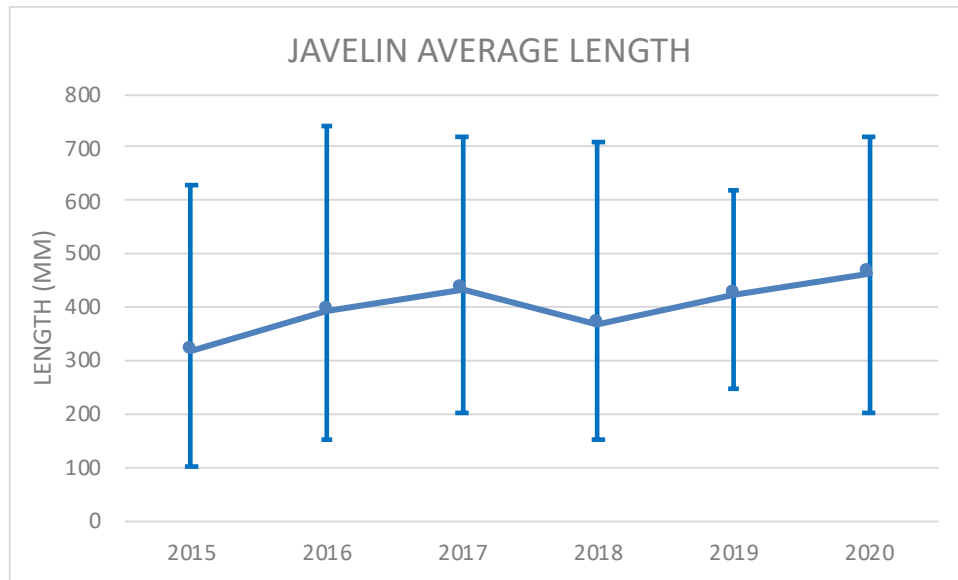


Figure 27: Average length of Javelin from 2015-2020 (bars show the minimum and maximum lengths)

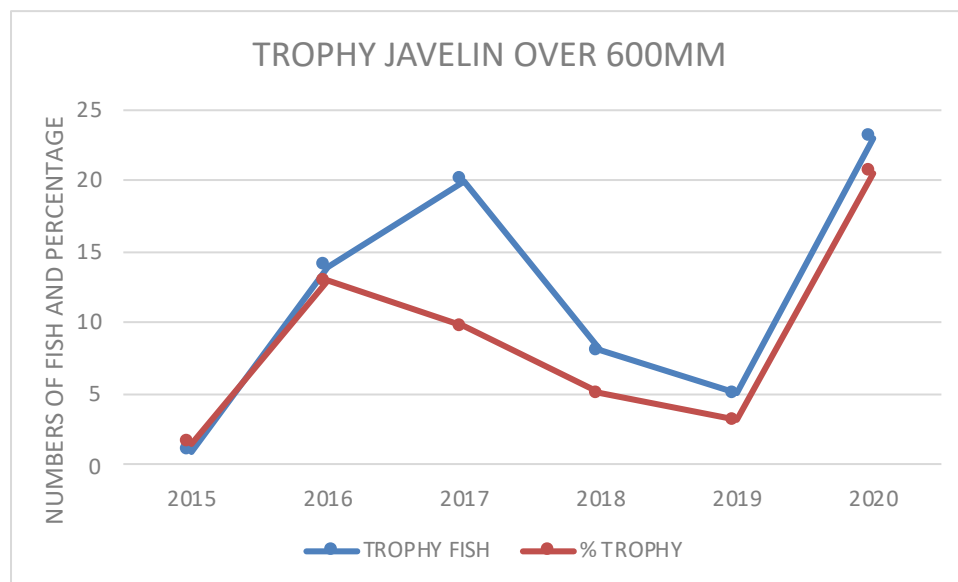


Figure 28: Numbers and percentage of trophy Javelin over 600mm

BREAM SIZES

Figure 29 shows the average length of Bream measured and the minimum and maximum lengths. The average length in 2015 was 226mm and has risen to 268mm in 2020.

Figure 30 shows the numbers and percentage of trophy Bream over 350mm recorded each year. There has been a significant increase in trophy fish from 2017 (1.4%) to 2019 (21.9%) and in 2020 (12.9%). This could be partly contributed to fewer Bream being kept.

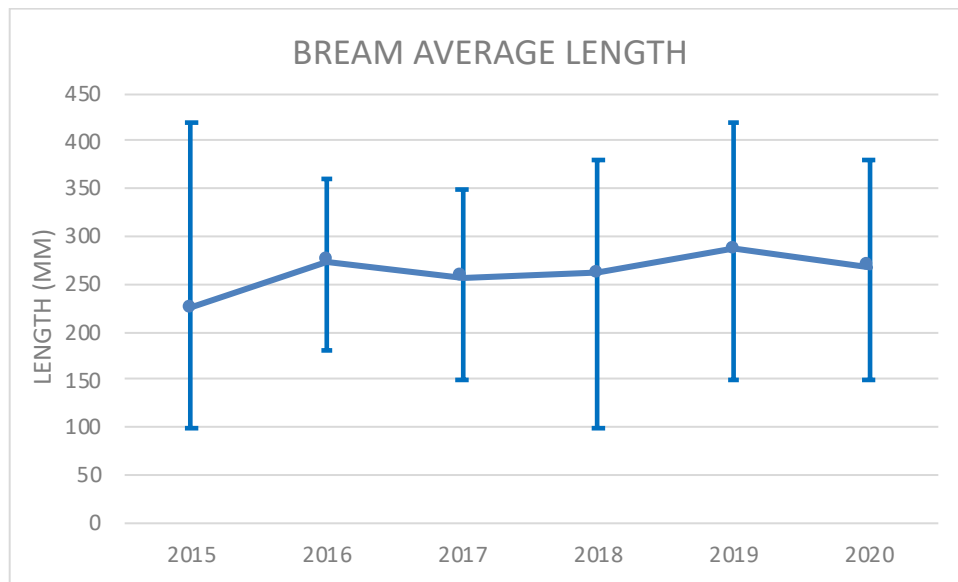


Figure 29: Average length of Bream from 2015-2020 (bars show the minimum and maximum lengths)

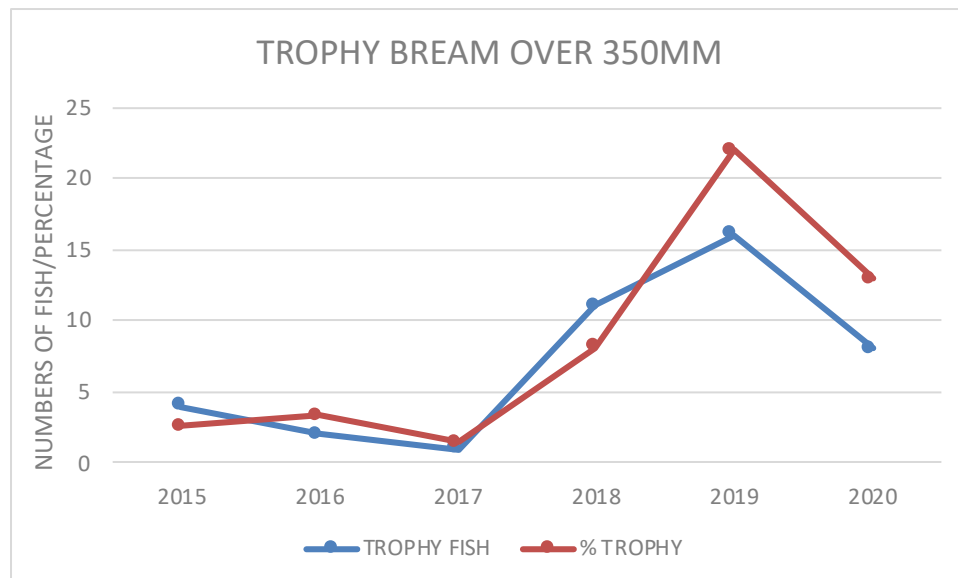


Figure 30 : Numbers and percentage of trophy Bream over 350mm

DISCUSSION

While there have been 6 surveys undertaken, surveys from 2016-2020 are the most comparable as they were taken at the same time of year where factors influencing fish and fishing effort were similar. Such factors include the wet season and the opening of the Barramundi season. Also, the number of trips and the total fishing times in each year are comparable.

What has changed is the fishers that have contributed to the data. There has been some level of turnover of the fishers providing trip details. This year that was complicated by the fishing and travel restrictions resulting from COVID-19 which occurred during the survey period. This limited contributing trip details to those fishing in local waterways

The overall catch rate has declined but is likely to be influenced by the continued increasing focus on Barramundi resulting in fewer larger fish being caught and lower bycatch.

There is a continuing trend of increased legal fish in the catch. In 2015 legal fish comprised just 32.0% of the catch while this steadily rose to 73.2% in 2020. Contributing to this is the increasing trend to release legal fish across all species. This may be due to an increase in catch and release or a trend to limit catches. In 2015 98.0% of legal Barramundi were kept while in 2020 this was 50.6% and 43.4% in 2019.

This trend is not related to the possession limit of 5 fish per fisher. Very few trips achieved this limit and most releases of fish were made before the limit was reached. Most fishers just kept 1-2 Barramundi. However, this trend is not limited to Barramundi and is reflected in the other species.

The increasing release of legal fish could be influenced by larger fish being taken, therefore reducing the need to keep other fish. While the area was previously netted there was a view by recreational fishers that legal fish should be kept otherwise they would be netted.

It could also be influenced by the development of a voluntary code of practice encouraging limiting the catch and an acceptance of a level of stewardship in conserving the resource. Whatever the drivers the evidence is that there are more legal fish being caught and released.

While the numbers and percentage of trophy fish have fluctuated, they are all well above the number of trophy fish recorded prior to the NFZ. In 2020 there was an increase in the number of trophy Barramundi and Javelin while there was a slight drop in the numbers of trophy Bream.

With 6 years of data now the effects of the NFZ are now apparent with initial increased catch rates that have stabilised, more legal fish, increased fish sizes and more trophy sized fish. There has also been a comeback of King and Blue Threadfin and changing attitudes by fishers in releasing more and more legal fish with 52.5% released in 2020.