

# NSW DPI GAME FISH TAGGING PROGRAM

REPORT 2020-2021



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**Cover image:** Zane Levett with a nice yellowtail kingfish tagged off South West Rocks NSW in June 2020. This fish was recaptured at Jervis Bay NSW 159 days later, having travelled a minimum distance of 278 nautical miles south.

## INTRODUCTION

The New South Wales Department of Primary Industries (NSW DPI) Game Fish Tagging Program was officially launched in December 1973 and has been in continuous operation since then. Similar cooperative tagging Programs operate in other countries including the United States, New Zealand, South Africa and Kenya but in terms of numbers of pelagic fish tagged, the NSW Program is the largest in the world. In that regard, this year marked a significant milestone for the Program, the release of the 500,000<sup>th</sup> fish tagged. Since the origins of the Program, more than 60,000 anglers have tagged at least one fish, members of 950 fishing clubs have participated and fish have been tagged and released from over 11,500 boats.

During 2020/21 a total of 10,207 fish were tagged under the Program – a slight increase on the previous year's total of 9,996. The number of recaptures reported in 2020/21 was 371, the fourth highest on record. As was the case for the past three years, this was primarily due to increasing numbers of yellowtail kingfish tagged, and therefore recaptured in both South Australia and NSW

Even though the Program has a long history, every year, new information is added to our store of knowledge on marine gamefish species. Some of the highlights for the 2020/21 tagging year are listed below.

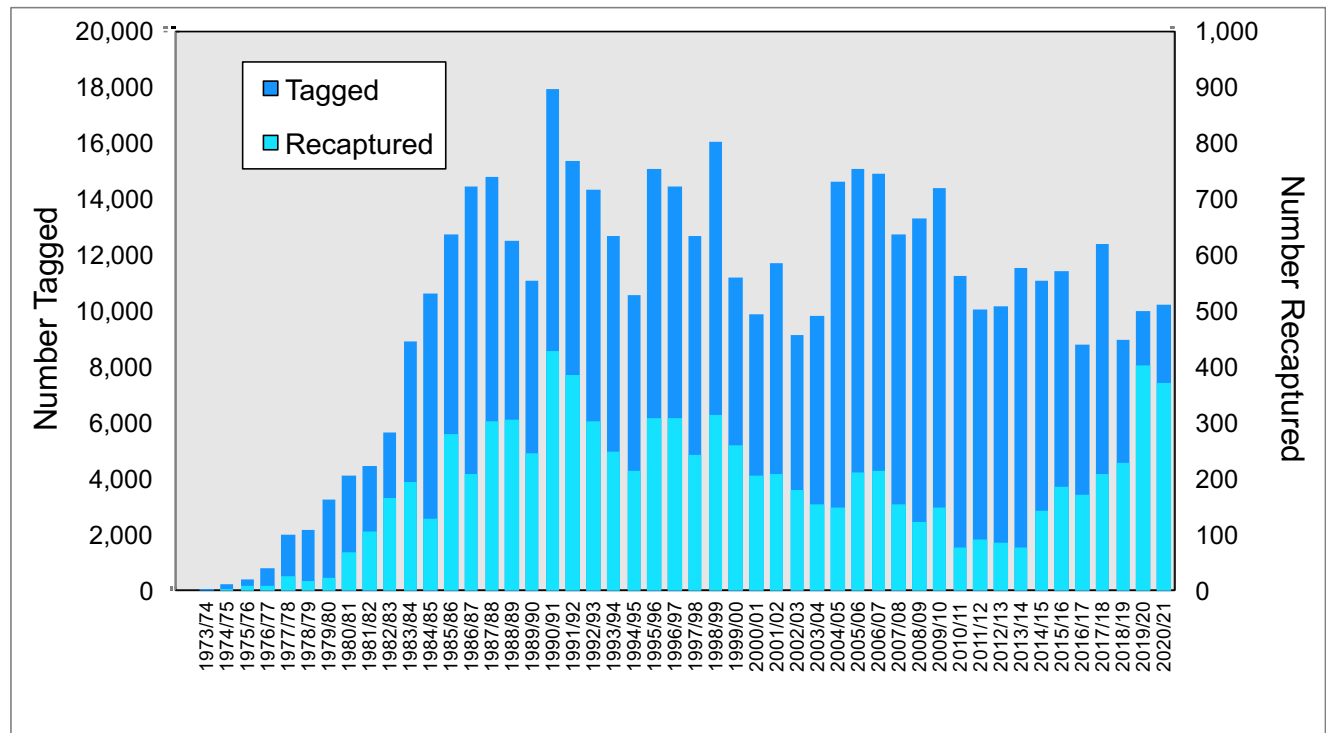
## HIGHLIGHTS OF THE 2020/21 TAGGING YEAR

- The 500,000<sup>th</sup> fish tagged on the Program
- The first recorded movement of a striped marlin from Australia to New Zealand
- New time-at-liberty record for a Samson fish – 12 years
- Record distance moved by a tagged Spanish mackerel – 1000 km, NSW to northern QLD
- Three long distance movements of black marlin into the southwestern Pacific
- Three blue marlin tagged off Papua New Guinea and recaptured in the Philippines
- A kingfish recaptured twice, once after 629 days, the second after another 330 days.  
– That fish had travelled approximately 3,000 km during its 959 days at liberty
- A yellowfin tuna at liberty for 4.5 years travelled 2,460 km from NSW to northern PNG
- An albacore at liberty for 3.5 years travelled 2,300 km from southern NSW to New Caledonia
- A southern bluefin tuna recaptured after six years at liberty
- Multiple recaptures of tagged striped marlin off Jervis Bay, NSW
- Second highest annual total of yellowtail kingfish tagged in 15 years – third highest on record

## THE PROGRAM TO DATE

Figure 1 shows the number of fish tagged and recaptured each year since the origin of the Program to 30 June 2021. The total numbers of fish tagged in a given year vary for many reasons, not least being the availability of different species of pelagic fish at different times and locations. In terms of total numbers of fish tagged, the 2020/21 game fishing season was close to the long-term average, despite Covid-19 impacts on fishing activity in different regions.

**FIGURE 1. NUMBER OF FISH TAGGED AND RECAPTURED EACH YEAR SINCE THE ORIGIN OF THE PROGRAM**



As at the end of June 2021, the grand totals of fish tagged and recaptured on the Program stood at 500,136 and 9,209 respectively (Table 1), continuing the Program's status as the largest of its kind in the world. The table summarises releases and recaptures of the main species or species groups tagged, with the remainder tallied as 'other species combined'.

The single species tagged in the highest numbers continues to be black marlin with 77,096 tagged (15% of all releases). Yellowtail kingfish continue to exceed yellowfin tuna as the second most tagged species followed by sailfish, striped marlin, southern bluefin tuna and dolphinfish. Other prominent key species are albacore, whaler sharks (several species of *Carcharhinus*, grouped together), blue marlin, narrow-barred Spanish mackerel and shortfin mako shark. Striped (skipjack) tuna, mackerel tuna and bonito have also been tagged in large numbers in the past, but are now discouraged as eligible tagging species for the Program.

TABLE 1. TOTAL NUMBERS OF FISH TAGGED AND RECAPTURED 1974-2021

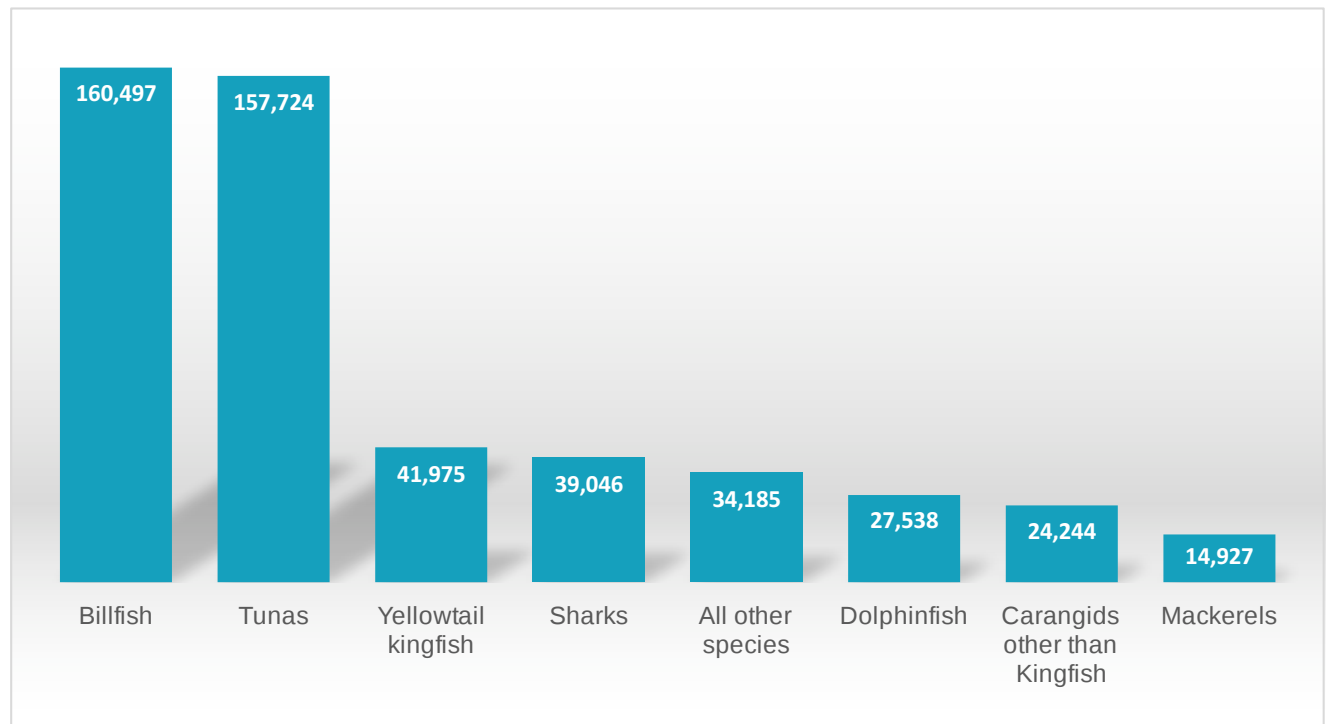
| Species                | Total Tagged   | Total Recaptured | % Recapt    |
|------------------------|----------------|------------------|-------------|
| BLACK MARLIN           | 77,096         | 610              | 0.79        |
| YELLOWTAIL KINGFISH    | 41,975         | 3,216            | 7.66        |
| YELLOWFIN TUNA         | 38,478         | 710              | 1.85        |
| SAILFISH               | 36,223         | 366              | 1.01        |
| STRIPED MARLIN         | 32,790         | 283              | 0.86        |
| SOUTHERN BLUEFIN TUNA  | 30,052         | 267              | 0.89        |
| DOLPHINFISH            | 27,538         | 258              | 0.94        |
| ALBACORE               | 22,463         | 172              | 0.77        |
| STRIPED TUNA           | 21,670         | 68               | 0.31        |
| MACKEREL TUNA          | 20,956         | 62               | 0.30        |
| WHALER SHARKS*         | 15,290         | 311              | 2.03        |
| BONITO                 | 13,254         | 219              | 1.65        |
| BLUE MARLIN            | 13,543         | 46               | 0.34        |
| AUSTRALIAN SALMON**    | 10,549         | 636              | 6.03        |
| SPANISH MACKEREL       | 9,805          | 101              | 1.03        |
| MAKO SHARK             | 8,763          | 194              | 2.21        |
| SILVER TREVALLY**      | 7,208          | 202              | 2.80        |
| HAMMERHEAD SHARKS      | 5,955          | 62               | 1.04        |
| BLUE SHARK             | 5,281          | 79               | 1.50        |
| LONGTAIL TUNA          | 5,280          | 61               | 1.16        |
| TAILOR**               | 4,033          | 122              | 3.03        |
| QUEENFISH              | 3,613          | 10               | 0.28        |
| SAMSON FISH            | 3,861          | 176              | 4.56        |
| BARRACUDA              | 3,439          | 6                | 0.17        |
| TREVALLY               | 3,467          | 32               | 0.92        |
| GIANT TREVALLY         | 2,805          | 37               | 1.32        |
| OTHER SPECIES COMBINED | 34,749         | 903              | 2.60        |
| <b>TOTAL</b>           | <b>500,136</b> | <b>9,209</b>     | <b>1.84</b> |

\*Whaler sharks include the following tag card entries: Whaler, bronze whaler, bull shark, black tip whaler, white tip shark, oceanic white tip shark and Galapagos shark.

\*\*Some species, such as tailor, silver trevally and Australian salmon, were tagged in large numbers in the past, but have since been removed from the list of desirable species to tag.

Combining the main species or species groups together over the history of the Program, Figure 2 shows that billfish combined have now passed tunas combined as the group tagged in the largest numbers – 160,497 tagged (32.8% of the total), compared with tuna combined (32.2% of all fish tagged). A single species, yellowtail kingfish, with nearly 42,000 tagged, now accounts for 8.6% of all releases while the total numbers of sharks combined (39,046) constitute 8% of the total number of fish tagged in the Program.

**FIGURE 2. TOTAL NUMBERS OF FISH TAGGED AS SPECIES GROUPINGS, 1974-2021**



## SUMMARY OF TAGGING ACTIVITY FOR 2020/21

Table 2 shows the breakdown of species or species groups tagged and recaptured during 2020/21. The top ten tagged species for the year were black marlin, yellowtail kingfish, southern bluefin tuna, striped marlin, sailfish, blue marlin, whaler sharks as a group, samsonfish, dolphinfish and narrow-barred Spanish mackerel. Positions on the 'leaderboard' may change from year to year depending on the relative abundance of species as well as avidity of anglers tagging them in different areas.

TABLE 2. NUMBERS OF ALL SPECIES / SPECIES GROUPS TAGGED AND RECAPTURED DURING 2020/21

| Species               | Total Tagged  | Total Recapt |
|-----------------------|---------------|--------------|
| BLACK MARLIN          | 2,679         | 24           |
| YELLOWTAIL KINGFISH   | 1,559         | 267          |
| SOUTHERN BLUEFIN TUNA | 1,400         | 6            |
| STRIPED MARLIN        | 1,211         | 10           |
| SAILFISH              | 657           | 3            |
| BLUE MARLIN           | 464           | 3            |
| WHALER SHARKS         | 547           | 12           |
| SAMSON FISH           | 301           | 26           |
| DOLPHINFISH           | 202           | 3            |
| SPANISH MACKEREL      | 115           | 3            |
| LONGTAIL TUNA         | 86            | 1            |
| YELLOWFIN TUNA        | 84            | 1            |
| SPOTTED MACKEREL      | 82            |              |
| TIGER SHARK           | 78            | 6            |
| MAKO SHARK            | 71            |              |
| HAMMERHEAD SHARK      | 59            |              |
| ALBACORE              | 54            | 1            |
| MACKEREL TUNA         | 55            |              |
| STRIPED TUNA          | 52            |              |
| DOGTOTH TUNA          | 43            |              |
| EAGLE RAY             | 37            | 1            |
| QUEENFISH             | 32            |              |
| GOLDEN TREVALLY       | 31            |              |
| BLUE SHARK            | 30            |              |
| COBIA                 | 30            |              |
| GUMMY SHARK           | 29            | 3            |
| WAHOO                 | 28            |              |
| SCHOOL SHARK          | 26            |              |
| AUSTRALIAN SALMON     | 20            |              |
| GIANT TREVALLY        | 19            |              |
| AMBERJACK             | 17            |              |
| SHARK MACKEREL        | 16            |              |
| SILVER TREVALLY       | 16            | 1            |
| BARRACUDA             | 14            |              |
| GOLD SPOTTED TREVALLY | 13            |              |
| BROADBILL SWORDFISH   | 12            |              |
| BROAD BARRED MACKEREL | 8             |              |
| SHORTBILL SPEARFISH   | 6             |              |
| OTHER SPECIES         | 24            |              |
| <b>TOTAL</b>          | <b>10,207</b> | <b>371</b>   |

## MAIN SPECIES TAGGED 2020/21

### BLACK MARLIN

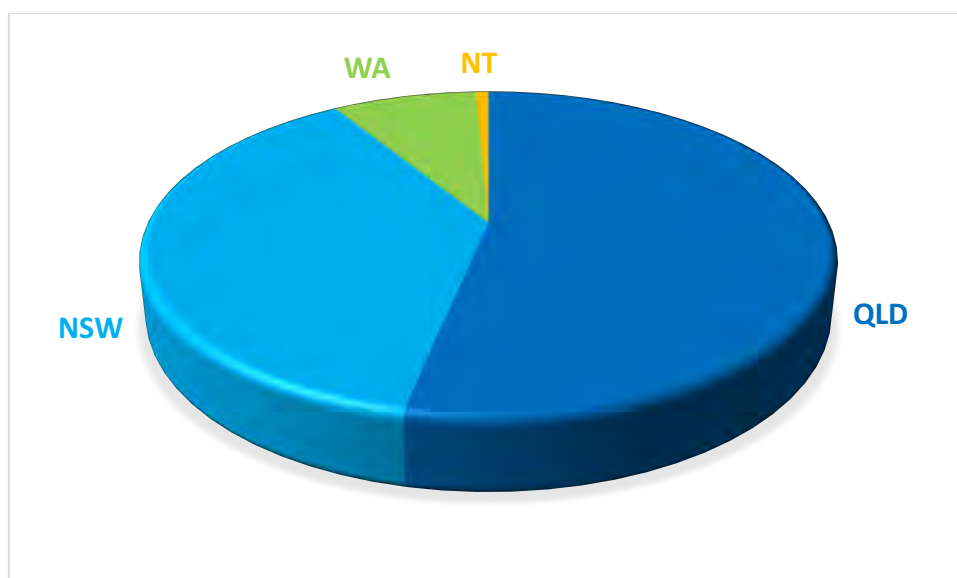
For the fifth year in succession, black marlin topped the list of species tagged. The total of 2,679 was a big increase on the previous year (1,787 tagged) and somewhat higher than the average annual number tagged for the previous 10 years (2,216).

The number of black marlin tagged in any given year is strongly influenced by the appearance or non-appearance on the east coast of juvenile fish in their first year of life. In years of high abundance, the juveniles, around 5 to 15 kg, appear inside the Great Barrier Reef off Cairns and Townsville, making their way south in coming months along the Queensland coast to Hervey Bay, the Sunshine and Gold Coasts and then into northern and central NSW by which time they will have grown to around 30 kg in size. Before this season, the most recent influx of juvenile black marlin occurred in 2017/18 when more than 2,500 were tagged during their north to south migration. This year, a similarly strong recruitment occurred along the east coast, extending en masse as far south as Port Stephens, with small numbers encountered as far south as Jervis Bay, resulting in about 1,800 juveniles tagged for the season.

Numbers of black marlin tagged in Western Australian waters in 2020/21 were down a little on the previous year (218 compared with 283) with most of those (194) tagged off Exmouth (average estimated size, 45 kg).

Other areas where black marlin were tagged were the Northern Territory, mainly off Darwin (19) and off Weipa, western Cape York (19). As was the case in the previous year, there were no recorded tag-and-releases of black marlin outside Australian waters in 2020/21.

FIGURE 3. PROPORTIONS OF BLACK MARLIN TAGGED BY REGION 2020/21



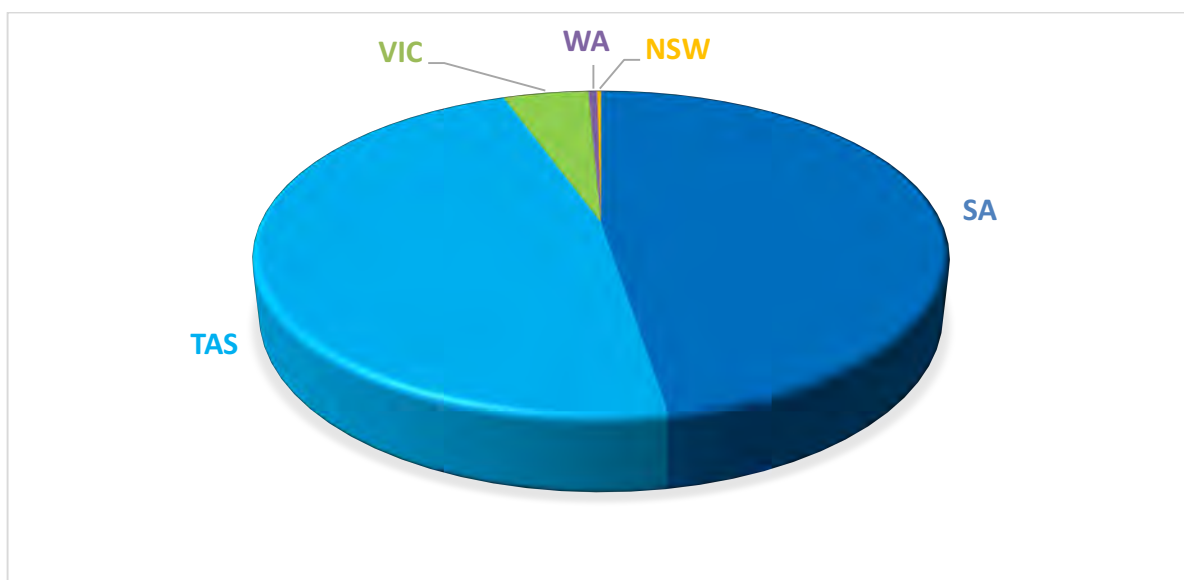
The annual heavy tackle charter fishery for adult black marlin off the outer Great Barrier Reef each Spring has traditionally resulted in the tag-and-release of hundreds of fish. However, over the past decade or so charter captains have increasingly opted not to tag fish, but to 'free-release' them instead.

Thus, only 39 black marlin were tagged during the 2020 heavy tackle season, marginally more than the previous year (35), which was the lowest on record. Since close to 100% of fish are released in this fishery, it is important to capture such data, hopefully via the introduction of free-release cards which would be incorporated into the tagging database.

### SOUTHERN BLUEFIN TUNA (SBT)

A total of 1,400 SBT were tagged in 2020/21, a slight decrease from the previous year (1,559) and a little under the average number tagged for the past 10 years (1,724). Figure 4 shows that 47.4% of SBT tagged this year were released in South Australia, followed by Tasmania, (47.1%). Numbers were well down in Victoria though, with just 4.8% tagged there compared with 23.7% last year. As is usually the case, the numbers of SBT tagged in Western Australia and NSW remained very small (7 and 3 respectively).

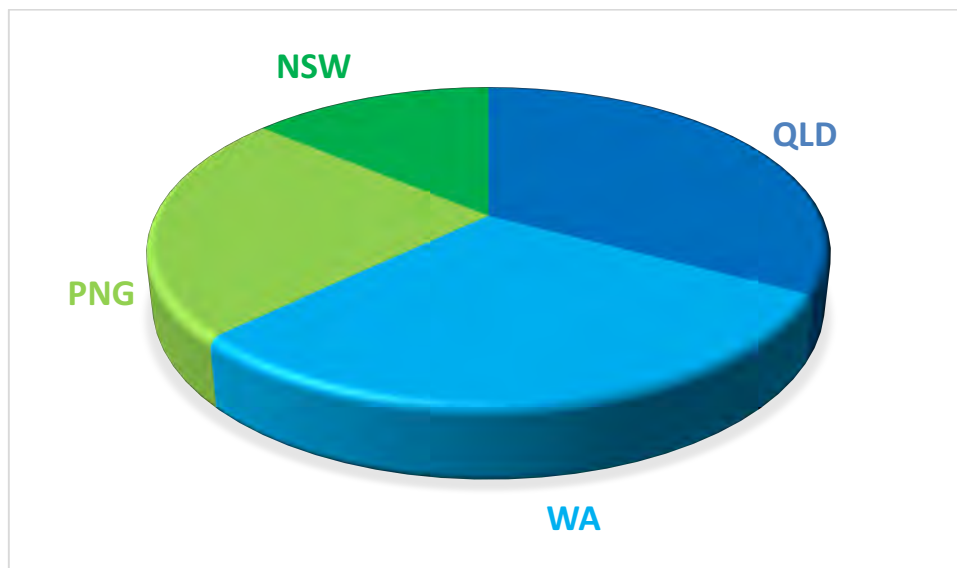
FIGURE 4. PROPORTIONS OF SOUTHERN BLUEFIN TUNA TAGGED BY STATE, 2020/21



### BLUE MARLIN

A total of 464 blue marlin were tagged during 2020/21, which was 205 less than the previous year's tally. Figure 5 shows that of the total, 152 (33%) were released off Queensland, mainly off the Gold Coast, 30% off Exmouth, Western Australia and 23% off Papua New Guinea, mainly off Rabaul, New Britain. Numbers tagged off New South Wales (64) were around double the number tagged the previous season.

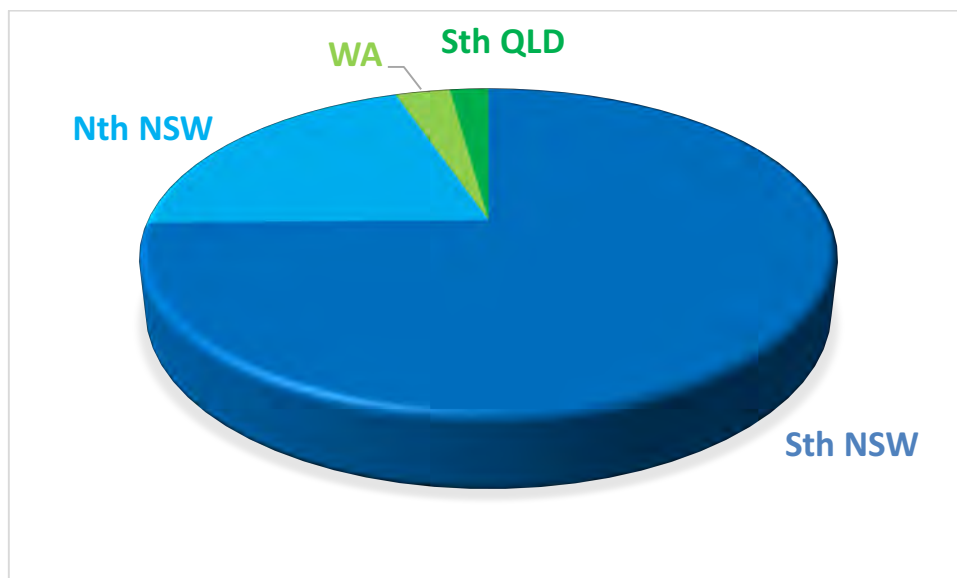
FIGURE 5. PROPORTIONS OF BLUE MARLIN TAGGED BY REGION, 2020/21



### STRIPED MARLIN

A total of 1,211 striped marlin was tagged in 2020/21, 59 more than the previous year and close to the average for the past 10 years (1,124). Nearly 95% of all striped marlin tagged during the season were released off NSW. In contrast to last year, when numbers tagged were evenly split between northern and southern NSW, this year a far higher proportion were tagged in southern waters (Figure 6). Small numbers of striped marlin were also tagged off the Gold Coast, southern QLD (26) and Exmouth, WA (37).

FIGURE 6. PROPORTIONS OF STRIPED MARLIN TAGGED BY REGION, 2020/21



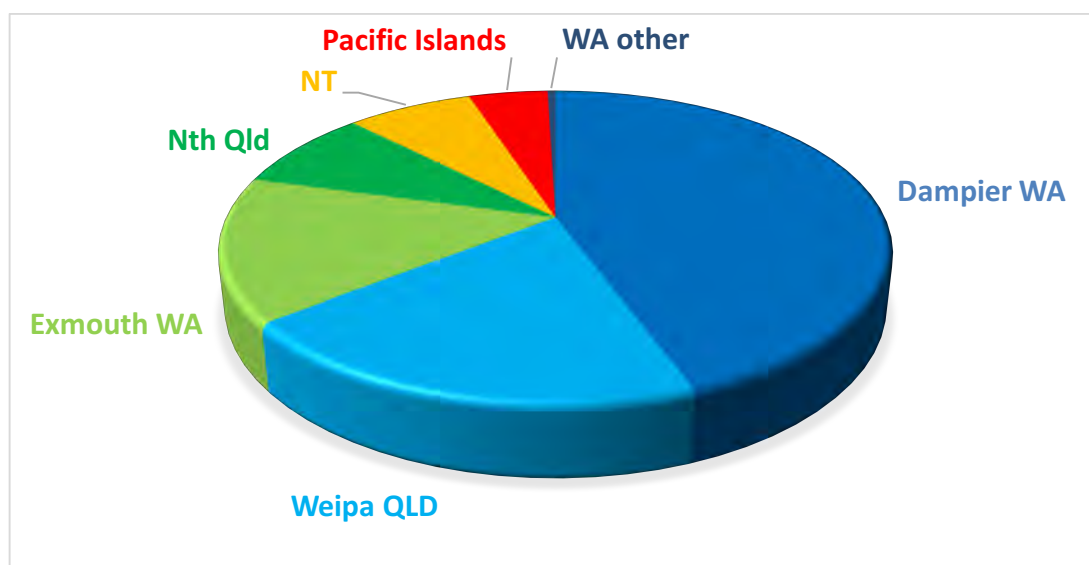
### SAILFISH

The number of sailfish tagged in 2020/21 (653) was only about half the number tagged in the previous year (1,234). This decrease was largely due to fewer sailfish tagged off both Exmouth and Dampier, WA, as well as off Weipa, QLD. An emerging billfish fishery in the Northern Territory (NT),

especially in the Darwin region, has seen increasing numbers of sailfish tagged there. This season, 50 sailfish were tagged in the NT.

As noted in previous annual reports of the Program, total numbers of sailfish tagged on the Program were nearly always boosted by the active fishery for this species off Broome WA where hundreds are still released each year, but without being tagged. This should be noted when considering long-term trends in overall numbers of sailfish tagged.

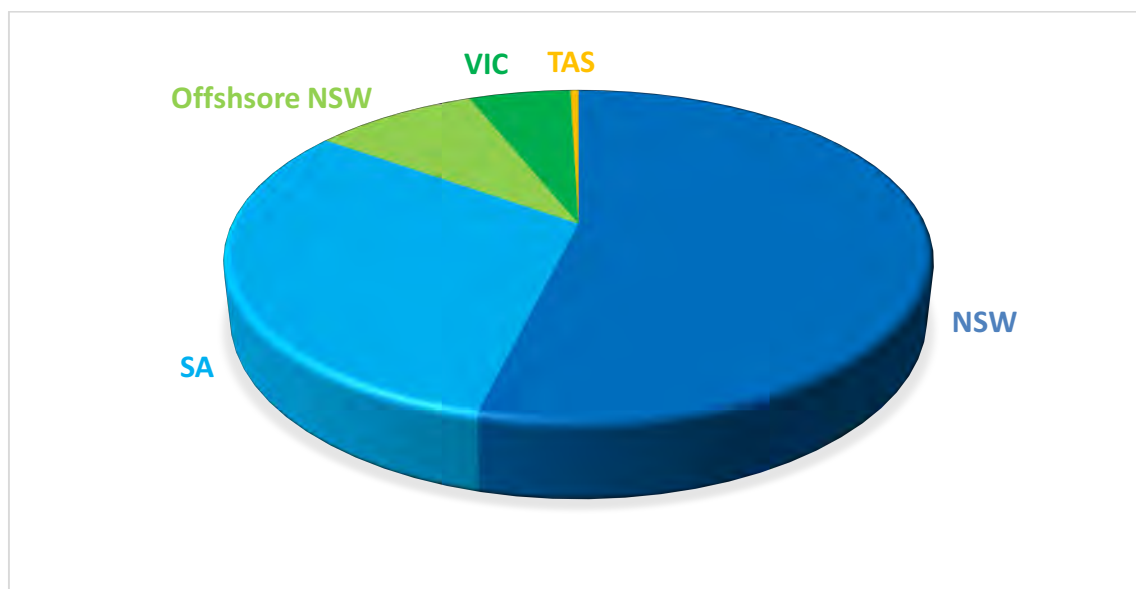
FIGURE 7. PROPORTIONS OF SAILFISH TAGGED BY REGION, 2020/21



## YELLOWTAIL KINGFISH

There were 1,559 yellowtail kingfish tagged during 2020/21, just 85 less than the previous year and the second highest total in the past 14 years of the Program. Of this total, 839 kingfish were tagged in coastal NSW waters while a further 141 were tagged well offshore of NSW, divided between Gascoyne seamount to the south and Elizabeth Reef to the north. Healthy numbers of mostly large (10-30kg) kingfish continued to be tagged near the mouths of both Gulfs in South Australia, with 484 released this year compared with 479 last year, and after several quiet seasons on kingfish in Victorian waters, this year saw 87 tagged, spread from Portland in the west to several reefs off eastern Victoria. Interestingly, seven very small kingfish (1.5-2kg) were tagged off south-eastern Tasmania, an area where the species was very rare until relatively recently, possibly indicating an extension of its range due to climate change.

FIGURE 8. PROPORTIONS OF YELLOWTAIL KINGFISH TAGGED BY STATE, 2020/21



## TAGGING TRENDS THROUGH TIME

Considering the numbers of different species of gamefish tagged each year over this long running Program, it is clear that these can and do fluctuate quite widely over time, sometimes showing long-term trends, and sometimes indicating marked shifts from one year to the next. Such changes may reflect the true abundance of particular species over these periods, or they may simply be due to changes in availability of those species or to changes in targeting practices. For example, the number of black marlin tagged on the Program each year is strongly influenced by the appearance or non-appearance of a 'pulse' of juvenile fish in their first year of life on the Australian east or west coasts.

In order to consider these fluctuations in more detail, the numbers of key gamefish species tagged over the past 12 years are shown in Figure 9.

FIGURE 9. NUMBERS OF KEY GAMEFISH SPECIES TAGGED OVER THE PAST 12 YEARS



Focusing on particular species shown in Figure 9, we see quite large fluctuations in numbers of southern bluefin tuna tagged over the given timeframe, from lows of around 1,000 in several years to highs of over 3,000 in others. After a drop in numbers tagged in 2016/17, numbers have fluctuated quite steadily around 1,200 to 1,300 tagged per year with a slight uptick this year.

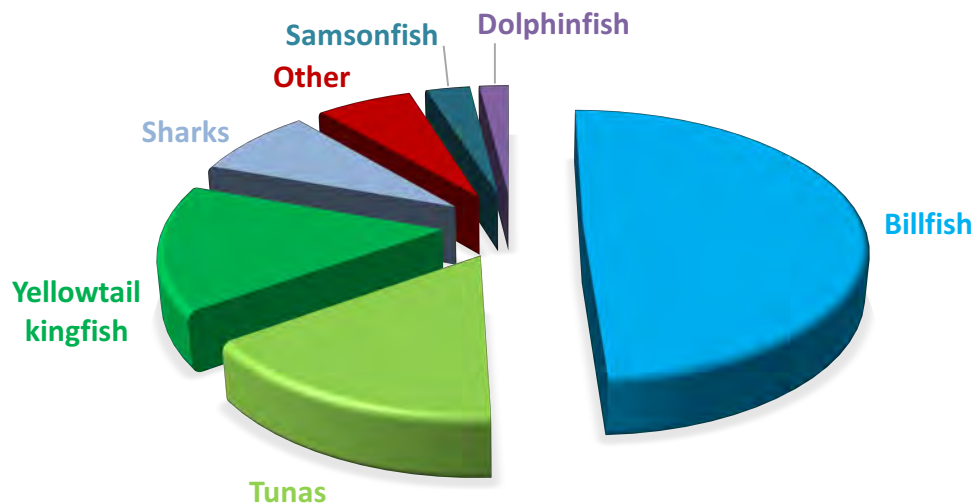
Numbers of black marlin tagged reached near record numbers in 2017/18 (3,500+ tagged), then dipped to 2,000 or less in the next two years. With the influx of juvenile fish along the east coast, the numbers tagged increased again to more than 2,600, with no indication of any long-term trend. Numbers of sailfish tagged decreased somewhat from a relative high the year before; striped marlin releases increased a little from the previous year, maintaining a relatively steady trend through time, or even an increasing trend since a low in 2012/13. Tagging of blue marlin has dropped a little since a decadal peak four years prior. Annual numbers of dolphinfish tagged can be highly variable, reflecting recruitment events of this very short-lived species. The past six years have seen quite small numbers tagged, though, with 2020/21 and the year before being the lowest on record. Yellowfin tuna have shown the most dramatic shift over time, with numbers tagged declining sharply in 2008/09 followed by a stable period and then another sharp and sustained drop in numbers since 2014/15. After an all-time low of just 47 tagged in 2017/18, less than 100 per year have been tagged, continuing a very low trend for the past seven years now. The number of mako sharks tagged has been on a fairly steady decline from a peak nine years ago, while numbers of whaler sharks (combined species), from a low base four to six years ago, showed a steady increase to a record high in 2017/18, followed by relatively high numbers tagged over the past three years. Lastly, following a dip in numbers tagged in the early 2010s, yellowtail kingfish releases have climbed steadily to record levels over the past two years.

Combining the species tagged into species or species groups, Figure 10 shows that billfish as a group constituted just over 50% of overall fish tagged in 2020/21 – very similar to the previous two years. This continues a trend of much higher proportions of billfish tagged than for earlier ‘average’ years of the Program when billfish were averaging between 30 and 35% of the total tagged.

The proportion of tunas tagged represented 16.3% of the total in 2020/21, slightly up on the past two years (15.8% and 14.5% respectively). In the past, yellowfin tuna was the dominant tuna species tagged, but with very few of that species being tagged over the past seven years, fluctuations in the number of tuna tagged is now largely due to fluctuations in numbers of southern bluefin tuna tagged each year.

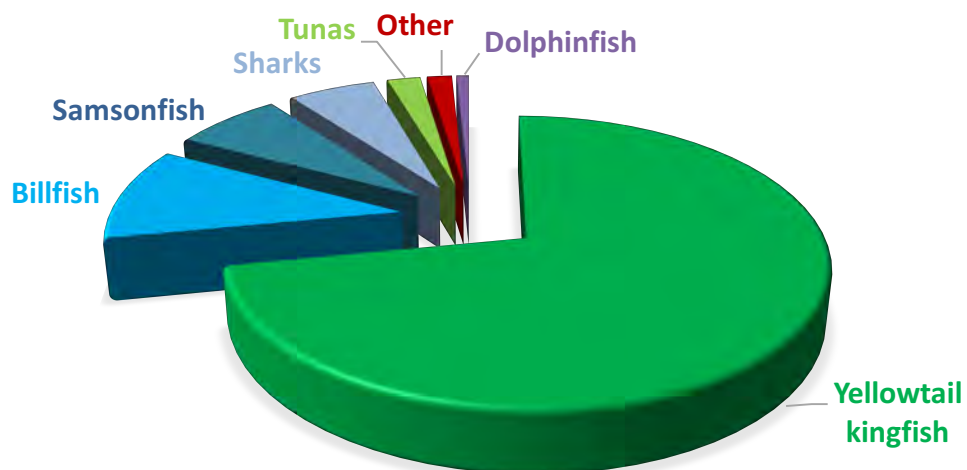
Sharks constituted 8.4% of all fish tagged in 2020/21, a substantial rise from 5.8% last year and higher than the average of about 7% over the past 12 years or so. This increase was at least partially due to 196 whaler sharks (presumed Galapagos whalers) tagged at Lord Howe Island over a short period in February 2021.

FIGURE 10. SPECIES GROUPS TAGGED IN 2020/21



Now considering recaptured species or species groups, Figure 11 shows the proportions of the major species groups recaptured in 2020/21 – as is usually the case, quite different proportions to those tagged. This year, yellowtail kingfish again dominated recaptures even more than usual, constituting 66.6% of all recaptures. This proportion was almost identical to that recorded in 2019/20, both years being considerably higher than the two previous years, for example (59.1% and 52.9% respectively). Billfish represented the next highest proportion of recaptures at 10% (12.0% last year) followed by samsonfish (6.5%) and tunas (2.0%).

FIGURE 11. SPECIES GROUPS RECAPTURED IN 2020/21



## RECAPTURE HIGHLIGHTS IN 2020/21

The full list of completed recaptures that were reported in 2020/21 is shown in Appendix I. Some of the highlights of these recaptures are detailed below. Because of the interest among anglers, we tend to emphasise some of the longer times at liberty and/or longer distances moved by tagged fish, however, these may often be exceptions to the rule. In contrast, many fish are also recaptured relatively close to their points of release, often, but not always within relatively short times. Therefore, it is stressed that information gained from these less 'spectacular' recaptures is just as important to our understanding of the movements and growth of game fish as are longer term, longer distance recaptures. (Note: In the maps of movements of different species in this section, the green dots represent release positions and the red dots represent locations of recapture).

### BLACK MARLIN

A total of 24 black marlin recaptures were reported during 2020/21, seven more than the previous year. Times at liberty ranged from 6 to 1,199 days (3 years 3 months) and minimum distances travelled from 2 to 1,474 nautical miles. Sixteen of the recaptured black marlin had been tagged in QLD waters and eight off NSW. Twenty-one of the recaptured marlin were caught by recreational boats in Australian east coast waters while the other three were taken by a Pacific Island domestic longline vessels.



Image: One of four healthy black marlin tagged and released by Joel Abercrombie off Port Macquarie NSW in January 2021. This fish was subsequently recaptured. Details to come in the 2021/22 Game Fish Tagging Report.

The furthest distance recorded by a black marlin in 2020/21 was for a fish tagged off Cape Moreton QLD in December 2019 and recaptured 8 months later by a PNG commercial longliner off Mahur Island in northern Papua New Guinea waters – a minimum swim of around 1,474 nautical miles (Figure 12).

Two other long-distance recaptures of black marlin were reported (Figure 12). One had been tagged off the Barwon Banks, Sunshine Coast QLD and recaptured 8 months later near the island of Vitu Levi, Fiji, a distance of 1,287 nautical miles. The other was released off Noosa QLD and recaptured by a New Caledonian longliner 554 nautical miles to the north, at the Chesterfield Isles, again after 8 months of liberty. All three black marlin were estimated at 25 to 30 kg at release (thought to be about one year old) and upon recapture 8 months later, weighed 50 to 80 kg.

The black marlin which had been at liberty for the longest time was initially tagged at a size of just 5 kg off Sandy Cape, Fraser Island QLD. It was subsequently recaptured more than 3.25 years later off Port Stephens NSW at an estimated size of 50 kg before being re-released.

Three black marlin tagged off the Port Macquarie region of NSW were subsequently recaptured. Tagged in January, February and March 2021, all three had headed south before being recaptured off Port Stephens, Sydney and Jervis Bay after 30 to 59 days at liberty. Other notable east coast movements of black marlin were also to the south, including one from Cape Bowling Green northern QLD to Noosa QLD and another from Cape Moreton to Port Stephens after 132 and 37 days respectively (Figure 13). Also of note was a black marlin at liberty for just under a year that had been tagged off South West Rocks NSW and recaptured off Moreton Island QLD – a distance of just 236 nautical miles. Over the course of the Program, many black marlin (and some other species, such as sailfish) have been recaptured after periods of almost exactly one, two, three or more years in the same vicinities that they were released. This strongly suggests that at least some fish make annual homing migrations, having moved considerable distances during the intervening time periods.



Image: Rebecca Roberts with a black marlin caught at the Drum Canyons off Jervis Bay NSW in March 2021. The fish had been tagged 54 days earlier off Point Plomer, near Port Macquarie NSW at an estimated 50 kg. Rebecca and crew estimated its size at 60 kg before re-releasing it.

**FIGURE 12. LONG-DISTANCE MOVEMENTS OF RECAPTURED BLACK MARLIN RECORDED IN 2020/21.**

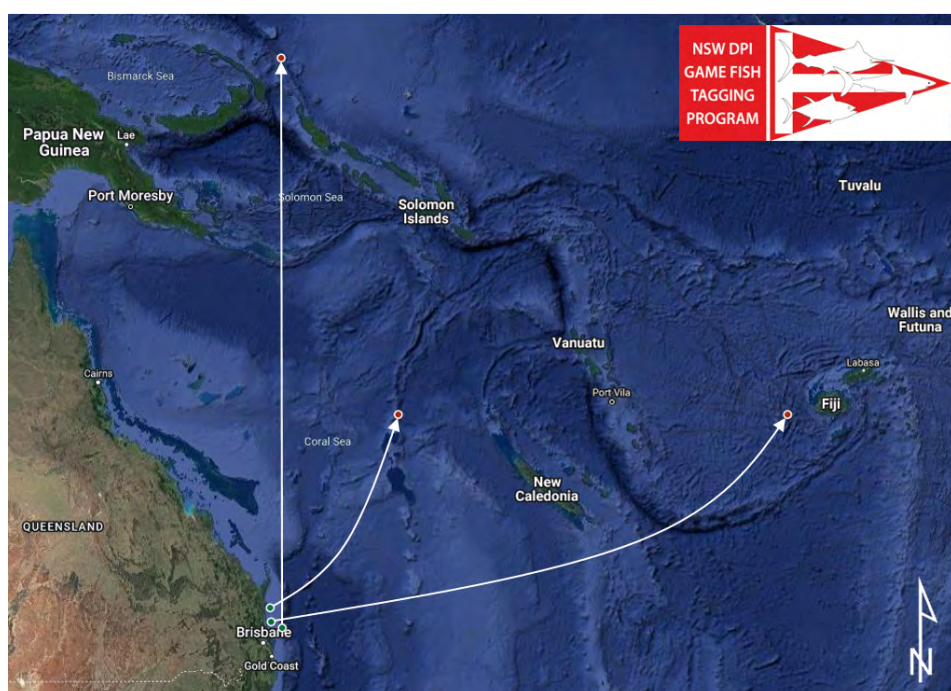


FIGURE 13. COASTAL MOVEMENTS BY RECAPTURED BLACK MARLIN RECORDED IN 2019/20



## BLUE MARLIN

Three blue marlin were recaptured in 2020/21, the same number as the previous year. Perhaps surprisingly, all three had been tagged in Papua New Guinea, and were recaptured off the east coast of the Philippine archipelago (Figure 14). Two of these had been tagged off New Britain PNG just five days apart, in November 2019. The first, estimated at 50 kg at release, was recaptured 8 months later by a subsistence fisher off Hiatuna, Philippines. It weighed 55 kg. The second, estimated at 70 kg, was recaptured after 1 year 7 months off Rapu-Rapu Island, Philippines, also by a subsistence fisher, and weighed 80.5 kg. The third blue marlin was tagged near Tami Island, off Lae PNG in March 2018. Estimated at just 40 kg at the time, it was recaptured after 2 years 3 months by a local commercial vessel off Samur Island the Borogan Coast, Philippines. The fish weighed 65 kg at recapture.

FIGURE 14. BLUE MARLIN MOVEMENTS BY RECAPTURED FISH RECORDED IN 2020/21

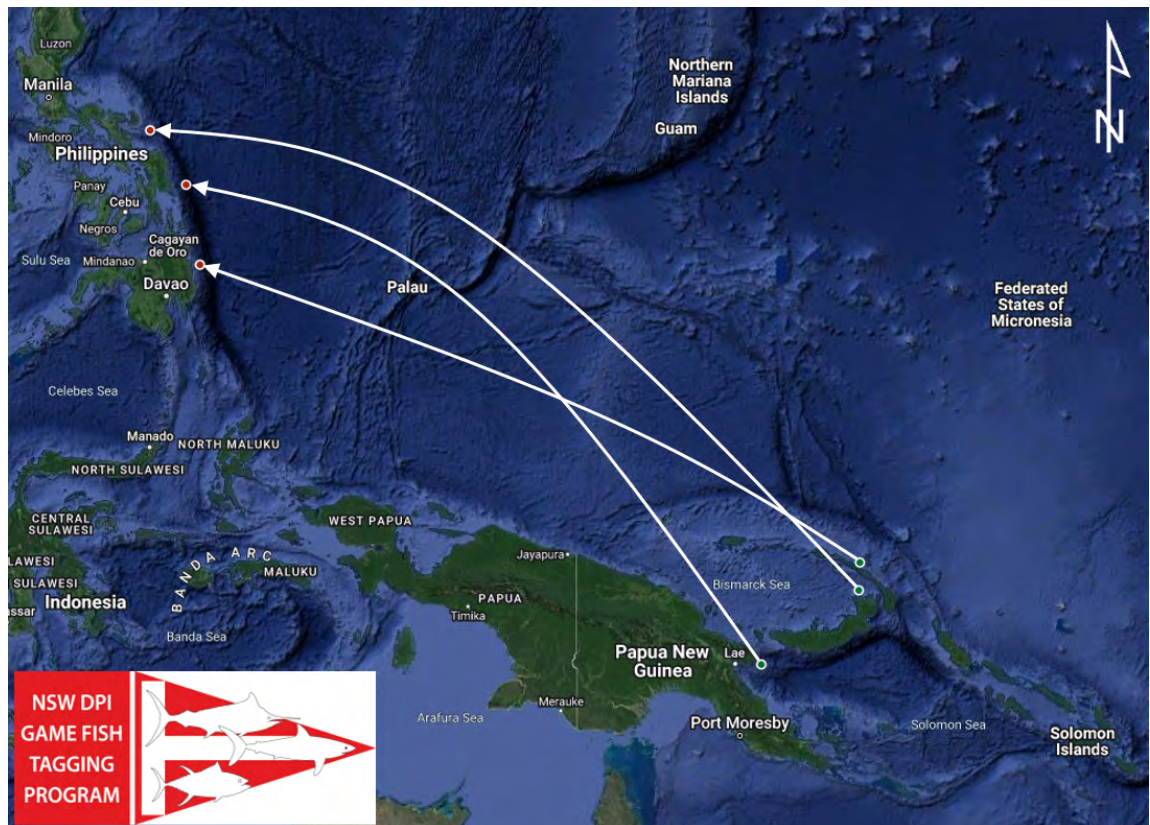


Image: A blue marlin about to be tagged and released.

## SAILFISH

In contrast to the previous year when 17 sailfish recaptures were recorded, there were just three reported for 2020/21. The three recaptures this year were all tagged off Weipa QLD and all recaptured very near their release points (3, 5 and 11 nautical miles). What made these recaptures noteworthy though was that the times-at-liberty between tagging and recapture were all substantial. One fish was recaptured after 1 year 18 days, another after 1 year 11 months and the third after 3 years 4.5 months. Remarkably, the last fish was both tagged and recaptured by the same angler, Darryl French.

This pattern of sailfish being recaptured close to their release points after considerable lengths of time has emerged over the course of the Tagging Program in multiple locations around northern Australia including Broome, Dampier and Exmouth in WA, Groote Eylandt NT, and Cairns, Townsville and Cape Moreton in Queensland. It is generally believed by anglers in these locations that sailfish are not present year round, so these results are thought to exhibit the phenomenon of annual homing, or 'philopatry' — meaning the tendency to return to one's 'homeland'. The general lack of recaptures of sailfish away from tagging sites remains difficult to explain, but may simply be due to lack of fishing effort targeting sailfish in other areas and at other times of the year.

## STRIPED MARLIN

Ten striped marlin were recaptured in 2020/21, one less than the previous year. Times at liberty between release and recapture ranged from 24 to 521 days while minimum distances moved ranged from 51 to 1,175 nautical miles. Nine of the ten recaptured fish were tagged off different regions of NSW, but surprisingly, eight of these were recaptured in one concentrated area known as the Drum Canyons, to the east of Jervis Bay NSW, indicating a general aggregation of the species in that region during February 2021.

There was one notable exception to this 'rule', however – a landmark recapture for striped marlin for the Program. This was the first ever recapture of this species to be tagged off Australia and recaptured off New Zealand. Interestingly, this was a relatively large fish, estimated at 100 kg, tagged off the Gold Coast QLD where encounters with striped marlin are relatively rare. The fish was recaptured off Manukau Harbour on the west coast of the North Island 1 year and 5 months after release (Figure 15). Thus, after more than 280 recaptures of striped marlin, one fish had finally been recorded as traversing the Tasman Sea from west to east. Striped marlin are by far the most common billfish caught off New Zealand, and over the course of a similar tagging program there, two fish tagged off north-western New Zealand have been recaptured off south-eastern Australia. On the other hand, the New Zealand Program has recorded multiple recaptures of striped marlin in the Coral Sea, as has the NSW Game Fish Tagging Program, suggesting that mixing and possible spawning of fish from both countries may well be occurring in that region.

FIGURE 15. MINIMUM DISTANCE MOVED BY THE FIRST AUSTRALIAN-TAGGED STRIPED MARLIN TO BE RECAPTURED IN NEW ZEALAND



Recaptures of striped marlin this year add to findings from previous years which have shown the species to be far less migratory than black or blue marlin, and that their times-at-liberty are nearly always short, rarely exceeding 12 months. In fact, the Tasman-traversing fish was one of less than ten striped marlin that have been recaptured more than one year after release. There is now good evidence that this is due to striped marlin rejecting tags at a higher rate than other marlin species.



Image: This striped marlin, recaptured by angler Tyler Wright off Bermagui NSW, had been tagged off Jervis Bay 53 days earlier. It was estimated at 80 kg on both occasions.



Image: Mitchell Kerr with a recaptured striped marlin, caught over the Drum Canyons NSW. It had been tagged 43 days earlier at the locality known as 'The Car Park' wide of Port Stephens NSW. At release it was estimated at 55 kg and at recapture, 60 kg.

## ALBACORE, YELLOWFIN TUNA, SPANISH MACKEREL

This year, just one albacore and one yellowfin tuna were recaptured. However, both were noteworthy in recording long-distance movements and considerable growth rates. In addition, of three narrow-barred Spanish mackerel recaptured, one had moved a record distance for the Program. All three movements are depicted on Figure 16.

FIGURE 16. ALBACORE, YELLOWFIN TUNA & SPANISH MACKEREL MOVEMENTS.



The albacore was tagged off Merimbula NSW in June 2017 and estimated at just 5 kg on release. Nearly 3 years 8 months later, a New Caledonian longline vessel recaptured the fish near the Chesterfield Isles, weighing it at 20.7 kg.



Image: The recaptured albacore photographed on board the commercial longliner which reported it to NSW DPI.

The single yellowfin tuna recapture in 2020/21 was significant for a number of reasons. Tagged wide of Sydney and recaptured off Sudest Island Papua New Guinea, it was the first long-distance movement for the species recorded for some years, presumably due partly to numbers of yellowfin tagged declining markedly over the past seven years or so (see Figure 9).

The recapture was also a great example of how growth rates of pelagic species can sometimes be ascertained quite accurately from tag and recapture details. In this case, the yellowfin, pictured below, was estimated to weigh 5 kg when tagged, and when recaptured 4 years 6 months later, weighed 71 kg.



Image: This yellowfin tuna, tagged by Gina Cleaver over the Southern Canyons off Sydney, that was recaptured 4.5 years later off southeastern Papua New Guinea. Estimated at 5 kg at release, the fish weighed 71 kg, illustrating how quickly this species can grow.

Lastly, the record breaking Spanish mackerel was tagged off Nambucca Heads NSW in April 2019 by veteran tagging angler Vic Levett, who estimated it to weigh 14 kg. Eighteen months later, Kelly Dalling, fishing on well-known marlin charter vessel 'Kekoa', captained by her husband Luke Fallon, recaptured the fish off No. 10 Ribbon Reef in northern QLD. The mackerel had swum a minimum distance of 1,037 nautical miles, the longest distance recorded for the species on the Program. It weighed 15 kg at recapture.

## SHARKS & RAYS

There were 22 sharks and one ray recaptured in 2020/21 – well up on the previous year when just nine recaptures were reported. Recaptures this year consisted of 6 'whaler' sharks, 6 tiger sharks, 5 'bronze whalers', 3 gummy sharks, one bull shark and one eagle ray.

Maps of two long distance movements of bronze whaler and one tiger shark are shown below (Figures 17 and 18). Note that the two bronze whalers had moved in opposite directions – one (estimated at 65 kg) from Nambucca Heads NSW to Cape Conron VIC in 68 days, the other from Golden Beach VIC to Seal Rocks NSW in 230 days. The latter shark was a large one, estimated at 230 kg and measuring 3.2 metres at both release and recapture.

FIGURE 17. MOVEMENTS BY RECAPTURED BRONZE WHALER SHARKS RECORDED IN 2020/21.



The long-distance tiger shark recapture was of considerable interest. The shark was tagged off Dampier WA in July 2016, at an estimated length of 185 cm and weight of 85 kg. It was at liberty for 4 years 5 months before being recaptured by WA Fisheries Researchers at Cowaramup Bay WA (220 km south of Perth). At recapture, it measured 283 cm long, which would convert to a weight of approximately 200 kg.

FIGURE 18. MOVEMENT OF RECAPTURED TIGER SHARK RECORDED IN 2020/21.



Three of the ‘whaler sharks’ recaptured were all tagged and recaptured at Elizabeth Reef, to the north of Lord Howe Island. Whaler sharks are notoriously difficult to identify in the water, but in this case, the species tagged are very likely to have been Galapagos sharks, *Carcharhinus galapagensis* – the dominant member of the family in that region. Two of these were recaptured after lengthy periods – 5 years and 3 years – at the same location while the third was recaptured after 132 days about 30 nautical miles to the south.

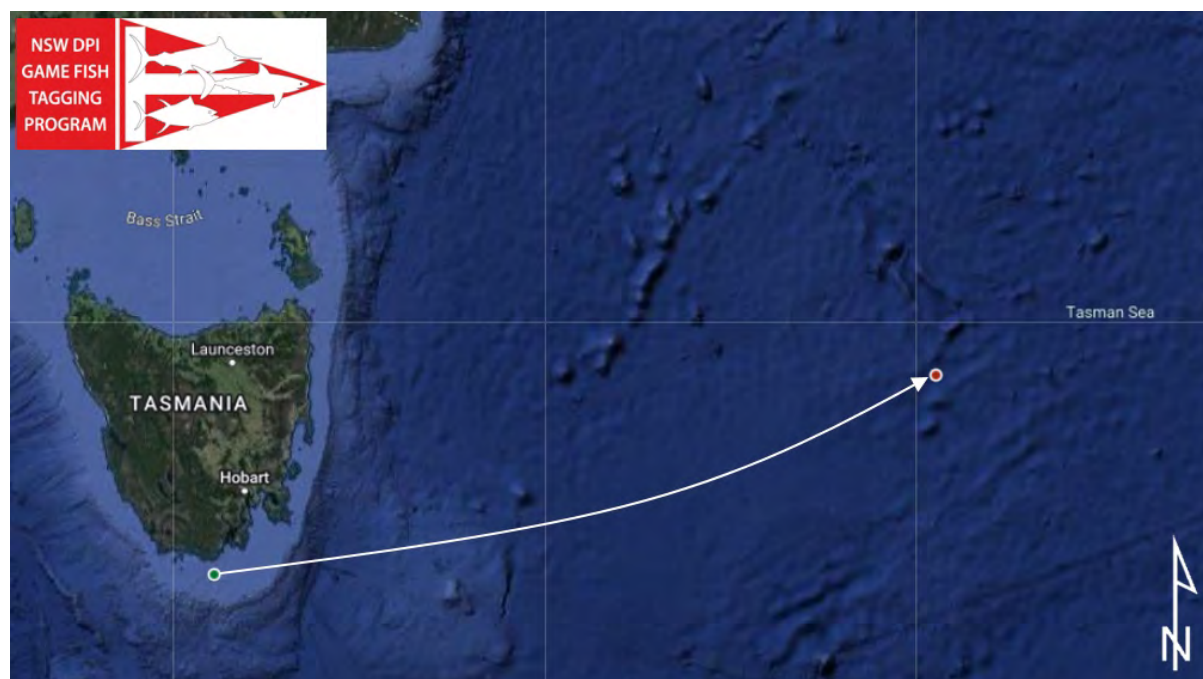
Few eagle rays have been recaptured on the Program so the single recapture this year is worth noting. The ray was tagged in Barker Inlet, north of Adelaide SA in November 2017 and recaptured 2 years 10 months later just 4 km from its release location. During its time at liberty it had grown from an estimated 140 cm across the ‘wings’ to 147 cm.

## SOUTHERN BLUEFIN TUNA

A total of six southern bluefin tuna (SBT) were recaptured this year, compared with 35 the previous year. Of those, 29 had been caught in purse seine nets by the commercial ranching fishery operating off South Australia. This year, just two recaptures were reported from those operations (possibly related to Covid-19 impacts on the industry). Two other SBT were recaptured by recreational anglers and one by a Japanese longliner. The latter fish had been tagged off Pedra Branca TAS, and was recaptured 500 nautical miles to the east (Figure 19) after a time-at-liberty of 6 years 4.5 months. When tagged, the tuna was estimated at 11 kg and at recapture, weighed 45 kg.

The other noteworthy SBT recapture was of a fish tagged off Eaglehawk Neck TAS, at an estimated 12 kg, which was recaptured almost exactly a year later near Kangaroo Island SA at a weight of 21 kg.

FIGURE 19. LONG DISTANCE MOVEMENT BY RECAPTURED SOUTHERN BLUEFIN TUNA IN 2020/21



## YELLOWTAIL KINGFISH

Recapture rates of tagged yellowtail kingfish have always ranked very highly compared with other species, currently showing an overall rate of 7.66% over the life of the tagging Program to date. In fact, this single species accounts for 33.4% of all recaptures even though it represents 8.39% of total numbers of fish tagged. As a result of this relatively high recapture rate, every year, many reports of tagged kingfish are received, always adding incrementally to our knowledge of the species, but often providing surprises as well.

In 2020/21, 267 recaptures of tagged kingfish were reported, just seven less than the previous year. Times at liberty ranged from zero days (11 fish were recaptured the day of their release) to 2,540 days (just under 7 years). The latter fish had been tagged off Port Augusta SA at an estimated weight of 24 kg, and recaptured at the same location where it weighed 24 kg. Eighteen other recaptured kingfish had been at liberty for more than 1,000 days, all but one of which were tagged in South Australian waters. The exception was a fish tagged at the Peak off Sydney in June 2017 which was recaptured one mile from its release point 3 years 6 months later. It was estimated at 14 kg at release and 15 kg at recapture.

The longest distance recorded for a tagged kingfish in 2020/21 was by a fish tagged off Whyalla SA and recaptured 330 days later off Tweed Heads NSW (see Figure 20). The calculated minimum displacement for this and all other fish recaptured on the Program is normally a straight line between the release and recapture points. In this case, that distance is 878 nautical miles, however, when land masses are taken into account, the minimum distance traveled by this fish around the coast, passing through Bass Strait, would have been approximately 1,170 nautical miles.

Two other kingfish tagged in South Australia were also recaptured in NSW waters this year (Figure 20) with times-at-liberty of 358 and 408 days. A third long distance traveling kingfish was tagged off Seal Rocks, Phillip Island VIC and recaptured at the Peak, Sydney NSW in just 57 days. Taking land masses into account, this fish traveled a minimum distance of 493 nautical miles (913 km) covering an average of 8.6 nm (16 km) per day.



Image: Jason Taylor about to release a kingfish at Seal Rocks in Victoria. This fish was recaptured just 57 days later at the Peak, off Sydney.

Movements of tagged kingfish from South Australian to NSW waters have been regularly recorded for a number of years now, strongly suggesting that fish from both areas form a single stock. This is further supported by the fact that the fish making these long journeys are larger, presumably adult fish in the 12 to 25 kg size range. It is possible therefore that these recaptures represent part of a spawning migration of kingfish into NSW waters.

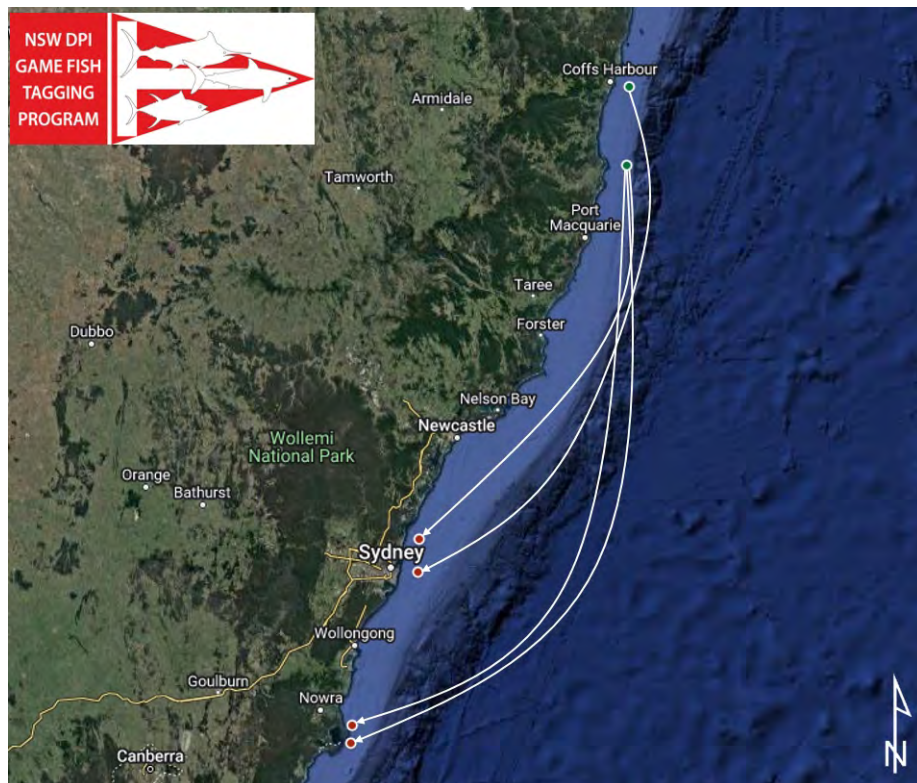
In contrast to these longer distance movements, of the 267 recaptured kingfish, 41.6% were recaptured at their release locations, 31.8% had moved 1 to 10 nautical miles and 12.0% had moved 11 to 100 nautical miles. Of the remaining fish that had moved more than 100 nautical miles (35 fish), 25 had been tagged in SA waters, 9 in NSW waters and 1 in VIC waters.

Another interesting statistic from this year's kingfish recaptures was the fact that 96% of all recaptured fish were reported by recreational anglers. The remaining 11 recaptures were reported by commercial fishers.

FIGURE 20. MOVEMENTS OF YELLOWTAIL KINGFISH FROM SOUTH AUSTRALIA & VICTORIA TO NEW SOUTH WALES RECORDED DURING 2020/21



FIGURE 21. LONG DISTANCE INTRASTATE YELLOWTAIL KINGFISH RECAPTURES DURING 2020/21



## SAMSON FISH

Samson fish continue to be tagged in numbers off South Australia and recaptures after lengthy periods continue to be reported. This year, 26 Samson fish were recaptured, mostly around islands in the vicinity of Coffin Bay/Port Lincoln SA. As was the case for the past two years, most of these tagged fish were recaptured within 70 nautical miles of their release points, 12 of them within 10 nautical miles, often after very lengthy times-at-liberty. For example, a fish tagged and released at Cabbage Patch SA was recaptured 6 years 1 month later just two miles away. Another at liberty for 5 years was recaptured off Rocky Island exactly where it had been released, while a third was recaptured exactly 12 years after its release off Rocky Island just 9 miles away at Greenly Island. The latter fish easily broke the Program record for the longest time-at-liberty for a Samson fish, set just last year by another fish tagged and recaptured off Rocky Island after 10 years 35 days at liberty. Other long term recaptures of Samson fish are listed in Appendix I.

Two other Samson fish recaptures were recorded in other States, one in Western Australia and one in New South Wales. The Western Australian fish had been tagged off Mandurah in August 2015 when it was estimated to weigh 25 kg. It was recaptured just 6 nautical miles away 5 years and 9 months later, again estimated at 25 kg.

Lastly, the NSW Samson fish was tagged off Shellharbour in May 2018 at an estimated size of just 4 kg and recaptured 2 years 9 months later at South Solitary Island NSW, a movement of 285 nautical miles to the north. At recapture, the fish was estimated to weigh 8 kg.



Image: Ian Osterloh about to release the tagged Samsonfish that travelled the furthest distance in 2020/21. It was recaptured at Solitary Island NSW 5 years 9 months after it had been released off Shellharbour NSW, 285 nautical miles to the south. None of the other 25 Samson fish recaptured during the year (24 in SA, one in WA) had moved more than 78 nautical miles even after times-at-liberty of 5 to 12 years.

## RECAPTURES WITH MISSING TAG CARDS

Each year, the Program receives notification of recaptures of some fish for which no tag card has been received. In many cases, the missing card is eventually sent, or is located by contacting club recorders or boat owners who have returned tag cards from the same batch of tags as the missing ones. In some cases though, these efforts fail to locate the missing cards, which disappointingly means potentially valuable information is lost. This year, we received information on 23 recaptures for which no matching tag card had been received at the time of writing this report. These are shown in Table 3 below in the hope that the cards might be located, and to encourage the return of any completed tag cards, regardless of when the fish were released.

We ask you to take a careful look at the Table, and if you have tagged any of the species listed at any time, please check to make sure there are no completed tag cards with matching numbers sitting in a drawer on a boat or at home. Note that the recapture location may be very different from where a fish was originally tagged.

**TABLE 3. DETAILS OF FISH RECAPTURED IN 2020/21 FOR WHICH NO TAG CARD HAS SO FAR BEEN RECEIVED.**

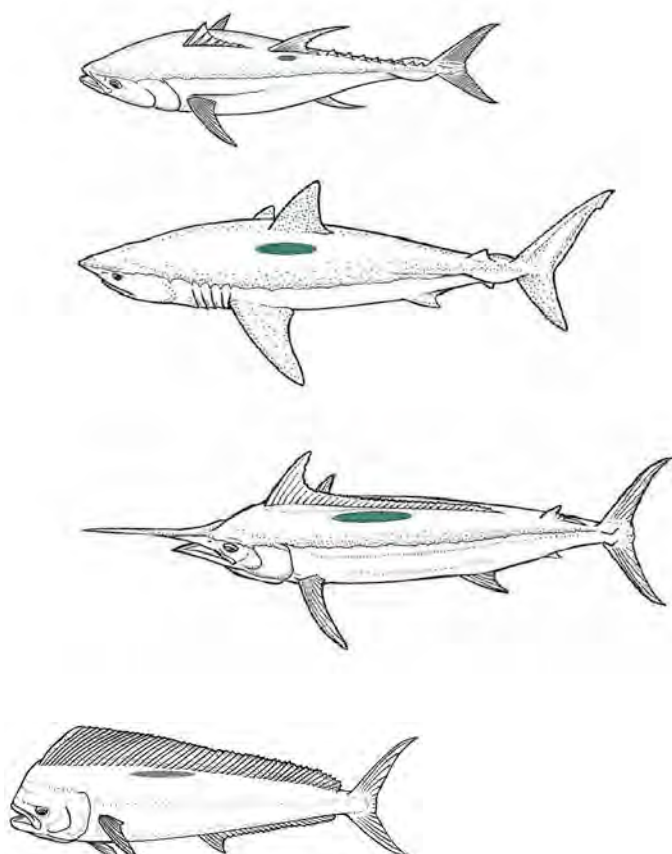
| Tag No  | Species             | Where recaptured             | Date recaptured | Recapt Lngth (cm) | Recapt Wt (kg) |
|---------|---------------------|------------------------------|-----------------|-------------------|----------------|
| B151483 | BLACK MARLIN        | SOLOMON ISLANDS              | 21/5/21         | 220               |                |
| B154278 | BLACK MARLIN        | PORT STEPHENS NSW            | 28/2/21         |                   | 15             |
| B167707 | BLUE MARLIN         | MOOLOOLABA (WIDE) QLD        | 30/6/21         |                   |                |
| A631851 | DOLPHINFISH         | 12 MILE REEF (NTH) NSW       | 27/2/21         | 86                | 4.8            |
| A652590 | DOLPHINFISH         | BOTANY BAY WIDE FAD NSW      | 27/2/21         | 65                |                |
| S263306 | HAMMERHEAD SHARK    | GIBBER REEF (OUTER) NSW      | 10/3/21         | 140               | 30             |
| S259586 | HAMMERHEAD SHARK    | BIRUBI POINT (40 FATH E) NSW | 28/2/21         | 180               | 30             |
| B087703 | SAILFISH            | TOWNSVILLE (STH GROUNDS) QLD | 10/8/20         | 220               | 40             |
| A643980 | SAMSON FISH         | HUMMOCKS (SA)                | 16/2/21         | 95                | 6              |
| A646618 | SAMSON FISH         | HUMMOCKS (SA)                | 16/2/21         | 62                | 3              |
| B125662 | STRIPED MARLIN      | PORT STEPHENS (CAR PARK) NSW | 19/2/21         | 180               | 80             |
| B156401 | STRIPED MARLIN      | JERVIS BAY CANYONS NSW       | 26/2/21         | 205               | 55             |
| S268217 | TIGER SHARK         | COLLARROY NSW (21 NM E)      | 22/5/21         | 140               | 35             |
| A639459 | YELLOWTAIL KINGFISH | WILLIAMS ISLAND (SA)         | 27/12/20        | 126               | 14             |
| A507895 | YELLOWTAIL KINGFISH | LONG REEF NSW                | 15/1/21         | 97                | 8.5            |
| A648963 | YELLOWTAIL KINGFISH | 12 MILE REEF NSW             | 26/11/20        | 87                | 7              |
| A651267 | YELLOWTAIL KINGFISH | WEDDING CAKE ISLAND NSW      | 18/11/20        | 73                |                |
| A639349 | YELLOWTAIL KINGFISH | 12 MILE REEF NSW             | 22/11/20        | 90                |                |
| A639454 | YELLOWTAIL KINGFISH | PORT AUGUSTA SA              | 14/11/20        | 141               | 27             |
| A636799 | YELLOWTAIL KINGFISH | PARRAMATTA RIVER NSW         | 18/9/20         | 90                |                |
| A636794 | YELLOWTAIL KINGFISH | PARRAMATTA RIVER NSW         | 16/9/20         | 83                |                |

## SCIENTIFIC VALUE OF THE GAME FISH TAGGING PROGRAM

It may not be widely realized that data accumulated on the Tagging Program is often sought for a wide variety of studies of aspects of the biology and fisheries of pelagic fishes. **Appendix III** shows the impressive list of reports, university theses and peer-reviewed scientific papers that have utilised data from the Program in some way. It is not just information derived from recaptures of tagged fish that make the Program so valuable. Understanding changes through time in availability of fish or fishing activities of the recreational sector would not be possible in the absence of the Program. Thus, the tagging database is widely recognised as a vital source of information on long term trends in the relative abundance of pelagic fish, and is used wherever possible for studies on changes in catches in relation to historic environmental variables such as temperature, chlorophyll, sea height and El Niño/La Niña cycles. Such studies' reports and publications are also included in Appendix III.

## TAGGING TIPS

### RECOMMENDED TAGGING AREAS



### HOW TO TAG LARGE GAME FISH

- Once the angler brings the fish within range, the fish should be traced and led alongside the boat so that it presents a broad tagging target. It is usually best to keep the boat moving slowly forwards to enable better control of the fish.
- Once the fish is in position for tagging, the person handling the tag pole should take position behind the person tracing the fish to allow for a clear tag shot.

- An attempt to apply the tag should only be made if the fish is calm or subdued. The tag should be placed towards the middle of the fish, well above the lateral line towards the dorsal fin.
- For billfish and most sportfish, the fish should be tagged with a firm, well-aimed stroke—simply place the tag against the fish's flank and push. Do not stab. Sharks will require a firm jab in order to penetrate their tough skin.
- Once the tag has been placed, remove the hook if possible (a de-hooker can facilitate this) or cut the trace close to the fish's mouth.
- Revive any fish that appear to be exhausted or are struggling to remain upright in the water. A commonly used approach for billfish is to hold the fish firmly by its submerged bill whilst the boat moves forwards at 2 to 3 knots. This ensures a good flow of water over the fish's gills.
- The fish should only be released when it shows strong signs of life and displays improved skin colour, which may take several minutes or more. Exercise caution, especially in rough weather. Alternatively, use a snooter. This is a safe and effective tool for reviving billfish.
- Fill out the tag card immediately and return to NSW DPI (or your fishing club recorder) as soon as possible, otherwise tagging is of no value.

## HOW TO TAG SMALL GAME/SPORT FISH

Smaller pelagic species may be removed from the water before tagging. This enables improved accuracy of tagging and may simplify hook removal. Often holding the fish on its back will lessen its 'flapping'. Try to prevent the fish damaging itself on hard, hot, or dry surfaces. A wet foam mat or similar is ideal (or a wet towel will suffice) for on-boat tagging.

Pelagic tags should be inserted using a hand tagger or short pole since they are designed to lock behind the bony structures of the dorsal fin or second dorsal fin in order to stay in position. Carefully insert the tag into the fish's back, close to the base of the fin and angled in so that it passes between the bony structures at the base of the fin. Try to insert the tag at an angle of at least 45° to reduce water friction and then twist the tag pole before removing it. In effect, you should be trying to hook the barb of the tag around one of these spines, which then locks the tag in place.

## TAGGING AND IMPROVED SURVIVAL TIPS

Elect one crew member as the person in charge of the tagging equipment, to ensure that:

- The number of the tag in position on the tag pole matches that on the tag card
- Details of the tagging are promptly recorded on the card
- The card is handed to the fishing club recorder or mailed to NSW DPI as soon as possible.
- Use non-offset circle hooks whenever possible when using live or dead baits. These hooks minimise deep hooking, foul hooking and bleeding and promote the survival of tagged fish.
- Keep your tag cards in an orderly bundle. This will help to ensure that tags do not become loose and fall out of their corresponding tag card.
- Load your tagging pole with a tag before you hook a fish to ensure that it is attached properly and is readily available whenever you wish to tag a fish.

- Check the length of your billfish tag applicator 75mm is the optimal length for most billfish —this ensures that the tag is placed at the correct depth and reduces the risk of the tag being shed by the fish.
- Do not attempt to tag very active fish, especially if the fish is jumping at the side of the boat. Poor tag placement can injure fish or result in the tag being shed. The recommended tagging areas are shown below. It is better to release the fish without tagging, if accurate tag placement is not possible.

### ESTIMATING THE SIZE OF TAGGED FISH

This may be done by estimating the weight of the fish or by measuring the fish when it is in, or alongside the boat. If the fish is less than a metre in length it may be carefully brought on board and measured using a standard measuring tape. However, larger fish should remain in the water. If you estimate the size of the fish (especially fish weight), get a consensus from all the crew immediately after release, and record immediately (first impressions are always best!).

For measuring length of fish in the water, it is best to rig up a simple tape measure. It helps if it is flexible, and at least 4 metres long. Attach a tennis ball to the zero end and when a fish is alongside, or being held at the back of the boat, float the tennis ball to the tail fork and get a measurement to the fish's snout, or to the tip of the lower jaw for billfish. For billfish, it is important that the recorded measurement should state where the fish was measured from and to (i.e. lower jaw to tail fork length or total length - tip of bill to end of tail).

### REPORTING A PREVIOUSLY TAGGED FISH

If an earlier tag is noticed on a fish, should the tag be retrieved and the fish re-tagged, or leave the tag in place? If the tag is well secured and the tag number can be read whilst attached to the fish the fish can be returned after first carefully recording the tag number (taking a clear photo is a good way to record the number) and measuring/and or estimating the weight of the fish. If it is difficult to read the tag or the fish is not enabling you to easily see the tag number, cut off the tag and replace with another if you have tagging equipment on board.

If the fish is small enough to measure, then this should be done, ideally from the tip of the snout to the tip of the tail (or if a billfish, from the tip of the lower jaw to the tail fork).

One other point regarding reporting recaptures of tagged fish should be kept in mind. In these days of nearly 100% release of billfish, previously tagged fish are quite often caught and re-released without being able to retrieve the earlier tag. If you do hook and release a fish which has a previous tag in place, you should definitely record the details of the event (even though the tag number is unknown) and report the incident to NSW DPI as a genuine recapture. In this way, better statistics on actual recapture rates of billfish will be able to be maintained.

### CONTACT THE PROGRAM

If you would like to contact the game fish tagging Program either to obtain further information on the Program, tags, or to report a recapture directly, call +61 (02) 6691 9602 or email [gamefish.tagging@dpi.nsw.gov.au](mailto:gamefish.tagging@dpi.nsw.gov.au) or head to the DPI website and find the online reporting form.

## ACKNOWLEDGEMENTS

The Game Fish Tagging Program, operated by NSW DPI, is generously supported by the NSW Recreational Fishing Trust through funds raised from the Recreational Fishing Licence in that State. We also acknowledge the thousands of anglers, club officials, captains and crew who participate in the Program. Without this continued effort, our knowledge of the biology of pelagic fish would be much the poorer. This report was prepared with the assistance of Clay Hilbert, Emma Simpson and Phil Bolton of NSW DPI.



Image: A beautifully coloured striped marlin tagged off Texas Reef, New South Wales by David Sinclair

## APPENDIX I: ALL RECAPTURES OF TAGGED FISH REPORTED IN 2020/21

| Species       | Date tagged | Release location                  | Days at liberty | Dist moved (nmi) | Direction |
|---------------|-------------|-----------------------------------|-----------------|------------------|-----------|
| ALBACORE      | 10-Jun-17   | MERIMBULA                         | 1336            | 1229             | NNE       |
| BLACK MARLIN  | 11-Jan-21   | POINT PLOMER (4 NM E)             | 6               | 32               | S         |
| BLACK MARLIN  | 11-Jan-21   | NOBBY HEAD (6NM E)                | 6               | 72               | SSW       |
| BLACK MARLIN  | 28-Dec-20   | CAPE MORETON TRENCH               | 7               | 9                | NW        |
| BLACK MARLIN  | 06-Jan-21   | JUMPINPIN (10NM E)                | 10              | 6                | SSE       |
| BLACK MARLIN  | 01-Jul-20   | FRASER ISLAND (SANDY CAPE 1NM NE) | 12              | 3                | S         |
| BLACK MARLIN  | 08-Aug-20   | EASTERN PATCHES                   | 14              | 19               | NW        |
| BLACK MARLIN  | 21-Jun-20   | FRASER ISLAND (SANDY CAPE)        | 21              | 3                | S         |
| BLACK MARLIN  | 05-Nov-20   | FRASER ISLAND (BREAKSEA SPIT)     | 23              | 95               | S         |
| BLACK MARLIN  | 05-Nov-20   | FRASER ISLAND (BREAKSEA SPIT)     | 23              | 95               | S         |
| BLACK MARLIN  | 07-Feb-21   | PORT MACQUARIE (EAST)             | 30              | 157              | SSW       |
| BLACK MARLIN  | 27-Feb-21   | BAIT STATION                      | 35              | 98               | SSW       |
| BLACK MARLIN  | 04-Jan-21   | CAPE MORETON (9 NM N)             | 37              | 356              | SW        |
| BLACK MARLIN  | 07-Mar-21   | POINT PLOMER (4 NM E)             | 39              | 100              | SSW       |
| BLACK MARLIN  | 24-Jan-21   | DOUBLE ISLAND POINT (EAST)        | 43              | 40               | SE        |
| BLACK MARLIN  | 14-Jan-21   | PORT MACQUARIE (11 NM E)          | 52              | 246              | SSW       |
| BLACK MARLIN  | 15-Jan-21   | POINT PLOMER (QUEENS HEAD)        | 54              | 251              | SSW       |
| BLACK MARLIN  | 24-Jun-20   | FRASER ISLAND (SANDY CAPE 2NM E)  | 73              | 2                | S         |
| BLACK MARLIN  | 21-Oct-20   | NOOSA (MISERY REEF)               | 96              | 101              | SSE       |
| BLACK MARLIN  | 18-Jul-20   | CAPE BOWLING GREEN (10NM E)       | 132             | 542              | SSE       |
| BLACK MARLIN  | 23-Dec-19   | CAPE MORETON (11 NM NE)           | 236             | 1474             | NW        |
| BLACK MARLIN  | 30-Dec-19   | NOOSA (10NM E)                    | 241             | 554              | NNE       |
| BLACK MARLIN  | 16-Feb-20   | BARWON BANKS                      | 247             | 1287             | ENE       |
| BLACK MARLIN  | 19-Jan-20   | SOUTH WEST ROCKS (JAIL REEF)      | 352             | 236              | N         |
| BLACK MARLIN  | 03-Nov-17   | FRASER ISLAND (SANDY CAPE)        | 1199            | 499              | S         |
| BLUE MARLIN   | 11-Nov-19   | MAKADA ISLAND (4NM NE)            | 248             | 1713             | WNW       |
| BLUE MARLIN   | 16-Nov-19   | ST GEORGES CHANNEL (GENERAL)      | 568             | 1996             | WNW       |
| BLUE MARLIN   | 30-Mar-18   | TAMI ISLAND (PNG)                 | 828             | 1715             | NW        |
| BRONZE WHALER | 13-Feb-21   | ROYSTON HEAD                      | 12              | 8                | SSE       |
| BRONZE WHALER | 02-Jan-21   | BALGOWAN (SA)                     | 32              | 9                | NE        |
| BRONZE WHALER | 07-Sep-20   | SHELLY BEACH NAMBUCCA HEADS       | 68              | 473              | SSW       |
| BRONZE WHALER | 26-Jan-20   | GOLDEN BEACH (VIC)                | 230             | 428              | NNE       |
| BRONZE WHALER | 09-Nov-18   | EAGLE BAY (WA)                    | 758             | 0                | NW        |
| BULL SHARK    | 20-Feb-21   | WISEMANS FERRY                    | 32              | 21               | ESE       |
| DOLPHINFISH   | 22-Nov-20   | SYDNEY EAST FAD                   | 1               | 0                | NW        |
| DOLPHINFISH   | 28-Oct-20   | BALLINA WAVE RIDER BUOY           | 2               | 0                | NW        |
| DOLPHINFISH   | 28-Feb-21   | FREMANTLE SAILING CLUB FAD        | 20              | 10               | SSW       |
| EAGLE RAY     | 18-Nov-17   | BARKERS INLET                     | 1021            | 2                | W         |
| GUMMY SHARK   | 08-Sep-20   | DOG FENCE BEACH                   | 74              | 11               | WNW       |
| GUMMY SHARK   | 15-May-20   | ANGELSEA (PT ROADKNIGHT)          | 80              | 55               | E         |

## APPENDIX I: RECAPTURES OF TAGGED FISH REPORTED IN 2020/21 (CONTD)

| Species               | Date tagged | Release location                   | Days at liberty | Dist moved (nmi) | Direction |
|-----------------------|-------------|------------------------------------|-----------------|------------------|-----------|
| GUMMY SHARK           | 22-Feb-19   | TORQUAY (VIC)                      | 769             | 119              | SE        |
| LONGTAIL TUNA         | 16-Mar-21   | PORT MACQUARIE                     | 30              | 85               | SSW       |
| SAILFISH              | 20-Jul-19   | WEIPA (FALSE PERA HEAD 15NM W)     | 383             | 3                | N         |
| SAILFISH              | 26-Aug-18   | WEIPA                              | 699             | 11               | SW        |
| SAILFISH              | 27-Aug-17   | ALBATROSS BAY                      | 1235            | 5                | ESE       |
| SAMSON FISH           | 24-Jan-21   | GREENLY ISLAND (5NM SW)            | 28              | 15               | NE        |
| SAMSON FISH           | 05-Mar-21   | STUART REEF                        | 29              | 0                | NW        |
| SAMSON FISH           | 29-Dec-20   | FOUR HUMMOCKS ISLAND (SA)          | 54              | 14               | WNW       |
| SAMSON FISH           | 10-Jan-21   | ROCKY ISLAND (SA)                  | 77              | 0                | NW        |
| SAMSON FISH           | 10-Feb-20   | ROCKY ISLAND (SA)                  | 188             | 72               | SE        |
| SAMSON FISH           | 06-Mar-20   | PONDALOWIE BAY (10NMNW)            | 327             | 49               | W         |
| SAMSON FISH           | 26-Apr-20   | HOPKINS ISLAND (SA)                | 336             | 66               | NW        |
| SAMSON FISH           | 10-Feb-20   | CABBAGE PATCH (SA)                 | 346             | 0                | NW        |
| SAMSON FISH           | 18-Jan-20   | FOUR HUMMOCKS ISLAND (SA)          | 392             | 1                | E         |
| SAMSON FISH           | 26-Jan-20   | ROCKY ISLAND (SW)                  | 392             | 11               | NNE       |
| SAMSON FISH           | 22-Apr-19   | HUMMOCKS (SA)                      | 663             | 28               | NW        |
| SAMSON FISH           | 28-Jan-19   | GREENLY ISLAND (SA)                | 744             | 0                | NW        |
| SAMSON FISH           | 13-Apr-19   | PONDALOWIE (SA)                    | 790             | 9                | SE        |
| SAMSON FISH           | 20-May-18   | SHELLHARBOUR (EAST)                | 1014            | 285              | NNE       |
| SAMSON FISH           | 24-Mar-18   | GREENLY ISLAND (SA)                | 1031            | 11               | SSW       |
| SAMSON FISH           | 06-Apr-18   | COFFIN BAY                         | 1045            | 66               | SE        |
| SAMSON FISH           | 25-Jun-18   | MARION BAY (SA)                    | 1061            | 2                | S         |
| SAMSON FISH           | 26-Jan-18   | COFFIN BAY                         | 1134            | 7                | SSW       |
| SAMSON FISH           | 26-Jan-18   | COFFIN BAY PENINSULA (2NM NW)      | 1135            | 24               | SW        |
| SAMSON FISH           | 14-Apr-17   | HUMMOCKS (SA)                      | 1464            | 63               | ESE       |
| SAMSON FISH           | 16-Jan-17   | ROCKY ISLAND (SA)                  | 1490            | 53               | ESE       |
| SAMSON FISH           | 24-Feb-17   | GREENLY ISLAND (SA)                | 1513            | 78               | ESE       |
| SAMSON FISH           | 24-Jan-16   | ROCKY ISLAND (SA)                  | 1850            | 0                | NW        |
| SAMSON FISH           | 04-Aug-15   | DAWESVILLE (STH OF MANDURAH)<br>WA | 2098            | 6                | S         |
| SAMSON FISH           | 10-Jan-15   | CABBAGE PATCH (SA)                 | 2234            | 2                | SSE       |
| SAMSON FISH           | 12-Mar-09   | ROCKY ISLAND (SA)                  | 4382            | 9                | NNE       |
| SILVER TREVALLY       | 17-Feb-21   | HUMMOCKS (SA)                      | 54              | 16               | SW        |
| SOUTHERN BLUEFIN TUNA | 26-Dec-20   | VICTOR HARBOUR (NEWLAND HEAD)      | 91              | 22               | SW        |
| SOUTHERN BLUEFIN TUNA | 26-Dec-20   | VICTOR HARBOUR (NEWLAND HEAD)      | 91              | 22               | SW        |
| SOUTHERN BLUEFIN TUNA | 15-Feb-20   | EAGLEHAWK NECK (18 NM E)           | 356             | 634              | WNW       |
| SOUTHERN BLUEFIN TUNA | 17-Jan-19   | VICTOR HARBOUR                     | 554             | 84               | SE        |
| SOUTHERN BLUEFIN TUNA | 21-Jan-17   | WEDGE ISLAND                       | 1428            | 91               | NW        |
| SOUTHERN BLUEFIN TUNA | 17-Feb-15   | PEDRA BRANCA                       | 2296            | 506              | NE        |
| SPANISH MACKEREL      | 12-Aug-20   | MACKAY (SHIPPING CHANNEL)          | 185             | 0                | NW        |
| SPANISH MACKEREL      | 12-Apr-19   | NAMBUCCA HEADS (ALBANY REEF)       | 566             | 1037             | NNW       |

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| Species             | Date tagged | Release location                | Days at liberty | Dist moved (nmi) | Direction |
|---------------------|-------------|---------------------------------|-----------------|------------------|-----------|
| SPANISH MACKEREL    | 05-Sep-18   | KNIGHT ISLAND                   | 738             | 0                | NW        |
| STRIPED MARLIN      | 17-Jan-21   | BELLAMBI (20NM NE)              | 24              | 51               | SW        |
| STRIPED MARLIN      | 17-Jan-21   | BERMAGUI KINK                   | 24              | 79               | NNE       |
| STRIPED MARLIN      | 29-Dec-20   | PORT STEPHENS (CAR PARK)        | 43              | 145              | SSW       |
| STRIPED MARLIN      | 23-Jan-21   | BAIT STATION                    | 46              | 100              | SSW       |
| STRIPED MARLIN      | 21-Dec-20   | NORAH CANYONS                   | 50              | 130              | SSW       |
| STRIPED MARLIN      | 21-Dec-20   | NORAH CANYONS                   | 51              | 129              | SSW       |
| STRIPED MARLIN      | 13-Feb-21   | JERVIS BAY (10 NM E)            | 53              | 78               | SSW       |
| STRIPED MARLIN      | 09-Jan-21   | BOTANY BAY (15NM SE)            | 60              | 60               | SW        |
| STRIPED MARLIN      | 04-Dec-20   | GIBBER REEF (OUTER)             | 76              | 169              | SSW       |
| STRIPED MARLIN      | 04-Sep-19   | JIMS MOUNT (GOLD COAST)         | 521             | 1175             | ESE       |
| TIGER SHARK         | 06-Jun-20   | KARRATHA (GENERAL)              | 323             | 5                | ENE       |
| TIGER SHARK         | 14-Jun-20   | WOODGATE BEACH (QLD)            | 334             | 0                | NW        |
| TIGER SHARK         | 01-Apr-20   | KARRATHA (GENERAL)              | 389             | 5                | ENE       |
| TIGER SHARK         | 22-Sep-19   | WICKHAM (WA)                    | 504             | 35               | WNW       |
| TIGER SHARK         | 09-Feb-19   | WHITE HILLS BEACH (WA)          | 619             | 63               | SW        |
| TIGER SHARK         | 29-Jul-16   | DAMPIER (WA)                    | 1592            | 805              | S         |
| WHALER SHARK        | 11-Feb-21   | TURIMETTA BEACH (NSW)           | 16              | 1                | E         |
| WHALER SHARK        | 24-Jan-21   | ELIZABETH REEF                  | 132             | 34               | W         |
| WHALER SHARK        | 24-Jan-21   | ELIZABETH REEF                  | 132             | 34               | W         |
| WHALER SHARK        | 07-Jan-18   | ELIZABETH REEF                  | 1113            | 4                | SW        |
| WHALER SHARK        | 01-Apr-17   | THE BANKS                       | 1479            | 76               | SSW       |
| WHALER SHARK        | 08-Jan-16   | ELIZABETH REEF                  | 1843            | 0                | NW        |
| YELLOWFIN TUNA      | 17-Jul-16   | SOUTHERN CANYONS (SYDNEY SOUTH) | 1649            | 1330             | NE        |
| YELLOWTAIL KINGFISH | 02-Oct-20   | PORT AUGUSTA (OUTLET CHANNEL)   | 0               | 0                |           |
| YELLOWTAIL KINGFISH | 06-May-20   | JERVIS BAY (LONG NOSE POINT)    | 0               | 0                |           |
| YELLOWTAIL KINGFISH | 08-May-20   | MIDDLE HARBOUR (SEAFORTH BLUFF) | 0               | 0                |           |
| YELLOWTAIL KINGFISH | 08-Oct-20   | COFFIN BAY                      | 0               | 0                |           |
| YELLOWTAIL KINGFISH | 07-Sep-20   | GOAT ISLAND (SYDNEY)            | 0               | 0                |           |
| YELLOWTAIL KINGFISH | 04-Sep-20   | GOAT ISLAND (SYDNEY)            | 0               | 0                |           |
| YELLOWTAIL KINGFISH | 07-Sep-20   | GOAT ISLAND (SYDNEY)            | 0               | 0                |           |
| YELLOWTAIL KINGFISH | 07-Jun-20   | SOUTH WEST ROCKS (FISH ROCK)    | 0               | 0                |           |
| YELLOWTAIL KINGFISH | 28-Dec-20   | LONG REEF                       | 0               | 0                |           |
| YELLOWTAIL KINGFISH | 26-Dec-20   | WARRIEWOOD HEADLAND             | 0               | 0                |           |
| YELLOWTAIL KINGFISH | 19-Apr-21   | SOUTH HEAD                      | 0               | 0                |           |
| YELLOWTAIL KINGFISH | 23-Jan-21   | PORTLAND (NORTH SHORE)          | 1               | 0                | NW        |
| YELLOWTAIL KINGFISH | 11-Jan-21   | 12 MILE REEF                    | 2               | 0                | NW        |
| YELLOWTAIL KINGFISH | 19-Apr-21   | SOUTH HEAD                      | 2               | 0                | NW        |
| YELLOWTAIL KINGFISH | 13-Jan-21   | LONG REEF                       | 4               | 0                | NW        |
| YELLOWTAIL KINGFISH | 05-Dec-20   | SOUTH HEAD                      | 5               | 42               | SSW       |

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| Species             | Date tagged | Release location              | Days at liberty | Dist moved (nmi) | Direction |
|---------------------|-------------|-------------------------------|-----------------|------------------|-----------|
| YELLOWTAIL KINGFISH | 22-Dec-20   | LONG REEF                     | 6               | 0                | NW        |
| YELLOWTAIL KINGFISH | 17-Jan-21   | LONG REEF                     | 8               | 4                | S         |
| YELLOWTAIL KINGFISH | 14-May-21   | SOUTH HEAD                    | 8               | 4                | SW        |
| YELLOWTAIL KINGFISH | 02-Apr-21   | POINT PERPENDICULAR           | 8               | 9                | NNE       |
| YELLOWTAIL KINGFISH | 11-Oct-20   | BLUEFISH POINT                | 9               | 0                | NW        |
| YELLOWTAIL KINGFISH | 02-Dec-20   | GREEN ISLAND (STH WEST ROCKS) | 9               | 1                | S         |
| YELLOWTAIL KINGFISH | 27-Mar-21   | LONG REEF                     | 9               | 6                | SSW       |
| YELLOWTAIL KINGFISH | 03-Oct-20   | SOUTH SOLITARY ISLAND         | 9               | 17               | NNE       |
| YELLOWTAIL KINGFISH | 16-Feb-21   | HUMMOCKS (SA)                 | 11              | 0                | NW        |
| YELLOWTAIL KINGFISH | 29-Nov-20   | LONG REEF                     | 11              | 0                | NW        |
| YELLOWTAIL KINGFISH | 02-Apr-21   | POINT PERPENDICULAR           | 11              | 3                | WNW       |
| YELLOWTAIL KINGFISH | 22-Nov-20   | PORT AUGUSTA (OUTLET CHANNEL) | 12              | 0                | NW        |
| YELLOWTAIL KINGFISH | 14-Nov-20   | PORT AUGUSTA (OUTLET CHANNEL) | 12              | 0                | NW        |
| YELLOWTAIL KINGFISH | 12-Sep-20   | PARRAMATTA RIVER              | 12              | 0                | NW        |
| YELLOWTAIL KINGFISH | 25-Aug-20   | SYDNEY HARBOUR                | 13              | 0                | NW        |
| YELLOWTAIL KINGFISH | 22-Jan-21   | PORTLAND (NORTH SHORE)        | 13              | 0                | NW        |
| YELLOWTAIL KINGFISH | 14-Nov-20   | COOGEE                        | 13              | 1                | S         |
| YELLOWTAIL KINGFISH | 21-Dec-20   | DEE WHY (SYDNEY)              | 13              | 2                | N         |
| YELLOWTAIL KINGFISH | 12-Sep-20   | PARRAMATTA RIVER              | 14              | 0                | NW        |
| YELLOWTAIL KINGFISH | 19-Jun-20   | 12 MILE REEF                  | 14              | 0                | NW        |
| YELLOWTAIL KINGFISH | 26-Dec-20   | HUMMOCKS (SA)                 | 15              | 0                | NW        |
| YELLOWTAIL KINGFISH | 04-Nov-20   | LONG REEF                     | 15              | 0                | NW        |
| YELLOWTAIL KINGFISH | 25-Aug-20   | PARRAMATTA RIVER              | 15              | 0                | NW        |
| YELLOWTAIL KINGFISH | 19-Apr-21   | SOUTH HEAD                    | 15              | 1                | W         |
| YELLOWTAIL KINGFISH | 03-Sep-20   | GOAT ISLAND (SYDNEY)          | 15              | 2                | W         |
| YELLOWTAIL KINGFISH | 09-Jul-20   | SOUTH WEST ROCKS              | 15              | 6                | WNW       |
| YELLOWTAIL KINGFISH | 09-Jul-20   | SOUTH WEST ROCKS              | 15              | 6                | WNW       |
| YELLOWTAIL KINGFISH | 09-Apr-21   | LONG NOSE POINT (JERVIS BAY)  | 15              | 82               | NE        |
| YELLOWTAIL KINGFISH | 30-Sep-20   | PORT AUGUSTA (OUTLET CHANNEL) | 16              | 0                | NW        |
| YELLOWTAIL KINGFISH | 25-Oct-20   | BLUEFISH POINT                | 16              | 0                | NW        |
| YELLOWTAIL KINGFISH | 11-Mar-21   | ROCKY ISLAND (SA)             | 16              | 0                | NW        |
| YELLOWTAIL KINGFISH | 27-Apr-21   | SYDNEY ARTIFICIAL REEF        | 16              | 1                | S         |
| YELLOWTAIL KINGFISH | 13-Dec-20   | PORT HACKING RIVER            | 17              | 0                | NW        |
| YELLOWTAIL KINGFISH | 16-Feb-21   | POINT TURTON (SA)             | 17              | 0                | NW        |
| YELLOWTAIL KINGFISH | 10-Oct-20   | COFFIN BAY                    | 17              | 0                | NW        |
| YELLOWTAIL KINGFISH | 05-Dec-20   | WEDDING CAKE ISLAND           | 17              | 1                | N         |
| YELLOWTAIL KINGFISH | 13-Apr-21   | LONG REEF                     | 17              | 8                | NE        |
| YELLOWTAIL KINGFISH | 13-Apr-21   | LONG REEF                     | 17              | 8                | NE        |
| YELLOWTAIL KINGFISH | 13-Nov-20   | WEDDING CAKE ISLAND           | 17              | 12               | NE        |
| YELLOWTAIL KINGFISH | 13-Nov-20   | WEDDING CAKE ISLAND           | 17              | 12               | NE        |

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|---------------------|-------------|-------------------------------|-----------------|------------------|-----------|
| YELLOWTAIL KINGFISH | 16-Jan-21   | LONG REEF                     | 18              | 0                | NW        |
| YELLOWTAIL KINGFISH | 11-Mar-21   | ROCKY ISLAND (SA)             | 18              | 0                | NW        |
| YELLOWTAIL KINGFISH | 28-Dec-20   | LONG REEF                     | 18              | 3                | E         |
| YELLOWTAIL KINGFISH | 01-Apr-21   | CLOVELLY POINT                | 18              | 5                | NE        |
| YELLOWTAIL KINGFISH | 28-Jan-21   | POINT TURTON (SA)             | 19              | 0                | NW        |
| YELLOWTAIL KINGFISH | 27-Sep-20   | NORTH SOLITARY ISLAND         | 19              | 0                | NW        |
| YELLOWTAIL KINGFISH | 11-Sep-20   | BLUEFISH POINT                | 19              | 0                | NW        |
| YELLOWTAIL KINGFISH | 21-Oct-20   | COOGEE                        | 20              | 0                | NW        |
| YELLOWTAIL KINGFISH | 12-Nov-20   | LONG REEF                     | 20              | 0                | NW        |
| YELLOWTAIL KINGFISH | 03-Sep-20   | GOAT ISLAND (SYDNEY)          | 20              | 2                | W         |
| YELLOWTAIL KINGFISH | 24-Dec-20   | 12 MILE REEF                  | 20              | 14               | NW        |
| YELLOWTAIL KINGFISH | 20-Jan-21   | HUMMOCKS (SA)                 | 21              | 0                | NW        |
| YELLOWTAIL KINGFISH | 15-May-21   | MIDDLE HARBOUR (BANTRY BAY)   | 21              | 3                | ESE       |
| YELLOWTAIL KINGFISH | 24-Sep-20   | NORTH SOLITARY ISLAND         | 22              | 0                | NW        |
| YELLOWTAIL KINGFISH | 21-Oct-20   | COOGEE                        | 23              | 3                | NE        |
| YELLOWTAIL KINGFISH | 15-Jun-20   | SOUTH WEST ROCKS (FISH ROCK)  | 24              | 0                | NW        |
| YELLOWTAIL KINGFISH | 17-Oct-20   | WEDDING CAKE ISLAND           | 24              | 2                | ESE       |
| YELLOWTAIL KINGFISH | 04-Dec-20   | POINT LOWLY (SA)              | 25              | 150              | SSW       |
| YELLOWTAIL KINGFISH | 27-Oct-20   | PORT AUGUSTA (OUTLET CHANNEL) | 26              | 0                | NW        |
| YELLOWTAIL KINGFISH | 13-Jun-20   | SOUTH WEST ROCKS (FISH ROCK)  | 26              | 0                | NW        |
| YELLOWTAIL KINGFISH | 15-Oct-20   | WEDDING CAKE ISLAND           | 26              | 1                | N         |
| YELLOWTAIL KINGFISH | 05-Sep-20   | GOAT ISLAND (SYDNEY)          | 26              | 2                | W         |
| YELLOWTAIL KINGFISH | 15-Oct-20   | WEDDING CAKE ISLAND           | 26              | 8                | NNE       |
| YELLOWTAIL KINGFISH | 06-Jun-20   | LONG REEF                     | 26              | 19               | NNE       |
| YELLOWTAIL KINGFISH | 26-Apr-21   | PORT HACKING                  | 26              | 213              | NNE       |
| YELLOWTAIL KINGFISH | 26-Apr-21   | PORT HACKING                  | 26              | 213              | NNE       |
| YELLOWTAIL KINGFISH | 11-Jan-21   | PORTLAND (NORTH SHORE)        | 27              | 0                | NW        |
| YELLOWTAIL KINGFISH | 11-Sep-20   | MIDDLE HARBOUR                | 27              | 1                | S         |
| YELLOWTAIL KINGFISH | 11-Oct-20   | BLUEFISH POINT                | 27              | 7                | WSW       |
| YELLOWTAIL KINGFISH | 03-Feb-21   | LONG REEF                     | 27              | 77               | SW        |
| YELLOWTAIL KINGFISH | 03-Feb-21   | LONG REEF                     | 27              | 77               | SW        |
| YELLOWTAIL KINGFISH | 11-Jun-20   | SOUTH WEST ROCKS (FISH ROCK)  | 28              | 0                | NW        |
| YELLOWTAIL KINGFISH | 31-Jan-21   | BIG ISLAND (PORT STEPHENS)    | 29              | 0                | NW        |
| YELLOWTAIL KINGFISH | 03-Sep-20   | GOAT ISLAND (SYDNEY)          | 29              | 0                | NW        |
| YELLOWTAIL KINGFISH | 04-Dec-20   | WHYALLA (SA)                  | 29              | 129              | SSW       |
| YELLOWTAIL KINGFISH | 11-Oct-20   | WEDDING CAKE ISLAND           | 30              | 0                | NW        |
| YELLOWTAIL KINGFISH | 26-Nov-20   | SEAL ROCKS                    | 30              | 1                | E         |
| YELLOWTAIL KINGFISH | 04-Oct-20   | PARRAMATTA RIVER              | 30              | 1                | E         |
| YELLOWTAIL KINGFISH | 11-Oct-20   | WEDDING CAKE ISLAND           | 30              | 2                | NNE       |
| YELLOWTAIL KINGFISH | 16-Nov-20   | PORT AUGUSTA (OUTLET CHANNEL) | 30              | 41               | SW        |

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| Species             | Date tagged | Release location              | Days at liberty | Dist moved (nmi) | Direction |
|---------------------|-------------|-------------------------------|-----------------|------------------|-----------|
| YELLOWTAIL KINGFISH | 23-Oct-20   | SOUTH SOLITARY ISLAND         | 30              | 246              | SSW       |
| YELLOWTAIL KINGFISH | 07-Jun-20   | SOUTH WEST ROCKS (FISH ROCK)  | 31              | 0                | NW        |
| YELLOWTAIL KINGFISH | 03-Nov-20   | PORT AUGUSTA (OUTLET CHANNEL) | 31              | 28               | S         |
| YELLOWTAIL KINGFISH | 20-Dec-20   | LONG REEF                     | 32              | 0                | NW        |
| YELLOWTAIL KINGFISH | 28-Oct-20   | PORT AUGUSTA (OUTLET CHANNEL) | 33              | 0                | NW        |
| YELLOWTAIL KINGFISH | 21-Jan-21   | PORTLAND (NORTH SHORE)        | 33              | 0                | NW        |
| YELLOWTAIL KINGFISH | 21-Dec-20   | 12 MILE REEF                  | 34              | 0                | NW        |
| YELLOWTAIL KINGFISH | 18-Nov-20   | THE PEAK                      | 34              | 76               | SSW       |
| YELLOWTAIL KINGFISH | 11-Aug-20   | SOUTH WEST ROCKS (FISH ROCK)  | 36              | 0                | NW        |
| YELLOWTAIL KINGFISH | 14-Jan-21   | PORTLAND (NORTH SHORE)        | 36              | 2                | E         |
| YELLOWTAIL KINGFISH | 30-Oct-20   | WEDDING CAKE ISLAND           | 37              | 0                | NW        |
| YELLOWTAIL KINGFISH | 15-Jun-20   | SOUTH WEST ROCKS (FISH ROCK)  | 39              | 0                | NW        |
| YELLOWTAIL KINGFISH | 09-Mar-21   | PORT HACKING RIVER            | 39              | 2                | E         |
| YELLOWTAIL KINGFISH | 04-Sep-20   | PORT AUGUSTA (OUTLET CHANNEL) | 40              | 0                | NW        |
| YELLOWTAIL KINGFISH | 25-Aug-20   | PARRAMATTA RIVER              | 40              | 0                | NW        |
| YELLOWTAIL KINGFISH | 09-Nov-20   | PORT AUGUSTA (OUTLET CHANNEL) | 40              | 28               | S         |
| YELLOWTAIL KINGFISH | 13-Apr-21   | LONG REEF                     | 40              | 99               | NNE       |
| YELLOWTAIL KINGFISH | 09-Sep-20   | PARRAMATTA RIVER              | 41              | 2                | E         |
| YELLOWTAIL KINGFISH | 09-Sep-20   | PARRAMATTA RIVER              | 41              | 2                | E         |
| YELLOWTAIL KINGFISH | 05-Aug-20   | PARRAMATTA RIVER              | 43              | 2                | E         |
| YELLOWTAIL KINGFISH | 21-Oct-20   | PORT AUGUSTA (OUTLET CHANNEL) | 44              | 0                | NW        |
| YELLOWTAIL KINGFISH | 27-Dec-20   | LONG REEF                     | 44              | 0                | NW        |
| YELLOWTAIL KINGFISH | 29-Aug-20   | PORT AUGUSTA (OUTLET CHANNEL) | 45              | 0                | NW        |
| YELLOWTAIL KINGFISH | 06-Sep-20   | DRUMMOYNE (SYDNEY HARBOUR)    | 46              | 2                | E         |
| YELLOWTAIL KINGFISH | 02-Nov-20   | PORT AUGUSTA (OUTLET CHANNEL) | 47              | 28               | S         |
| YELLOWTAIL KINGFISH | 29-Nov-20   | LONG REEF                     | 49              | 0                | NW        |
| YELLOWTAIL KINGFISH | 10-Nov-20   | SOUTH WEST ROCKS (FISH ROCK)  | 49              | 116              | SSW       |
| YELLOWTAIL KINGFISH | 10-Feb-21   | HUMMOCKS (SA)                 | 51              | 0                | NW        |
| YELLOWTAIL KINGFISH | 30-Oct-20   | WEDDING CAKE ISLAND           | 51              | 12               | NE        |
| YELLOWTAIL KINGFISH | 18-Nov-20   | THE PEAK                      | 52              | 0                | NW        |
| YELLOWTAIL KINGFISH | 31-Jan-21   | SOUTH HEAD                    | 56              | 3                | WSW       |
| YELLOWTAIL KINGFISH | 27-Mar-21   | SOUTH HEAD                    | 57              | 21               | NNE       |
| YELLOWTAIL KINGFISH | 15-Jan-21   | LONG REEF                     | 57              | 77               | SW        |
| YELLOWTAIL KINGFISH | 06-Apr-21   | SEAL ROCKS (VIC)              | 57              | 408              | NE        |
| YELLOWTAIL KINGFISH | 05-Mar-21   | POINT TURTON (SA)             | 58              | 0                | NW        |
| YELLOWTAIL KINGFISH | 12-Sep-20   | COOGEE                        | 59              | 0                | NW        |
| YELLOWTAIL KINGFISH | 27-Sep-20   | NORTH SOLITARY ISLAND         | 61              | 0                | NW        |
| YELLOWTAIL KINGFISH | 04-Oct-20   | PARRAMATTA RIVER              | 62              | 7                | NE        |
| YELLOWTAIL KINGFISH | 12-Jan-21   | LONG REEF                     | 64              | 0                | NW        |
| YELLOWTAIL KINGFISH | 08-Oct-20   | LONG REEF                     | 66              | 2                | S         |

## APPENDIX I: RECAPTURES OF TAGGED FISH REPORTED IN 2020/21 (CONTD)

| Species             | Date tagged | Release location                | Days at liberty | Dist moved (nmi) | Direction |
|---------------------|-------------|---------------------------------|-----------------|------------------|-----------|
| YELLOWTAIL KINGFISH | 05-Sep-20   | SOUTH WEST ROCKS (FISH ROCK)    | 66              | 5                | NNE       |
| YELLOWTAIL KINGFISH | 12-Sep-20   | PARRAMATTA RIVER                | 67              | 2                | E         |
| YELLOWTAIL KINGFISH | 21-Oct-20   | COOGEE                          | 68              | 7                | NW        |
| YELLOWTAIL KINGFISH | 05-Sep-20   | PARRAMATTA RIVER                | 73              | 2                | E         |
| YELLOWTAIL KINGFISH | 12-Jan-21   | LONG REEF                       | 74              | 0                | NW        |
| YELLOWTAIL KINGFISH | 12-Sep-20   | PARRAMATTA RIVER                | 76              | 0                | NW        |
| YELLOWTAIL KINGFISH | 06-Sep-20   | DRUMMOYNE (SYDNEY HARBOUR)      | 76              | 1                | E         |
| YELLOWTAIL KINGFISH | 27-Dec-20   | LONG REEF                       | 79              | 6                | SW        |
| YELLOWTAIL KINGFISH | 12-Jan-21   | LONG REEF                       | 83              | 0                | NW        |
| YELLOWTAIL KINGFISH | 30-Jun-20   | CLIFTON GARDENS                 | 85              | 5                | NNW       |
| YELLOWTAIL KINGFISH | 13-Jun-20   | SOUTH WEST ROCKS (FISH ROCK)    | 91              | 0                | NW        |
| YELLOWTAIL KINGFISH | 13-Jan-21   | LONG REEF                       | 93              | 0                | NW        |
| YELLOWTAIL KINGFISH | 18-Nov-20   | THE PEAK                        | 95              | 64               | SW        |
| YELLOWTAIL KINGFISH | 16-Oct-20   | PORT AUGUSTA (OUTLET CHANNEL)   | 100             | 191              | SW        |
| YELLOWTAIL KINGFISH | 04-Oct-20   | WEDDING CAKE ISLAND             | 101             | 5                | WSW       |
| YELLOWTAIL KINGFISH | 29-Sep-20   | SYDNEY HARBOUR                  | 102             | 3                | ENE       |
| YELLOWTAIL KINGFISH | 04-Sep-20   | GOAT ISLAND (SYDNEY)            | 107             | 14               | SSW       |
| YELLOWTAIL KINGFISH | 17-Dec-20   | PORT KEMBLA                     | 109             | 0                | NW        |
| YELLOWTAIL KINGFISH | 11-Oct-20   | BLUEFISH POINT                  | 109             | 3                | WSW       |
| YELLOWTAIL KINGFISH | 31-Dec-20   | THE SHALLOWS                    | 114             | 2                | E         |
| YELLOWTAIL KINGFISH | 26-Nov-20   | SOUTH WEST ROCKS (GREEN ISLAND) | 115             | 1                | SE        |
| YELLOWTAIL KINGFISH | 24-Sep-20   | NORTH SOLITARY ISLAND           | 117             | 0                | NW        |
| YELLOWTAIL KINGFISH | 20-Sep-20   | GOAT ISLAND (SYDNEY)            | 117             | 3                | ENE       |
| YELLOWTAIL KINGFISH | 06-Dec-20   | NEWPORT REEF                    | 121             | 4                | SW        |
| YELLOWTAIL KINGFISH | 07-Sep-20   | SOUTH WEST ROCKS (FISH ROCK)    | 126             | 272              | SSW       |
| YELLOWTAIL KINGFISH | 13-Jun-20   | SOUTH WEST ROCKS (FISH ROCK)    | 131             | 5                | NNE       |
| YELLOWTAIL KINGFISH | 15-Jun-20   | SOUTH WEST ROCKS (FISH ROCK)    | 137             | 0                | NW        |
| YELLOWTAIL KINGFISH | 02-Jul-20   | CLIFTON GARDENS                 | 138             | 1                | SE        |
| YELLOWTAIL KINGFISH | 28-Jun-20   | 12 MILE REEF                    | 150             | 0                | NW        |
| YELLOWTAIL KINGFISH | 18-Jun-20   | SOUTH WEST ROCKS (FISH ROCK)    | 158             | 0                | NW        |
| YELLOWTAIL KINGFISH | 15-Jun-20   | SOUTH WEST ROCKS (FISH ROCK)    | 159             | 278              | SSW       |
| YELLOWTAIL KINGFISH | 17-Feb-20   | SOUTH HEAD                      | 167             | 7                | SW        |
| YELLOWTAIL KINGFISH | 11-Jul-20   | MIDDLE HARBOUR                  | 170             | 6                | NNE       |
| YELLOWTAIL KINGFISH | 13-Mar-20   | GOAT ISLAND (SYDNEY)            | 175             | 2                | W         |
| YELLOWTAIL KINGFISH | 10-Sep-20   | GOAT ISLAND (SYDNEY)            | 175             | 9                | NE        |
| YELLOWTAIL KINGFISH | 22-Feb-20   | LONG REEF                       | 181             | 11               | SW        |
| YELLOWTAIL KINGFISH | 10-Apr-20   | PORT HACKING RIVER              | 188             | 2                | E         |
| YELLOWTAIL KINGFISH | 02-Jul-20   | CLIFTON GARDENS                 | 214             | 2                | W         |
| YELLOWTAIL KINGFISH | 13-Jun-20   | SOUTH WEST ROCKS (FISH ROCK)    | 235             | 191              | SSW       |
| YELLOWTAIL KINGFISH | 07-Dec-19   | THORNY PASSAGE (SA)             | 236             | 155              | NNE       |

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| Species             | Date tagged | Release location               | Days at liberty | Dist moved (nmi) | Direction |
|---------------------|-------------|--------------------------------|-----------------|------------------|-----------|
| YELLOWTAIL KINGFISH | 07-Dec-19   | THORNY PASSAGE (SA)            | 236             | 155              | NNE       |
| YELLOWTAIL KINGFISH | 05-Sep-20   | SOUTH WEST ROCKS (FISH ROCK)   | 237             | 1                | E         |
| YELLOWTAIL KINGFISH | 13-May-20   | THE PEAK                       | 241             | 0                | NW        |
| YELLOWTAIL KINGFISH | 08-Jan-20   | COOGEE                         | 245             | 7                | WNW       |
| YELLOWTAIL KINGFISH | 30-Jul-20   | PARRAMATTA RIVER               | 248             | 7                | NE        |
| YELLOWTAIL KINGFISH | 06-Dec-19   | LONG REEF                      | 253             | 9                | SW        |
| YELLOWTAIL KINGFISH | 06-May-20   | LONG REEF                      | 271             | 5                | S         |
| YELLOWTAIL KINGFISH | 04-Dec-19   | PARRAMATTA RIVER               | 275             | 1                | E         |
| YELLOWTAIL KINGFISH | 05-Mar-20   | GREENLY ISLAND (SA)            | 277             | 180              | ENE       |
| YELLOWTAIL KINGFISH | 25-Nov-19   | SYDNEY HARBOUR                 | 282             | 2                | W         |
| YELLOWTAIL KINGFISH | 25-Nov-19   | SYDNEY HARBOUR                 | 283             | 0                | NW        |
| YELLOWTAIL KINGFISH | 25-Nov-19   | SYDNEY HARBOUR                 | 284             | 2                | W         |
| YELLOWTAIL KINGFISH | 02-Mar-20   | PORT HACKING RIVER             | 287             | 6                | NE        |
| YELLOWTAIL KINGFISH | 16-Dec-19   | THORNY PASSAGE (SA)            | 295             | 122              | ENE       |
| YELLOWTAIL KINGFISH | 09-Nov-19   | PORT AUGUSTA (OUTLET CHANNEL)  | 314             | 0                | NW        |
| YELLOWTAIL KINGFISH | 15-Dec-19   | PORT AUGUSTA (OUTLET CHANNEL)  | 315             | 0                | NW        |
| YELLOWTAIL KINGFISH | 02-Dec-19   | THE PASSAGE (SA)               | 322             | 167              | NNE       |
| YELLOWTAIL KINGFISH | 12-Oct-19   | COFFIN BAY (SA)                | 328             | 170              | NE        |
| YELLOWTAIL KINGFISH | 28-Nov-19   | GOAT ISLAND (SYDNEY)           | 329             | 0                | NW        |
| YELLOWTAIL KINGFISH | 15-Sep-19   | PARRAMATTA RIVER (GLADESVILLE) | 330             | 2                | ESE       |
| YELLOWTAIL KINGFISH | 09-Nov-19   | WHYALLA (SA)                   | 330             | 878              | NE        |
| YELLOWTAIL KINGFISH | 09-Nov-19   | WHYALLA (SA)                   | 330             | 878              | NE        |
| YELLOWTAIL KINGFISH | 07-Dec-19   | THISTLE ISLAND (SA)            | 331             | 169              | NNE       |
| YELLOWTAIL KINGFISH | 05-Oct-19   | BLUEFISH POINT                 | 335             | 7                | WSW       |
| YELLOWTAIL KINGFISH | 23-Nov-19   | PORT AUGUSTA (OUTLET CHANNEL)  | 338             | 0                | NW        |
| YELLOWTAIL KINGFISH | 13-Dec-19   | WILLIAMS ISLAND (SA)           | 340             | 43               | NW        |
| YELLOWTAIL KINGFISH | 20-Oct-19   | COFFIN BAY (SA)                | 347             | 134              | ENE       |
| YELLOWTAIL KINGFISH | 24-Nov-19   | PORT AUGUSTA (OUTLET CHANNEL)  | 349             | 0                | NW        |
| YELLOWTAIL KINGFISH | 18-Oct-19   | PORT AUGUSTA (OUTLET CHANNEL)  | 352             | 0                | NW        |
| YELLOWTAIL KINGFISH | 18-Oct-19   | PORT AUGUSTA (OUTLET CHANNEL)  | 352             | 0                | NW        |
| YELLOWTAIL KINGFISH | 18-Oct-19   | PORT AUGUSTA (OUTLET CHANNEL)  | 354             | 71               | SE        |
| YELLOWTAIL KINGFISH | 14-Dec-19   | SYDNEY HARBOUR                 | 357             | 1                | SE        |
| YELLOWTAIL KINGFISH | 23-Nov-19   | PORT RIVER                     | 358             | 662              | E         |
| YELLOWTAIL KINGFISH | 04-Nov-19   | COFFIN BAY                     | 359             | 170              | NE        |
| YELLOWTAIL KINGFISH | 23-Oct-19   | PORT AUGUSTA (OUTLET CHANNEL)  | 369             | 0                | NW        |
| YELLOWTAIL KINGFISH | 31-Dec-19   | SYDNEY HARBOUR                 | 370             | 3                | ENE       |
| YELLOWTAIL KINGFISH | 08-Nov-19   | PORT AUGUSTA (OUTLET CHANNEL)  | 371             | 0                | NW        |
| YELLOWTAIL KINGFISH | 17-Dec-19   | 12 MILE REEF                   | 384             | 10               | WSW       |
| YELLOWTAIL KINGFISH | 06-Nov-19   | PORT AUGUSTA (OUTLET CHANNEL)  | 394             | 0                | NW        |
| YELLOWTAIL KINGFISH | 27-Sep-19   | PORT AUGUSTA (OUTLET CHANNEL)  | 408             | 669              | ESE       |

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| Species             | Date tagged | Release location              | Days at liberty | Dist moved (nmi) | Direction |
|---------------------|-------------|-------------------------------|-----------------|------------------|-----------|
| YELLOWTAIL KINGFISH | 10-Oct-19   | PORT AUGUSTA (POWER STATION)  | 417             | 0                | NW        |
| YELLOWTAIL KINGFISH | 17-Dec-19   | 12 MILE REEF                  | 421             | 14               | NW        |
| YELLOWTAIL KINGFISH | 27-Oct-19   | PORT AUGUSTA (OUTLET CHANNEL) | 421             | 198              | SSW       |
| YELLOWTAIL KINGFISH | 28-Feb-20   | SOUTH WEST ROCKS (FISH ROCK)  | 422             | 230              | NE        |
| YELLOWTAIL KINGFISH | 14-Oct-19   | 12 MILE REEF                  | 424             | 0                | NW        |
| YELLOWTAIL KINGFISH | 06-Nov-19   | 12 MILE REEF                  | 430             | 10               | WSW       |
| YELLOWTAIL KINGFISH | 23-Oct-19   | BLUEFISH POINT                | 434             | 7                | WSW       |
| YELLOWTAIL KINGFISH | 03-Apr-20   | LONG REEF                     | 436             | 351              | NNE       |
| YELLOWTAIL KINGFISH | 15-Oct-19   | LONG REEF                     | 461             | 110              | NNE       |
| YELLOWTAIL KINGFISH | 07-Sep-19   | PORT JACKSON                  | 462             | 2                | W         |
| YELLOWTAIL KINGFISH | 06-Jul-19   | MIDDLE HARBOUR                | 475             | 4                | WSW       |
| YELLOWTAIL KINGFISH | 05-Sep-19   | 12 MILE REEF                  | 488             | 10               | WSW       |
| YELLOWTAIL KINGFISH | 05-Jul-19   | MIDDLE HARBOUR                | 506             | 6                | NNE       |
| YELLOWTAIL KINGFISH | 04-Jul-19   | MIDDLE HARBOUR                | 513             | 2                | WNW       |
| YELLOWTAIL KINGFISH | 25-Nov-19   | BLUEFISH POINT                | 564             | 3                | WSW       |
| YELLOWTAIL KINGFISH | 29-Aug-19   | 12 MILE REEF                  | 568             | 14               | NW        |
| YELLOWTAIL KINGFISH | 16-Feb-19   | HUMMOCKS (SA)                 | 624             | 191              | NE        |
| YELLOWTAIL KINGFISH | 16-Dec-18   | 12 MILE REEF                  | 655             | 0                | NW        |
| YELLOWTAIL KINGFISH | 11-Jun-19   | 12 MILE REEF                  | 671             | 100              | NNE       |
| YELLOWTAIL KINGFISH | 25-Nov-18   | PORT ADELAIDE (SA)            | 681             | 72               | NNW       |
| YELLOWTAIL KINGFISH | 30-Nov-18   | PORT AUGUSTA (OUTLET CHANNEL) | 697             | 0                | NW        |
| YELLOWTAIL KINGFISH | 30-Nov-18   | PORT AUGUSTA (OUTLET CHANNEL) | 697             | 0                | NW        |
| YELLOWTAIL KINGFISH | 26-Oct-18   | COFFIN BAY                    | 713             | 0                | NW        |
| YELLOWTAIL KINGFISH | 09-Nov-18   | PORT AUGUSTA (OUTLET CHANNEL) | 717             | 0                | NW        |
| YELLOWTAIL KINGFISH | 27-Oct-18   | PORT AUGUSTA (OUTLET CHANNEL) | 722             | 0                | NW        |
| YELLOWTAIL KINGFISH | 07-Oct-18   | PORT ADELAIDE (SA)            | 734             | 153              | W         |
| YELLOWTAIL KINGFISH | 29-Sep-18   | PORT AUGUSTA (OUTLET CHANNEL) | 742             | 0                | NW        |
| YELLOWTAIL KINGFISH | 20-Sep-18   | PORT AUGUSTA (OUTLET CHANNEL) | 745             | 0                | NW        |
| YELLOWTAIL KINGFISH | 04-Nov-18   | COFFIN BAY                    | 748             | 170              | NE        |
| YELLOWTAIL KINGFISH | 28-Oct-18   | PORT AUGUSTA (OUTLET CHANNEL) | 752             | 41               | SW        |
| YELLOWTAIL KINGFISH | 12-Oct-18   | PORT AUGUSTA (OUTLET CHANNEL) | 772             | 28               | S         |
| YELLOWTAIL KINGFISH | 18-Nov-18   | PORT AUGUSTA (OUTLET CHANNEL) | 772             | 198              | SSW       |
| YELLOWTAIL KINGFISH | 30-Nov-18   | PORT AUGUSTA (OUTLET CHANNEL) | 805             | 192              | SW        |
| YELLOWTAIL KINGFISH | 20-Aug-18   | 12 MILE REEF                  | 821             | 10               | WSW       |
| YELLOWTAIL KINGFISH | 25-Aug-18   | COFFIN BAY                    | 848             | 152              | ENE       |
| YELLOWTAIL KINGFISH | 07-Sep-18   | PORT AUGUSTA (SA)             | 916             | 190              | WSW       |
| YELLOWTAIL KINGFISH | 25-Apr-18   | HUMMOCKS (SA)                 | 937             | 192              | NE        |
| YELLOWTAIL KINGFISH | 10-Dec-17   | SYDNEY (THE PEAK)             | 1062            | 0                | NW        |
| YELLOWTAIL KINGFISH | 24-Nov-17   | PORT AUGUSTA (OUTLET CHANNEL) | 1075            | 0                | NW        |
| YELLOWTAIL KINGFISH | 02-Oct-17   | PORT AUGUSTA (OUTLET CHANNEL) | 1091            | 0                | NW        |

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| Species             | Date tagged | Release location              | Days at liberty | Dist moved (nmi) | Direction |
|---------------------|-------------|-------------------------------|-----------------|------------------|-----------|
| YELLOWTAIL KINGFISH | 25-Oct-17   | PORT AUGUSTA (OUTLET CHANNEL) | 1116            | 41               | SW        |
| YELLOWTAIL KINGFISH | 08-Oct-17   | PORT AUGUSTA (SA)             | 1120            | 17               | S         |
| YELLOWTAIL KINGFISH | 14-Oct-17   | COFFIN BAY                    | 1182            | 43               | SE        |
| YELLOWTAIL KINGFISH | 24-Jun-17   | SYDNEY (THE PEAK)             | 1290            | 1                | NW        |
| YELLOWTAIL KINGFISH | 02-Mar-17   | GREENLY ISLAND (SA)           | 1318            | 195              | NE        |
| YELLOWTAIL KINGFISH | 18-Dec-16   | POINT LOWLY (SA)              | 1414            | 1                | SE        |
| YELLOWTAIL KINGFISH | 02-Aug-16   | EVANS HEAD (EAST)             | 1438            | 79               | SSW       |
| YELLOWTAIL KINGFISH | 12-Jan-17   | HUMMOCKS (SA)                 | 1490            | 0                | NW        |
| YELLOWTAIL KINGFISH | 10-Oct-16   | PORT AUGUSTA (SA)             | 1504            | 24               | SSW       |
| YELLOWTAIL KINGFISH | 29-Mar-16   | ROCKY ISLAND (SA)             | 1657            | 205              | NE        |
| YELLOWTAIL KINGFISH | 07-Oct-15   | PORT AUGUSTA (OUTLET CHANNEL) | 1819            | 0                | NW        |
| YELLOWTAIL KINGFISH | 25-Sep-15   | PORT AUGUSTA (OUTLET CHANNEL) | 1840            | 170              | SW        |
| YELLOWTAIL KINGFISH | 24-Oct-15   | PORT AUGUSTA (OUTLET CHANNEL) | 1851            | 28               | S         |
| YELLOWTAIL KINGFISH | 01-Sep-15   | PORT AUGUSTA (OUTLET CHANNEL) | 1862            | 0                | NW        |
| YELLOWTAIL KINGFISH | 30-Aug-15   | PORT AUGUSTA (OUTLET CHANNEL) | 1943            | 169              | SSW       |
| YELLOWTAIL KINGFISH | 26-Nov-13   | PORT AUGUSTA (OUTLET CHANNEL) | 2540            | 0                | NW        |

## APPENDIX II: TOP TAGGING BOATS AND ANGLERS FOR 2020/21

NSW DPI would like to recognise the boats and anglers that have provided exceptional contributions to the Program over the past season. These boats and anglers are shown in the table below with the numbers of fish that they tagged over the 2020/21 season. We will continue to develop these end of season summaries and acknowledge the strong supporters of the tagging Program in future years.

### TOP TAGGING BOATS AND ANGLERS 2020/21

| Species                            | Top boat                                                                                 | Runner up boat                                             |
|------------------------------------|------------------------------------------------------------------------------------------|------------------------------------------------------------|
| <b>Billfish combined</b>           | <b>117 – <i>Chaos</i> (QLD)<br/>Sunshine Coast GFC</b>                                   | <b>91– <i>Zorro</i> (NSW) Broken Bay GFC</b>               |
| <b>Black Marlin</b>                | <b>110 – <i>Chaos</i> (QLD)<br/>Sunshine Coast GFC</b>                                   | <b>88 – <i>Reel Crazy</i> (QLD)<br/>Sunshine Coast GFC</b> |
| <b>Blue Marlin (International)</b> | <b>24 – <i>Black Label</i> (PNG)<br/>Lae GFC</b>                                         | <b>23 – <i>Backload</i> (PNG) Lae GFC</b>                  |
| <b>Blue Marlin (Australia)</b>     | <b>18 – <i>Innkeeper</i> (WA)<br/>Exmouth GFC</b>                                        | <b>17 - <i>Assegai</i> (QLD) Gold Coast GFC</b>            |
| <b>Striped Marlin</b>              | <b>62 – <i>Ya Mum</i> (NSW)<br/>Jervis Bay GFC</b>                                       | <b>56 – <i>Zorro</i> (NSW)<br/>Broken Bay GFC</b>          |
| <b>Sailfish</b>                    | <b>30 – <i>Billistic</i> (WA) Nickol Bay SFC, <i>Disco Prawn</i> (WA) Nickol Bay SFC</b> | <b>29 – <i>Wine Down</i> (QLD)<br/>Weipa Billfish Club</b> |
| <b>Shortbill Spearfish</b>         | <b>2 – <i>Fifi</i> (NSW) Lake Macquarie GFC</b>                                          | <b>1 – Multiple Vessels</b>                                |
| <b>Swordfish</b>                   | <b>3 - <i>Buck Hunter</i> (NSW)<br/>Exmouth GFC</b>                                      | <b>2 - <i>Tin Can</i> (VIC) Bass Strait GFC</b>            |
| <b>Shark combined</b>              | <b>232 – <i>Tantrum</i> (NSW)<br/>Sydney GFC</b>                                         | <b>24 – <i>Wet Dreams</i> (WA)<br/>King Bay GFC</b>        |
| <b>Mako Shark</b>                  | <b>7 – <i>Makajax II</i> (TAS) GFC of Northern Tasmania</b>                              | <b>6 – <i>Undertaker</i> (NSW)<br/>Port Hacking GFC</b>    |

| Species                      | Top boat                                                      | Runner up boat                                                                  |
|------------------------------|---------------------------------------------------------------|---------------------------------------------------------------------------------|
|                              |                                                               |                                                                                 |
| <b>Blue Shark</b>            | <b>4 – <i>Anticipation</i> (NSW) Shellharbour GFC</b>         | <b>3 – <i>Groundswell</i> (NSW) Sydney GFC, <i>Tantrum</i> (NSW) Sydney GFC</b> |
| <b>Tiger Shark</b>           | <b>7 – <i>Okcaj</i> (NSW) Lake Macquarie GFC</b>              | <b>6 – <i>Wet Dreams</i> (WA) King Bay GFC</b>                                  |
| <b>Whaler Shark</b>          | <b>229 - <i>Tantrum</i> (NSW) Sydney GFC</b>                  | <b>17 - <i>Wet Dreams</i> (WA) King Bay GFC</b>                                 |
| <b>Hammerhead Shark</b>      | <b>5 – <i>Casey</i> (NSW) Sydney GFC</b>                      | <b>4 - <i>Witchdoctor</i> (NSW) Newcastle &amp; Port Stephens GFC</b>           |
| <b>Thresher Shark</b>        | <b>2 – <i>Snappy Tom</i> (NSW) Merimbula BG &amp; LAC</b>     |                                                                                 |
| <b>Tuna combined</b>         | <b>110 - <i>Searider</i> (SA) Port MacDonnell Offshore AC</b> | <b>76 – <i>Just A Girl</i> (SA) GFC of South Australia</b>                      |
| <b>Yellowfin Tuna</b>        | <b>8 – <i>Storm Front</i> (WA) Geraldton Districts OAC</b>    | <b>6 - <i>Allure</i> (WA) Geraldton Districts OAC</b>                           |
| <b>Southern Bluefin Tuna</b> | <b>107 - <i>Searider</i> (SA) Port MacDonnell Offshore AC</b> | <b>76 – <i>Just A Girl</i> (SA) GFC of South Australia</b>                      |
| <b>Bigeye Tuna</b>           | <b>2 - <i>Tagged by Commercial Vessel</i> (NSW)</b>           |                                                                                 |
| <b>Albacore Tuna</b>         | <b>20 – <i>Rediculous</i> (NSW) Jervis Bay GFC</b>            | <b>10 – <i>Fifi</i> (NSW) Lake Macquarie GFC</b>                                |
| <b>Longtail Tuna</b>         | <b>11 - <i>Black Rat</i> (NSW)</b>                            | <b>9 – <i>Happy Ours</i> (QLD) Weipa Billfish Club</b>                          |
| <b>Dogtooth Tuna</b>         | <b>43 – <i>Motorvation</i> (QLD) Mackay GFC</b>               |                                                                                 |

| Species             | Top boat                                                          | Runner up boat                                                |
|---------------------|-------------------------------------------------------------------|---------------------------------------------------------------|
| Spanish Mackerel    | 28 - <i>Anarchy</i> (QLD)<br>Mackay GFC                           | 13 – <i>Allure</i> (WA)<br>Geraldton Districts<br>Offshore AC |
| Mahi Mahi           | 20 - <i>Ocean Hunter</i> (NSW)<br>Ocean Hunter Sports<br>Fishing  | 10 – <i>Seadeuce</i> (NSW)<br>Port Hacking GFC                |
| Yellowtail Kingfish | 238 - <i>Ocean Hunter</i> (NSW)<br>Ocean Hunter Sports<br>Fishing | 140 - <i>Fishabout</i> (NSW)<br>Fishabout Tours               |
| Samsonfish          | 29 – <i>Checkmate</i> (SA) GFC<br>of South Australia              | 28 – <i>Far Caller</i> (SA)                                   |
| Species             | Top individual                                                    | Runner up individual                                          |
| Billfish            | 73 - Sandy Gorecki<br>(NSW) Jervis Bay GFC                        | 37 – Chloe Laurence<br>(NSW) Ulladulla GFC                    |
| Shark               | 100 – Mia Wright (NSW)<br>Sydney GFC                              | 68 – Makira Wright<br>(NSW) Sydney GFC                        |
| Tuna                | 38 - Tracey Tito (SA)<br>GFC of South Australia                   | 37 - Beau Ewens (SA)<br>Port MacDonnell<br>Offshore AC        |
| Seriola             | 151 - Zane Levett (NSW)<br>Oceanhunter<br>Sportsfishing           | 146 - Seamus McCleave<br>(NSW) Fishabout Tours                |

## APPENDIX III

### SCIENTIFIC PUBLICATIONS UTILIZING OR CITING DATA FROM THE TAGGING PROGRAM

- Champion, C., A.J. Hobday, X. Zhang and M.A. Coleman (2022). Climate change alters the temporal persistence of coastal-pelagic fishes off eastern Australia. *ICES Journal of Marine Science*, 2022, 0, 1–15. DOI: 10.1093/icesjms/fsac025
- Campbell, R., J. Pepperell and D. Ghosn (2021). Where have all the yellowfin gone? Investigating an apparent disjunct between commercial and recreational catches of yellowfin tuna off southeastern Australia. Report to New South Wales Recreational Fishing Trusts, 114 pp.
- Champion C., S., Brodie and M.A. Coleman (2021). Climate-driven range shifts are rapid yet variable among recreationally important coastal-pelagic fishes. *Frontiers in Marine Science*, 8:622299. doi: 10.3389/fmars.2021.622299.
- Griffiths, S.P., D. Leadbitter, D. Willette, F. Kaymaram and M. Moazzam (2020). Longtail tuna, *Thunnus tonggol* (Bleeker, 1851): a global review of population dynamics, ecology, fisheries, and considerations for future conservation and management. *Reviews in Fish Biology and Fisheries*, 30 (1), 25-66.
- Bolton, P. and J. Pepperell (2020). A summary of tag-recapture and survey information for sharks and rays in recreational fisheries. In: Reina, R., Rogers, P., and Williamson, S. 2020. Sharks and rays in recreational fishing: priority species, handling guidelines, post-release survival, and extension approaches to support cultural change in fishers. Proceedings of the national workshop, Adelaide, South Australia, 26th November 2019. Adelaide, March. 88pp. CC BY 3.0. doi: 10.26180/5f85004cb5782
- Pepperell, J.G. (2020). A review and analysis of the determination of two species of hammerhead sharks as threatened in New South Wales. Report to New South Wales Recreational Fishing Trusts, 54 pp.
- Hillary R. and T. Patterson (2019). Initial estimates of striped marlin Western and Central Pacific Ocean movement dynamics. Tropical Tuna Resource Assessment Group, 12 July 2019.
- Pepperell, J., P. Bolton, C. Hilbert and J. Neilson (2019). In for the long haul. The scientific legacy of five decades of angler-based gamefish tagging in Australia. Keynote address, National Recreational Fishing Conference, Hobart Tasmania December 2019.
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- Williams, S.M., J.G. Pepperell, M.B. Bennett, B.J. Holmes and J.R. Ovenden (2018). Global genetic population structure of black marlin (*Istiompax indica*) and its relevance to fishery management. In Review.

- Brodie S., L. Litherland, J. Stewart, H.T. Schilling, J.G. Pepperell and I.M. Suthers (2018). Citizen science records describe the distribution and migratory behaviour of a piscivorous predator, *Pomatomus saltatrix*. ICES Journal of Marine Science, doi:10.1093/icesjms/fsy057
- Tracey, S. and J. Pepperell (2018). Understanding the movement, behaviour and post-capture survival of recreationally caught swordfish from southeast Australia – a pilot study. FRDC Project No 2015/022, 87pp.
- Champion, C., A. J. Hobday, Z. Xuebin, G.T. Pecl and S.R. Tracey (2018). Changing windows of opportunity: past and future climate-driven shifts in temporal persistence of kingfish (*Seriola lalandi*) oceanographic habitat within south-eastern Australian bioregions. Marine and Freshwater Research, doi.org/10.1071/MF17387.
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### CURRENT UNIVERSITY THESES

The following post-graduate studies utilizing data from the NSW DPI Game Fish Tagging Program are currently under way:

- Guillemin, Tristan. Macquarie University. Evolution of the blue marlin fishery off the east coast of Australia. Ph.D Program.
- Smith, Laura. University of Queensland. Population structure of sailfish (*Istiophorus platypterus*) and its ecology and distribution in the Indo-Pacific. Ph.D Program.
- Osborne, Felicity. University of Southern Queensland. The interactive effects of anthropogenic impacts on coastal fisheries value and condition. Ph.D Program.

### PREVIOUS UNIVERSITY THESES

The following theses have all been successfully completed, most of them relying heavily on data from the NSW DPI Game Fish Tagging Program:

- Cameron Baber, James Cook University. Examining the impacts of environmental factors on the distribution of the shortfin mako shark, *Isurus oxyrinchus*, from eastern Australia. M.Sc., 2018.
- Samuel Williams, University of Queensland. The global biology, ecology and phylogenetic status of black marlin (*Istiompax indica*) Ph.D. 2018.
- Shane Ovington, University of Queensland. The distribution and size structure of blue marlin (*Makaira nigricans*) along the East Coast of Australia, modelled from recreational capture and tagging data. B.Sc. Honours 2017.
- Stephanie Brodie, University of New South Wales. The ecology and distribution of two pelagic fish: yellowtail kingfish *Seriola lalandi* and dolphinfish *Coryphaena hippurus*. Ph.D. 2016.

Bonnie Holmes, University of Queensland. The biology and ecology of the tiger shark (*Galeocerdo cuvier*) on the east coast of Australia. Ph.D 2015.

Nicholas Hill, James Cook University. Variability in the distribution and movement of black marlin (*Istiompax indica*) determined via environmental conditions along the East Coast of Australia using recreational tag data. B.Sc. Honours, 2014.

Samuel Williams, University of Queensland Genetic population structure of black marlin (*Istiompax indica*) within the central Indo-Pacific: Breeding populations defined despite mitonuclear discordance. B.Sc. Honours, 2014.

Ronan Lynch, University of Queensland, Variability in the spatial and temporal occurrence, and size composition of sailfish (*Istiophorus platypterus*) in eastern Australian waters, and the influence of environmental conditions. B.Sc. Honours, 2012.

Richard Keller Kopf, Charles Sturt University. Age, growth and reproductive dynamics of striped marlin, *Kajikia audax*, in the southwest Pacific ocean. Ph.D., 2010.

Tom Bridge, University of Sydney. Effects of environmental variables on the recruitment and distribution of juvenile black marlin, *Makaira indica*, off the east coast of Australia. B.Sc. Honours, 2007.

John Hoolihan, University of New South Wales, Biology and stock structure of sailfish in the Persian Gulf. Ph.D., 2005.

Danielle Williams, University of New South Wales. Variations in the size composition and occurrence of yellowfin tuna (*Thunnus albacares*) in eastern Australian waters through time, inferred from a unique recreational-based dataset. B.Sc. Honours, 2003.

Ricky Chan, University of New South Wales. Biology of pelagic sharks off New South Wales. Ph.D., 2001.

Joanne Bennett, University of New South Wales. Ecology of dolphin fish (*Coryphaena hippurus*) and other large pelagic species: Environmental influences on their distribution. B.Sc. Honours, 2000.

## CURRENT PROJECTS USING DATA

The following projects are currently under way that are utilizing data from the Game Fish Tagging Program:

“Investigate oceanographic and environmental factors impacting on the Eastern Tuna and Billfish Fishery (ETBF)”. Led by CSIRO with input from AFMA, BoM, ABARES and the University of the Sunshine Coast.

“Enhance and upgrade the Gamefish Tagging Program’s recapture database through an online GIS platform” Pepperell Research, funded by NSW Recreational Fishing Trusts

## MAGAZINES, EMAIL LISTS

Many articles on the tagging Program have appeared in recreational fishing magazines, especially in 'Bluewater Boats & Sportfishing', which is targeted at a game fishing audience.

Regular updates on the tagging Program, provided by NSW DPI staff, are published in 'Bluewater Boats & Sportfishing'.

Tag Times e-zine is distributed to a large email list on a regular basis.

Lastly, detailed Annual Reports on the Game Fish Tagging Program have been regularly published throughout its history, originally in hard copy, and digitally over the past decade. These are all available at [NSW Game Fish Tagging Reports](#)