

NSW DPI GAME FISH TAGGING PROGRAM

REPORT 2021-2022



**Primary
Industries**



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Cover image: NSW DPI Fisheries Manager Clay Hilbert releasing a healthy black marlin off Coffs Harbour NSW in late December 2021. Clay oversees the Game Fish Tagging Program and enters all of the data from tag cards on to the Program's large database.

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.

During 2021/22 a total of 8,340 fish were tagged under the Program – a decrease on the previous year's total of 9,996 and the lowest total since 1982/83. While there have been three other years since then when the total tagged has been less than 9,000, the 2021/22 season was very likely affected by the Covid-19 pandemic which caused a marked decline in total fishing effort in all States. The number of recaptured fish reported in 2021/22 was also down considerably on the previous two years (269 versus 369 and 401 respectively), albeit the totals for those years were the highest and second highest in the history of the Program.

HIGHLIGHTS OF THE 2021/22 TAGGING YEAR

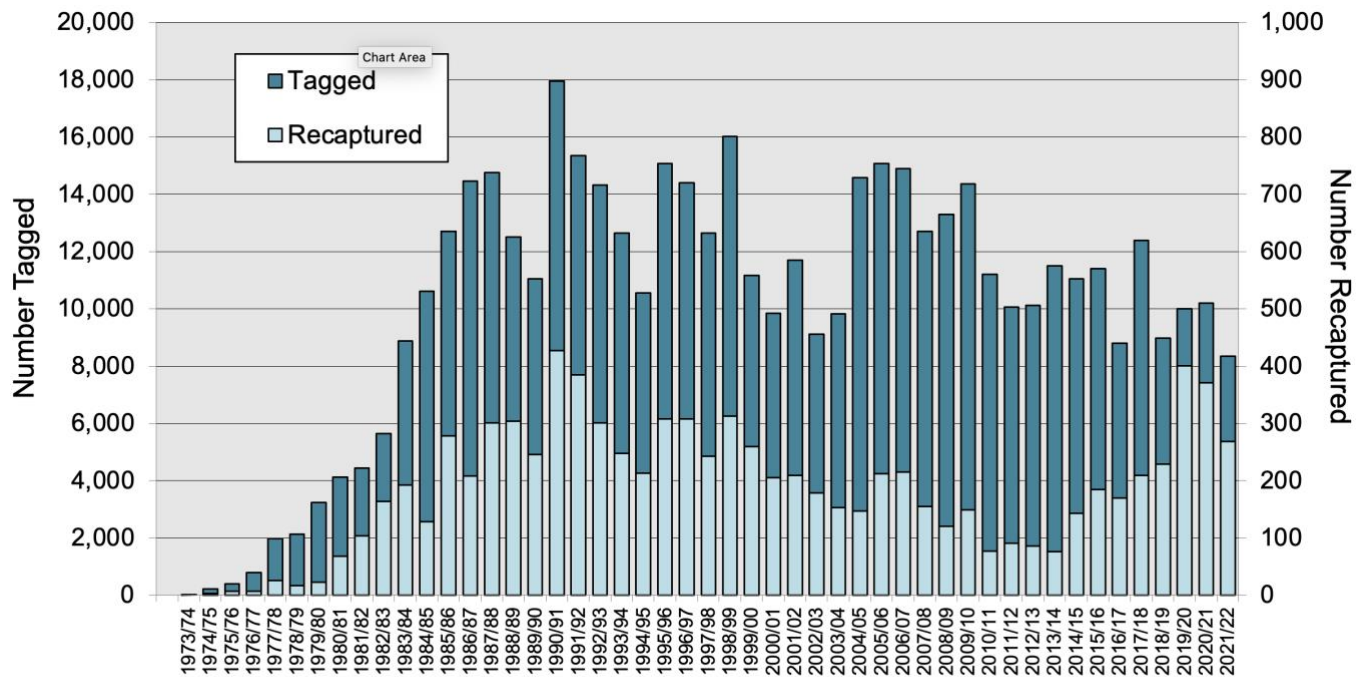
Even though the Program has a long history, every year, new information is added to our store of knowledge on marine gamefish species. Some of the highlights for the 2021/22 season are listed below and are expanded in the text of the report.

- Southern bluefin tuna (SBT) topped the list for most fish tagged (2,121) – the first time this has happened for seven years
- The first recapture of a blue marlin on the coast of Taiwan (the fish had been tagged off New Britain, PNG)
- Another blue marlin tagged off PNG recaptured off the Philippines
- Six long-distance recaptures of black marlin from southeastern Australia to the southwestern Pacific – five in PNG/Solomon Island waters, one off Tonga.
- Eleven samson fish recaptured after more than one year at liberty – one after nearly 6 years, another after 5.8 years
- Eight yellowtail kingfish tagged in South Australia recaptured in NSW / southern QLD.
- A dolphinfish tagged on a NSW DPI FAD off Sydney recaptured near New Caledonia.
- Two Spanish mackerel recaptured after lengthy periods – one after 3.5 years, one after 7 years
- A southern bluefin tuna recaptured after 4 years, 40 days. It had grown from 14kg to 73kg.
- A kingfish tagged at the Gascoyne Seamount, 300 nautical miles from the NSW coast recaptured 11 months later at the same location.

THE GAME FISH TAGGING PROGRAM TO DATE

Figure 1 shows the number of fish tagged and recaptured each year since the origin of the Program to 30 June 2022. The numbers of fish tagged in any given year vary for many reasons, not least being the availability of different species of pelagic fish at different times and locations and/or level of fishing effort. Numbers tagged in 2021/22 were relatively low, no doubt partly due to Covid-19 but also exacerbated by a poor show of juvenile black marlin along the Australian east coast.

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



As at the end of June 2022, the grand totals of fish tagged and recaptured on the Program stood at 508,476 and 9,478 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 species tagged in the highest numbers within the Game Fish Tagging Program continues to be black marlin (78,297 tagged, 15.4% of all releases) followed by yellowtail kingfish (43,211, 8.5% and yellowfin tuna (38,544, 7.6%). Other prominent key species are sailfish (7.3% of all releases), striped marlin (6.6%) and southern bluefin tuna (6.3%) and dolphinfish (5.5%).

TABLE 1. TOTAL NUMBERS OF FISH TAGGED AND RECAPTURED 1974-2022

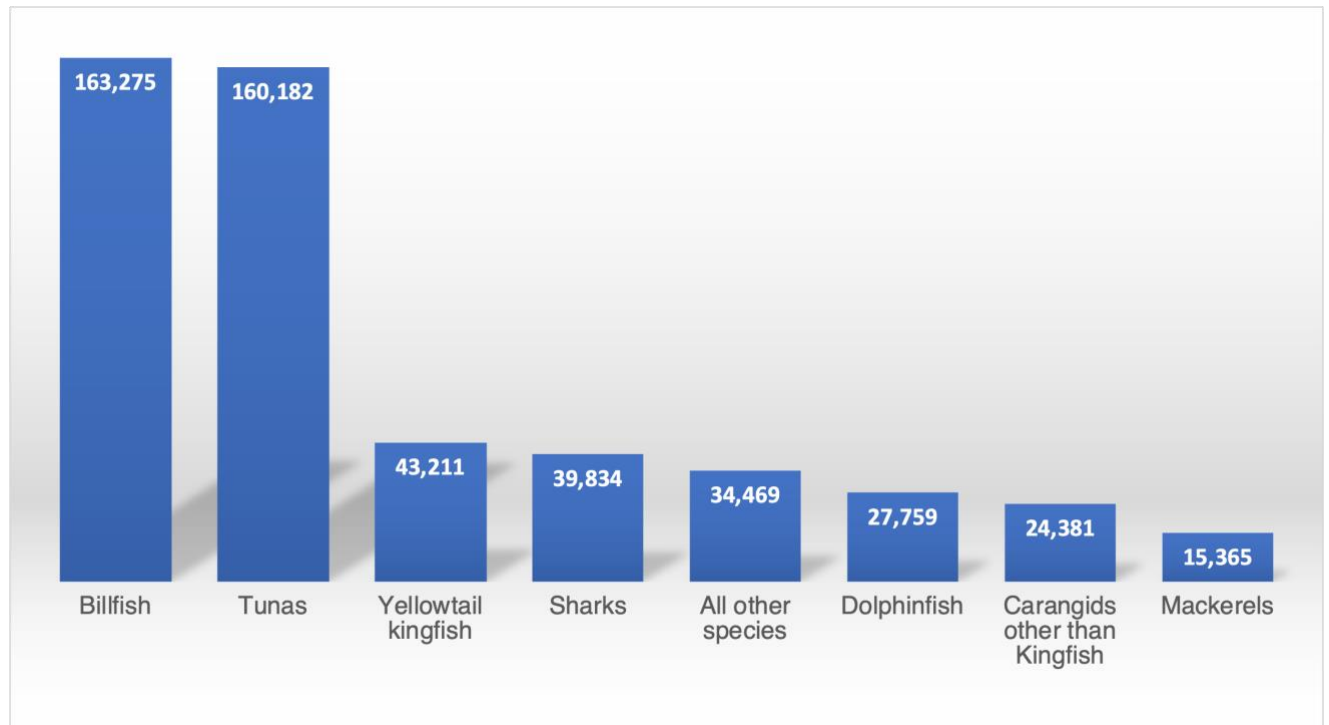
Species	Total Tagged	Total Recaptured	% Recapt
BLACK MARLIN	78,297	620	0.79
YELLOWTAIL KINGFISH	43,211	3,425	7.93
YELLOWFIN TUNA	38,554	710	1.84
SAILFISH	36,876	366	0.99
STRIPED MARLIN	33,396	284	0.85
SOUTHERN BLUEFIN TUNA	32,173	272	0.85
DOLPHINFISH	27,759	260	0.94
ALBACORE	22,513	172	0.76
STRIPED TUNA	21,712	68	0.31
MACKEREL TUNA	21,058	62	0.29
WHALER SHARKS*	15,756	321	2.04
BONITO	13,255	219	1.65
BLUE MARLIN	13,843	48	0.35
AUSTRALIAN SALMON**	10,578	637	6.02
SPANISH MACKEREL	10,065	103	1.02
MAKO SHARK	8,819	194	2.20
SILVER TREVALLY**	7,213	202	2.80
HAMMERHEAD SHARKS	6,005	62	1.03
BLUE SHARK	5,299	79	1.49
LONGTAIL TUNA	5,352	62	1.16
TAILOR**	4,034	122	3.02
QUEENFISH	3,685	10	0.27
SAMSON FISH	3,969	193	4.86
BARRACUDA	3,458	6	0.17
TREVALLY	3,468	32	0.92
GIANT TREVALLY	2,813	37	1.32
OTHER SPECIES COMBINED	35,315	912	2.58
TOTAL	508,476	9,478	1.86

*'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.

Overall, billfish as a group have been tagged in the largest numbers (163,275 or 32.1% of the total), compared with tuna as a group (160,182 or 31.5% of the total). A single species, yellowtail kingfish, with over 43,000 tagged, accounts for 8.5% of all releases while The total numbers of sharks combined (39,834) constitute 7.8% of the total number of fish tagged in the Program.

FIGURE 2. TOTAL NUMBERS OF FISH TAGGED AS SPECIES GROUPINGS, 1974-2022



SUMMARY OF TAGGING ACTIVITY FOR 2021/22

Table 2 shows the breakdown of species or species groups tagged and recaptured during 2021/22. The top ten tagged species for the year were southern bluefin tuna, yellowtail kingfish, black marlin, sailfish, striped marlin, whaler sharks as a group, blue marlin, narrow-barred Spanish mackerel, dolphinfish and spotted 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 2021/22

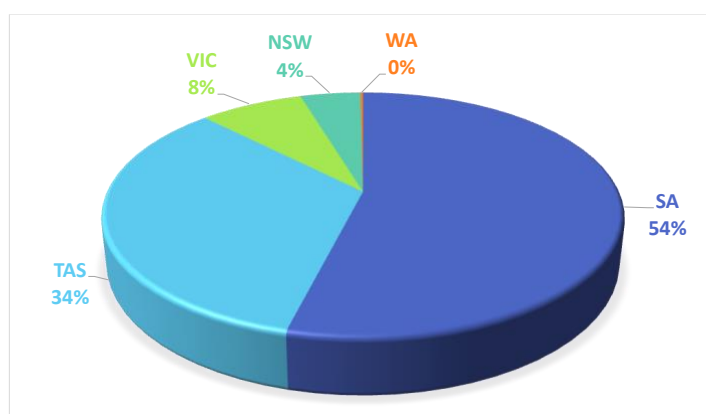
Species	Total Tagged	Total Recaptured
SOUTHERN BLUEFIN TUNA	2,121	5
YELLOWTAIL KINGFISH	1,236	209
BLACK MARLIN	1,201	10
SAILFISH	653	
STRIPED MARLIN	606	1
WHALER SHARKS	466	10
BLUE MARLIN	300	2
SPANISH MACKEREL	260	2
DOLPHINFISH	221	2
SPOTTED MACKEREL	127	
SAMSON FISH	108	17
MACKEREL TUNA	101	
GUMMY SHARK	87	4
TIGER SHARK	85	3
YELLOWFIN TUNA	76	
LONGTAIL TUNA	72	1
QUEENFISH	72	
MAKO SHARK	56	
GOLDEN TREVALLY	55	
ALBACORE	50	
HAMMERHEAD SHARK	50	
SHARK MACKEREL	37	
STRIPED TUNA	37	
COBIA	34	1
EAGLE RAY	34	
GOLD SPOTTED TREVALLY	30	
AUSTRALIAN SALMON	29	1
SCHOOL SHARK	20	
BARRACUDA	19	
BLUE SHARK	18	
BROADBILL SWORDFISH	14	
BROAD BARRED MACKEREL	13	
WAHOO	11	
GIANT TREVALLY	8	
AMBERJACK	5	1
SILVER TREVALLY	5	
SKIPJACK TUNA	5	
SHORTBILL SPEARFISH	4	
MISC. OTHER SPECIES	14	
TOTAL	8,340	269

MAIN SPECIES TAGGED 2021/22

SOUTHERN BLUEFIN TUNA (SBT)

The top species tagged this year was southern bluefin tuna (SBT) with a total of 2,121 tagged and released. This was a large increase on the tally for the previous season (1,400) and also significantly higher than the average number tagged for the past 10 years (1,525). Figure 3 shows that 54% of SBT tagged in 2021/22 were released in South Australia, followed by Tasmania, (33.6%). Numbers remained low in Victoria, with just 7.7% tagged there. In contrast, numbers of SBT tagged in NSW increased, with 95 released (4.5% of the total) compared with just seven fish tagged in the previous year.

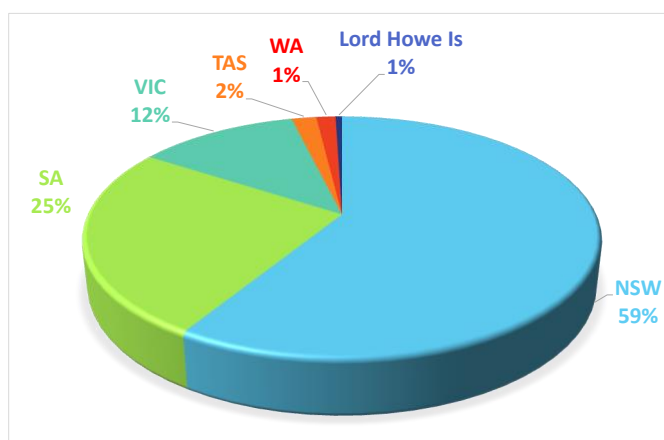
FIGURE 3. PROPORTIONS OF SOUTHERN BLUEFIN TUNA TAGGED BY STATE, 2021/22



YELLOWTAIL KINGFISH

There were 1,239 yellowtail kingfish tagged during 2021/22, 320 less than the previous year but still considerably higher than the average number tagged over the past 10 years (762). Figure 4 shows that of this total, 732 kingfish were tagged off NSW and 316 off South Australia (mostly larger fish in the 10kg to 30kg range). Numbers of kingfish tagged in Victorian waters continued to increase with 150 tagged this year compared with 87 the year before. Kingfish are not commonly caught in Tasmania, although in recent years small numbers have begun to be encountered. This year, 23 were tagged in that State, 18 on the northern coast and five off Tasman Island in the southeast.

FIGURE 4. PROPORTIONS OF YELLOWTAIL KINGFISH TAGGED BY STATE, 2021/22



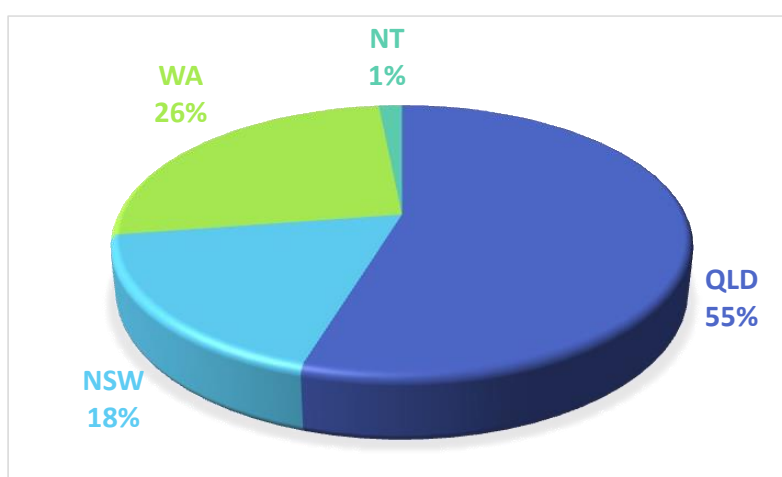
BLACK MARLIN

After dominating the annual list of tagged fish for the last five years, black marlin dropped to the third highest this year, with 1,201 fish tagged, less than half the number tagged in the previous year (2,679) and significantly under the average number tagged for the past 10 years (2,374). In fact, the difference in tag numbers between last year and this year for this one species largely accounts for the overall decrease in numbers of all fish tagged in 2021/22.

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. In 2020/21, this pulse in 'recruitment' of young black marlin was especially strong right down the coast, resulting in about 1,800 juveniles tagged for that season. In contrast, during the 2021/22 season, although juvenile fish again extended from northern Queensland to central NSW, the 'pulse' was much weaker, resulting in just 500 young-of-year fish tagged (estimated between 5 kg and 30 kg).

Looking at other regions, the number of black marlin tagged in Western Australian waters in 2021/22 was higher than the previous year (315 compared with 218). As usual, most of those (248) were tagged off Exmouth with an average estimated size of 45 kg). Other areas where black marlin were tagged were the Northern Territory, mainly off Darwin (19) and off Weipa, western Cape York (39). As was the case in the previous year, there were no recorded tag-and-releases of black marlin outside Australian waters in 2021/22.

FIGURE 5. PROPORTIONS OF BLACK MARLIN TAGGED BY REGION 2021/22



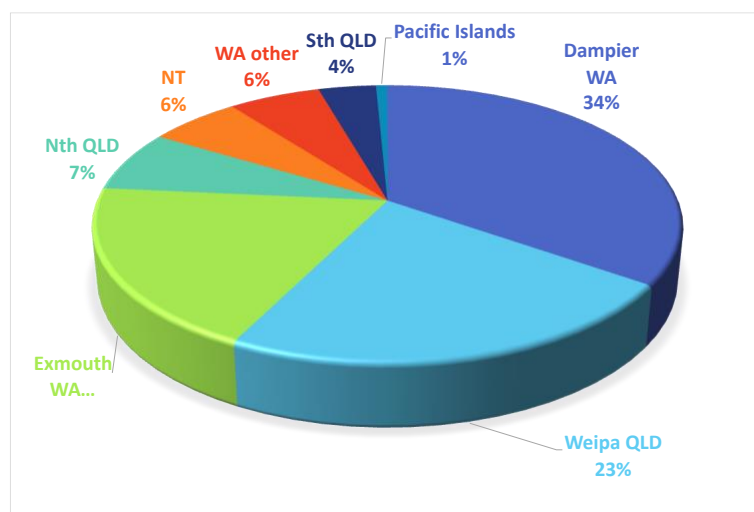
The annual heavy tackle charter fishery for adult black marlin off the outer Great Barrier Reef each Spring has traditionally resulted in the tag-and-release of hundreds of fish. However, over the past decade or so charter captains have increasingly opted not to tag fish, but to 'free-release' them instead. This has resulted in a steady decline in the number of fish tagged in this important fishery, with only 27 recorded tags returned for the season – the second lowest on record. In this case, there is no doubt that the Covid-19 pandemic had an impact since bookings were well down for the heavy-tackle charter fleet, but the proportion of tagged to freely released fish in the fishery is still believed to be extremely low. We are currently looking at ways to address this issue by gathering data on released fish from captains at the end of each season.

SAILFISH

The number of sailfish tagged in 2021/22 (657) was virtually identical to the number tagged in the previous year (653) but still about half the number tagged in the year before that (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, 40 sailfish were tagged in the NT.

Total numbers of sailfish tagged within the Program were previously boosted by the active fishery off Broome WA where hundreds are still released each year, but without being tagged. Free-release cards are being used in the region, but these are not included in the tagging database. Additionally, many sailfish are tagged each year off Groote Eylandt in the Gulf of Carpentaria (NT), but with tags supplied by the US-based Billfish Foundation. Those data are also not included in the NSW Tagging database. These factors should be noted when considering long-term trends in numbers of sailfish tagged in Western Australia, the Northern Territory and overall.

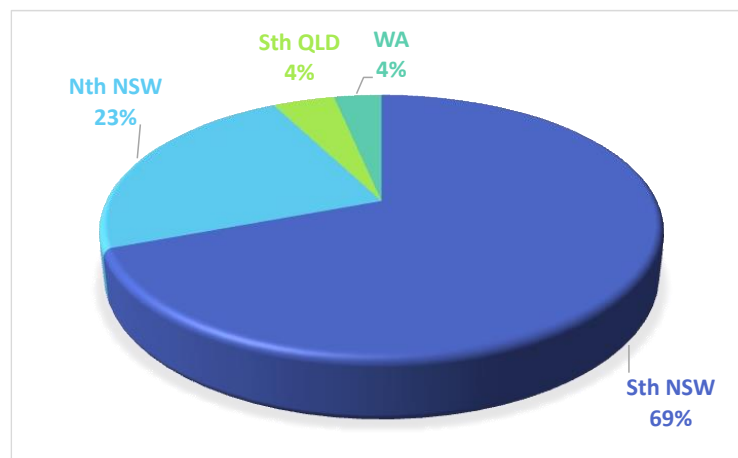
FIGURE 6. PROPORTIONS OF SAILFISH TAGGED BY REGION, 2021/22



STRIPED MARLIN

A total of 605 striped marlin were tagged in 2021/22, exactly half the number for the previous year and well below the average for the past 10 years (1,147). Most striped marlin tagged over the season were released off NSW (92.4%). As was the case last year, a far higher proportion were tagged in southern waters, (south of Sydney) compared with north of the State (Figure 7). This result in both years was largely due to a relatively poor appearance of striped marlin on the traditional grounds off Port Stephens NSW. Small numbers of striped marlin were also tagged in 2021/22 off southern QLD (26) and Exmouth, WA (20).

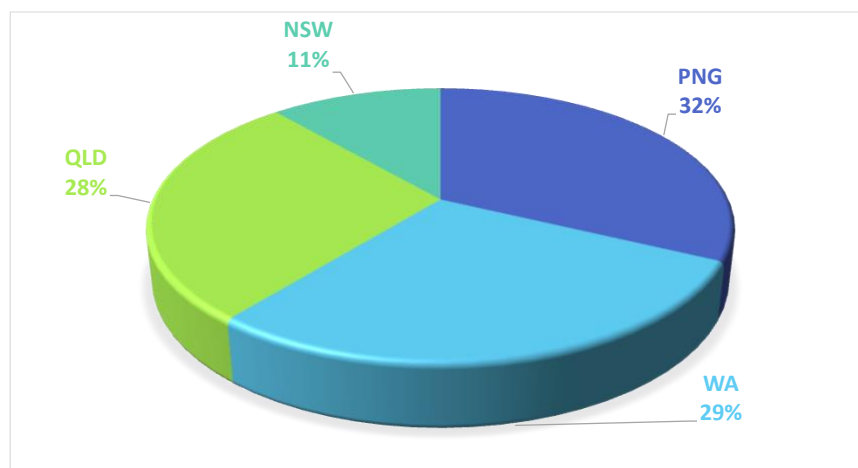
FIGURE 7. PROPORTIONS OF STRIPED MARLIN TAGGED BY REGION, 2021/22



BLUE MARLIN

A total of 398 blue marlin were tagged during 2021/22, 66 less than the previous year's tally and well below the average for the past 10 years (680). Figure 8 shows that 32.1% of blue marlin were tagged off Papua New Guinea, 28.8% off Exmouth WA, 27.8% off Queensland – mainly off the Gold Coast, and 11.3% off New South Wales.

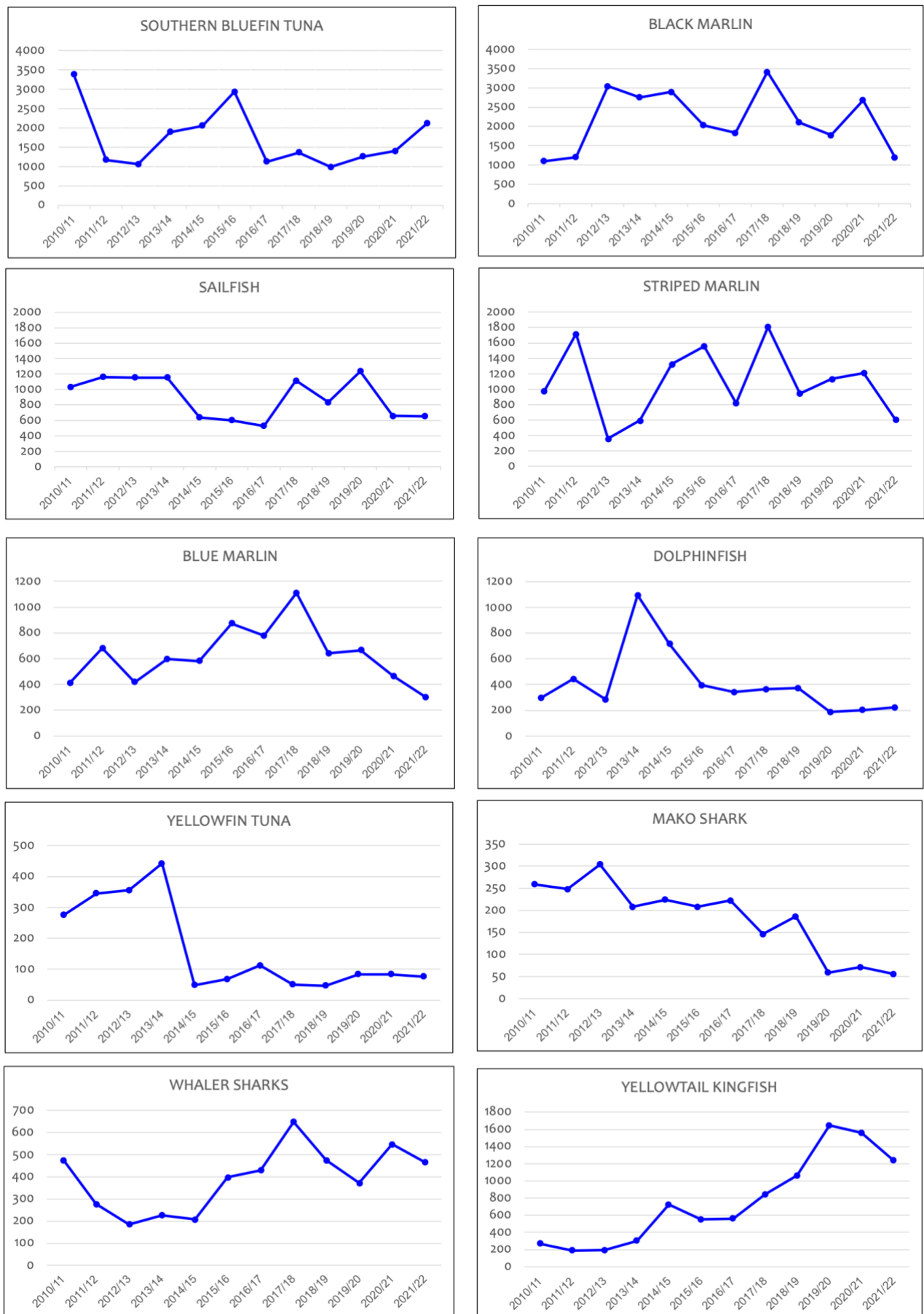
FIGURE 8. PROPORTIONS OF BLUE MARLIN TAGGED BY REGION, 2021/22



TAGGING TRENDS THROUGH TIME

Reviewing 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 in different regions, 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 the 10 key gamefish species or species groups tagged over the past 12 years are shown in Figure 9.

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



Referring to individual species in Figure 9, we note 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 then fluctuated quite steadily around 1,200 to 1,300 tagged per year, with a strong uptick this year to over 2,000 tagged.

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. A strong recruitment of juvenile fish along the east coast in 2020/21 resulted in over 2,600 being tagged, but in 2021/22, numbers tagged dipped to a ten year low. This was partly due to a weak show of juvenile fish, but was also no doubt contributed to by reduced fishing activity in many areas due to the Covid-19 pandemic.

The number of sailfish tagged last year was consistent with the previous year, and shows no overall trend for the past 12 years. On the other hand, striped marlin releases dropped to an eight year low in 2021/22, although this species does show quite marked interannual increases and decreases in availability off the NSW coast.

The last two years has seen a small decline in tagging of blue marlin since a decadal peak five years ago. This could be due to a number of non biological factors including increasing cost of fuel (blue marlin occur well wide of the coast) or as noted for other species in 2021/22, the Covid-19 pandemic limiting fishing time.

Annual numbers of dolphinfish tagged vary considerably, reflecting juvenile recruitment events along the southeast coast of this very short-lived species. Numbers tagged over the past three years have been historically low, but it should also be noted that dolphinfish are highly regarded as table-fish – another factor that may influence numbers tagged versus numbers kept for eating.

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 over the past eight years, including 2021/22, continuing a very low and sustained trend.

The number of mako sharks tagged has been on a fairly steady decline from a peak 10 years ago. While this trend may indicate a decline in the stock, it is also likely to be influenced by the level of fishing effort directed at sharks in general by the game fishing sector. Targeted game fishing for sharks appears to have declined considerably over the past decade or more, although this supposition could be studied in greater detail via data collected under the long-running Gamefish Tournament Monitoring program of NSW DPI.

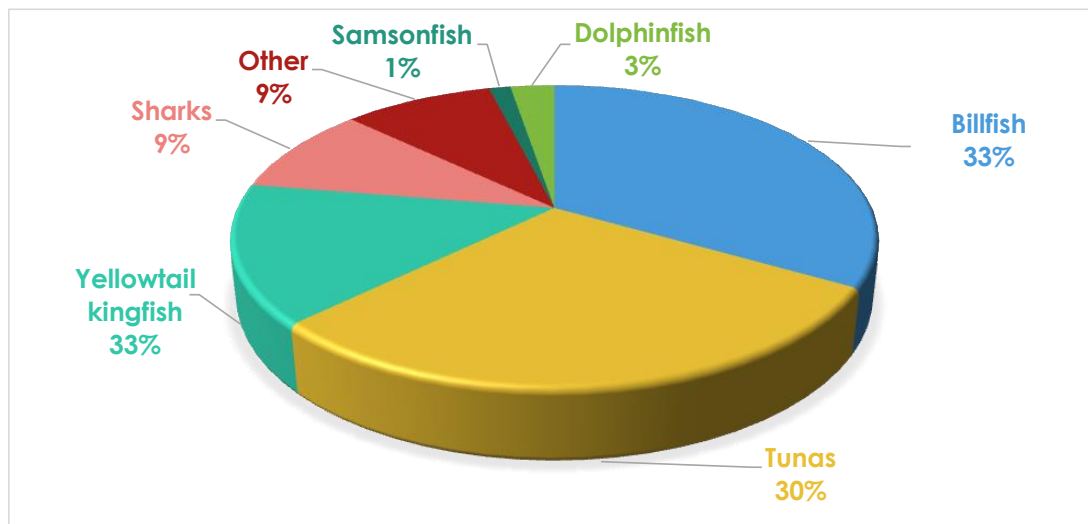
Interpretation of tagging trends for whaler sharks (combined species) is confounded by the fact that different species are caught, and sometimes targeted, in different areas. For example, there is a small but active fishery for bronze whalers in South Australia and Galapagos whaler sharks are sometimes tagged in high numbers at Lord Howe Island by visiting mainland game fishing vessels. Lastly, following a dip in numbers tagged in the early 2010s, yellowtail kingfish releases climbed steadily to record levels over the previous two seasons, but dropped slightly last year, again possibly affected by Covid-19.

Combining the species tagged into species or species groups, Figure 10 shows that billfish as a group constituted exactly one-third of all fish tagged in 2021/22 – well down from half of the total for the previous two years. As noted this lower combined proportion was due to declines in numbers of all three marlin species tagged.

The proportion of tunas tagged in 2021/22 represented 29.5% of all species, which was considerably higher than the previous three years (averaging around 15% of the total). In the past, yellowfin tuna was the dominant tuna species tagged, but with very few of that species being tagged over the past eight years now, fluctuations in the proportions of tunas tagged are now largely due to changes in numbers of southern bluefin tuna tagged each year.

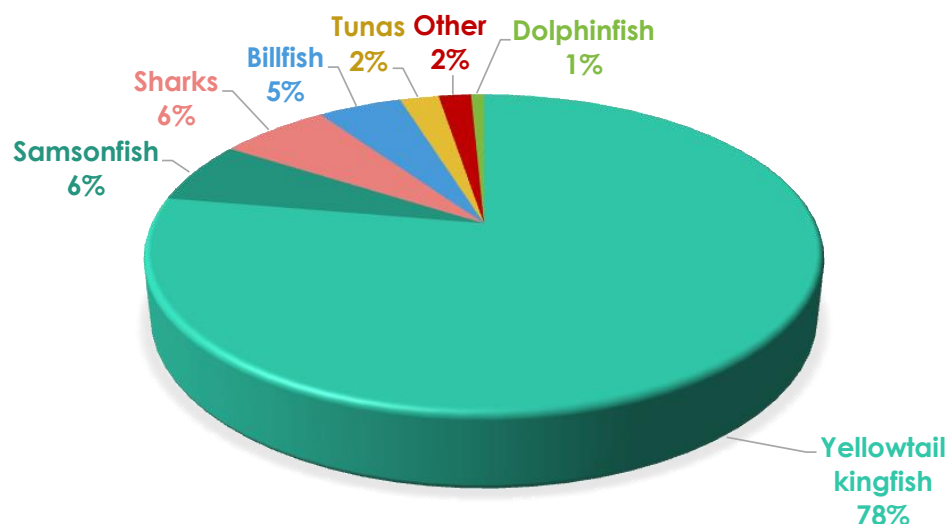
Sharks constituted 9.4% of all fish tagged in 2021/22, a slight increase from 8.4% last year and higher than the average of about 7% over the past 12 years or so.

FIGURE 10. SPECIES GROUPS TAGGED IN 2021/22



Now considering recaptured species or species groups, Figure 11 shows the proportions of the major species groups recaptured in 2021/22. As is usually the case, quite different proportions to those tagged. This year, yellowtail kingfish again dominated to a great extent, representing 77.7% of all reported recaptures. This proportion is higher than that recorded in 2020/21 (66.6%), which in turn was higher than the two previous years (59.1% and 52.9% respectively).

FIGURE 11. SPECIES GROUPS RECAPTURED IN 2021/22



RECAPTURE HIGHLIGHTS IN 2021/22

The full list of completed recaptures reported in 2021/22 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 recapture positions).

BLACK MARLIN

A total of 10 black marlin recaptures were reported during 2021/22, 14 less than the previous year. Times at liberty ranged from 3 to 1,135 days (3 years 2 months) and minimum distances travelled from 0 to 1,718 nautical miles. Five of the recaptured black marlin had been tagged in QLD waters and five off NSW. Four of the recaptured marlin were caught by Australian recreational fishers, four by commercial longline vessels and two by artisanal canoe fishermen.



Image: Matt Hansen with a recaptured black marlin caught at 'the Banks', off Greenwell Point, NSW in February 2022. The fish had originally been tagged 18 months earlier off Bundaberg, QLD. When tagged, it was estimated at just 10 kg, and at recapture, at 60 kg, showcasing the rapid growth rate of the species.



Image: One of four black marlin tagged and released by Joel Abercrombie off Port Macquarie NSW in January 2021. This fish was recaptured six months later off New Britain PNG.

The longest distance recorded by a black marlin in 2021/22 was for a fish tagged off Caloundra QLD in February 2021 and recaptured 15 months later by a commercial longline vessel near Fonuafo'ou Island, Tonga, a minimum swim of 1,718 nautical miles (Figure 12). When tagged, this fish was estimated to weigh 10 kg, while at recapture, its estimated weight was 80 kg. Remarkably, five other recaptured black marlin reported for the year had also made minimum journeys of over 1,000 nautical miles, all of them having moved north from eastern Australia (Table 3, Figure 12).

TABLE 3. DETAILS OF SIX LONG-DISTANCE RECAPTURES OF BLACK MARLIN IN 2021/22

Moved from	Moved to	Days at Liberty	Growth
Caloundra QLD	Tonga	455	10 – 80 kg
Port Macquarie NSW	North of New Britain, PNG	178	40 – 60 kg
Gibber Reef NSW	Mono Island, Solomon Sea	273	25 – 50 kg
Point Plomer NSW	Solomon Islands	337	35 – 65 kg
Point Plomer NSW	Southeast of Port Moresby, PNG	1135	22 – 100 kg
Noosa QLD	Gawa Island PNG	297	28 – 60 kg

Of the four recreationally recaptured black marlin reported this year, only one had been at liberty for an appreciable time. This fish was tagged off Bundaberg QLD in August 2020 and recaptured on the Banks, NSW 18 months later, having grown from an estimated 10 kg to 60 kg in that time. The other three recreational recaptured fish, tagged off northern QLD, southern QLD and central NSW had been at liberty for 3 to 58 days and moved zero to 153 nautical miles.

FIGURE 12. LONG-DISTANCE MOVEMENTS OF RECAPTURED BLACK MARLIN RECORDED IN 2021/22

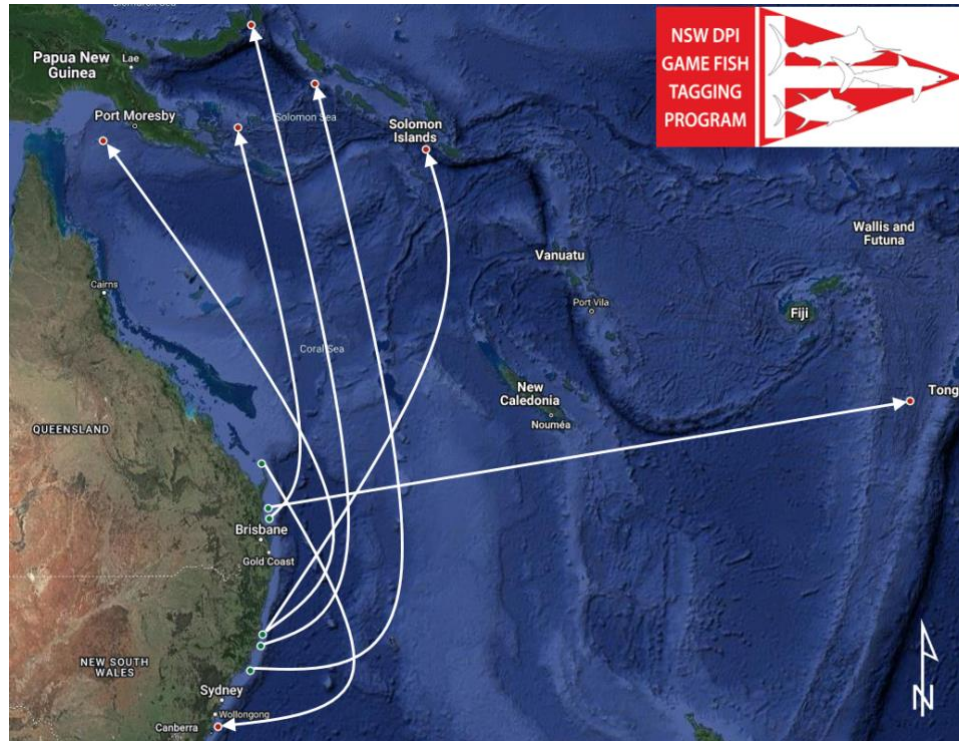


Image: A black marlin estimated at 35 kg tagged by Sean Murphy off Point Plomer, central NSW in January 2021. The fish was recaptured 337 days later in the Solomon Islands at a weight of 65 kg.

BLUE MARLIN

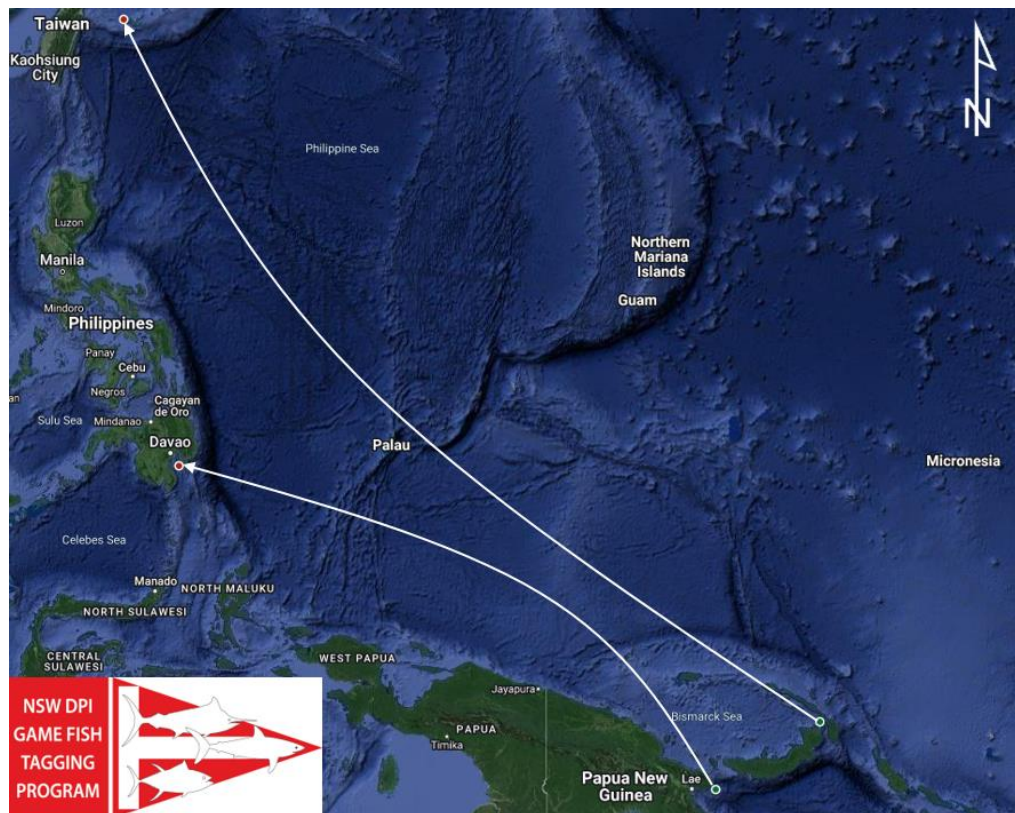
Reports of two recaptured blue marlin were received in 2021/22, both of which revealed long distance westerly directed movements from PNG (Figure 13). The first was tagged near Tami Island, off Lae PNG in April 2021. Estimated at 65 kg at release, it was recaptured just 90 days later off the coast of Daveo, Philippines by a local subsistence fisherman who reported its weight at 70 kg. The second recapture was a blue marlin tagged in November 2019 off Kokopo PNG. On 24 October 2021, just shy of two years after release, it was recaptured by a longliner close to the northeast coast of Taiwan. When tagged it was estimated at 90 kg and weighed in at 115 kg at recapture (minus the bill and lower jaw). These recaptures follow three similar ones from the 2020/21 season, all blue marlin tagged in PNG waters and recaptured along the east coast of the Philippine archipelago (see last year's tagging report for full details).

The story behind the blue marlin that was recaptured off Taiwan is worth relating. The tag had not been noticed when the fish was caught, but a sharp-eyed researcher at the landing port noticed and photographed the remnants of the tag that had been virtually shredded during trimming and dressing of the carcass. The researcher had posted a message on social media asking for help in tracking down the tag, with the readable part of the legend recorded as: B755823 CKED BAG 3020 NO1. After some deciphering it was realised that part of the message was referring to NSW DPI's address – LOCKED BAG 3020 NOWRA, but the problem was, that tag number did not exist. Fortunately, the photo of the tag provided the solution. This showed that the number '7' was actually number '1', enabling the tag to be matched with the correct fish. As it transpired, this fish was one of 245 blue marlin tagged during the 2019 Tropicana tournament run by PNG game fishing guru, John Lau and that two of the fish recaptured earlier in the Philippines had also been tagged during the same event.



Image: Left – Angler Natalie Reimann releasing her tagged blue marlin off New Britain PNG. Top right – the marlin after processing on the floor of the Taiwanese landing dock (shredded tag circled). Bottom right – closeup of the tag number which had been initially mis-read.

FIGURE 13. BLUE MARLIN MOVEMENTS BY RECAPTURED FISH RECORDED IN 2021/22



SOUTHERN BLUEFIN TUNA

A total of five tagged southern bluefin tuna (SBT) were recaptured in 2021/22, compared with six in 2020/21. In previous years, many recaptured SBT were recaptured in purse seine nets by the commercial ranching fishery operating off South Australia. However in the past two years, just four recaptures were reported from those operations – likely related to Covid-19 impacts on the industry. This year, one of those recaptured fish had been tagged off the southern tip of Tasmania and recaptured wide of Robe, SA while the other was recaptured on Sanders Bank SA just four days after its release at the same site.

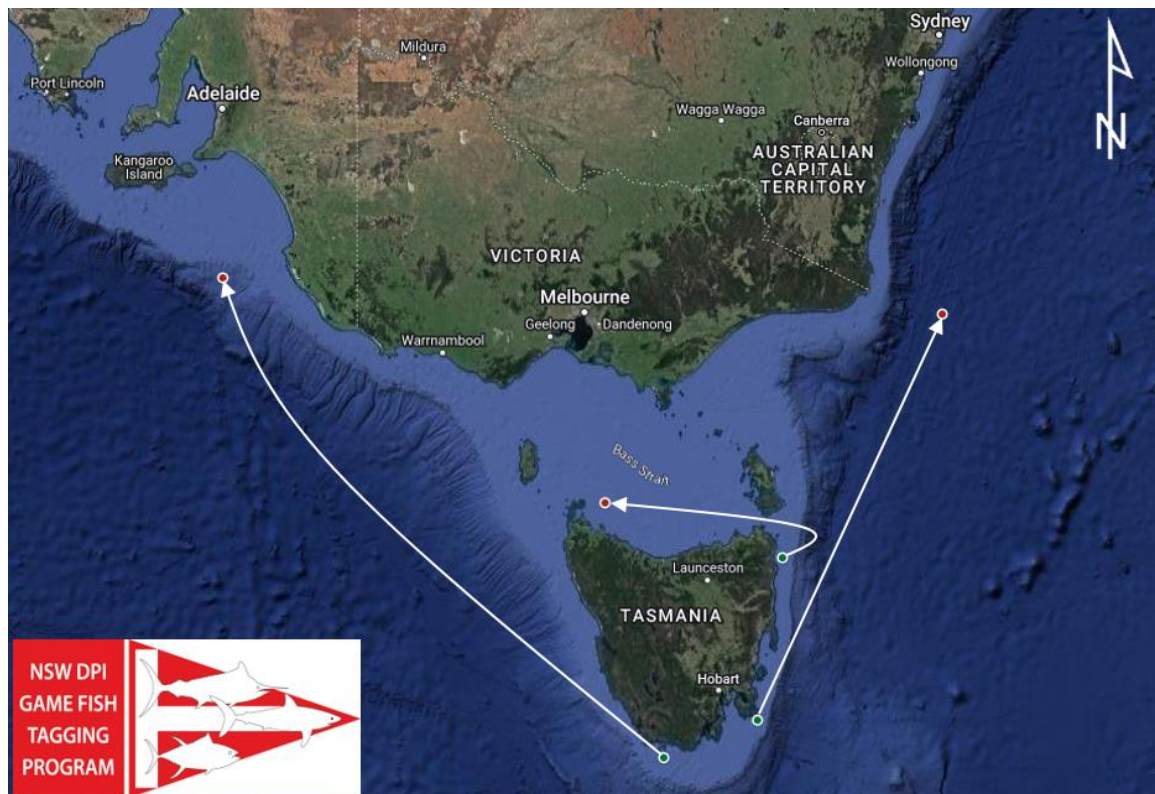
A third SBT recapture was reported from a commercial vessel, but in this case, a longliner. That fish was tagged off Tasman Island in June 2017 and recaptured 4 years 1 month later wide of Green Cape NSW. At release, it was estimated at 14 kg and weighed 73 kg at recapture.

The other two recaptured SBT were reported by recreational anglers. One had only been at liberty for two weeks and was released and recaptured in the same locality (Cape Northumberland South Australia), while the other was tagged off St Helens, eastern Tasmania and recaptured 105 days later off Stanley, northwestern Tasmania.



Image: Southern bluefin tuna tagged by Todd Bakes off St Helens, Tasmania. The fish was recaptured just over 4 years later off Stanley, northwestern Tasmania.

FIGURE 14. LONG DISTANCE MOVEMENTS BY TAGGED SOUTHERN BLUEFIN TUNA IN 2021/22



YELLOWTAIL KINGFISH

Recapture rates of tagged yellowtail kingfish have always ranked very highly compared with other species, currently showing an overall rate of 7.93% over the life of the tagging Program. In fact, this single species accounts for 36.1% of all recaptures even though it represents 8.5% 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 2021/22, 209 recaptures of tagged kingfish were reported, 58 fewer than the previous year. Times at liberty ranged from zero days (eight fish were recaptured the day of their release) to 1,635 days (4 years 5 months). The latter fish had been tagged off Sydney NSW and recaptured by the same angler within a nautical mile of its release location. Thirteen other recaptured kingfish had been at liberty for more than 1,000 days, 11 of which were tagged in South Australian waters, the other two off New South Wales.

The longest distance recorded for a tagged kingfish in 2021/22 was by a fish tagged off Williams Island SA and recaptured 249 days later off Yamba NSW. 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 951 nautical miles, however, when land masses are taken into account, the minimum distance travelled by this fish around the coast, if it passed through Bass Strait, would have been approximately 1,300 nautical miles. Similar calculations would also apply to actual distances travelled by another seven kingfish that were tagged in South Australia and recaptured off New South Wales or southern Queensland (see Figures 15a and 15b).



Image: Chad Jones about to release a 100 cm kingfish at Windarra Banks, north of Byron Bay NSW. It was recaptured 81 days later by a commercial fisher at South Solitary Island, measuring 103 cm.

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, 43.5% of the 209 recaptured kingfish this year were recaptured at their release locations, 26.8% had moved between 1 and 10 nautical miles and 10.5% had moved between 11 and 100 nautical miles. Of the remaining fish that had moved more than 100 nautical miles (39 fish), 28 had been tagged in South Australian waters, 10 in New South Wales waters and one in Victorian waters.



Image: Matt Reid releasing a tagged kingfish from Raptor Charters off Long Reef NSW in February 2020. The fish was then at liberty for 18 months before being recaptured by Katie James off the Gold Coast QLD. During that time it had grown from a length of 78 cm to 98 cm.

One particularly interesting recapture this year shows that evidence of lack of movement can be just as important as long distance movement data. A kingfish tagged in May 2021 over the Gascoyne Seamount, 300 nautical miles east of Batemans Bay NSW was recaptured at the same location by a commercial dropline vessel 11 months after its release. Having grown from a length of 65 cm to 79 cm in that time, this would have been a mature fish if male, and possibly just attaining maturity if female. Very little is known regarding kingfish biology on such remote locations between Australia and New Zealand so information such as this can be very valuable.

Lastly, of the 209 reported yellowtail kingfish recaptures, 201 (96.1%) were caught by recreational anglers and eight (3.9%) by commercial fishers – virtually identical figures to the previous season.

FIGURE 15A. MOVEMENTS OF YELLOWTAIL KINGFISH FROM COFFIN BAY PENINSULAR REGION OF SOUTH AUSTRALIA TO NEW SOUTH WALES, RECORDED DURING 2021/22

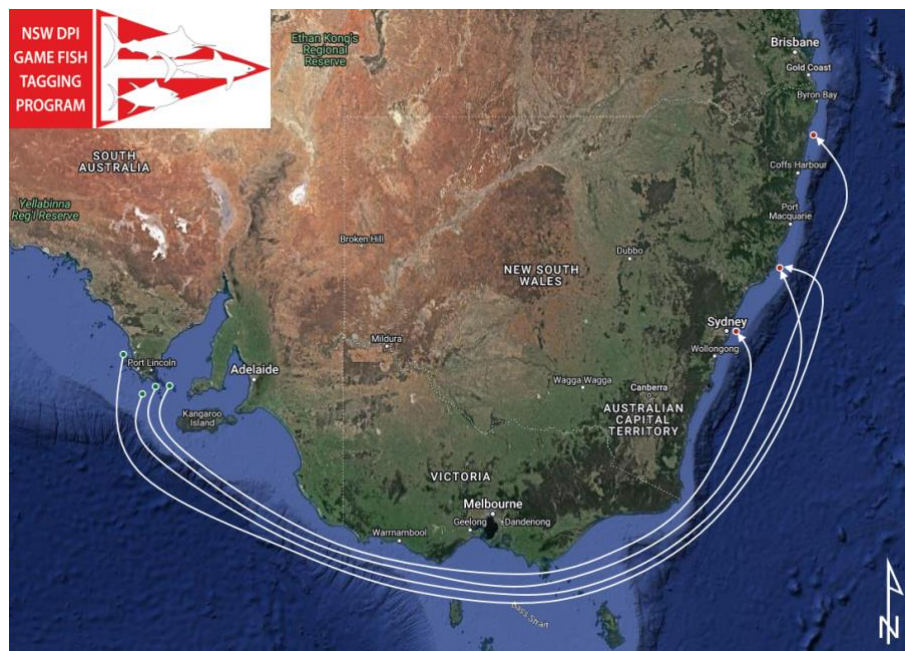


FIGURE 15B. MOVEMENTS OF YELLOWTAIL KINGFISH FROM PORT AUGUSTA REGION OF SOUTH AUSTRALIA TO NEW SOUTH WALES & QUEENSLAND RECORDED DURING 2021/22

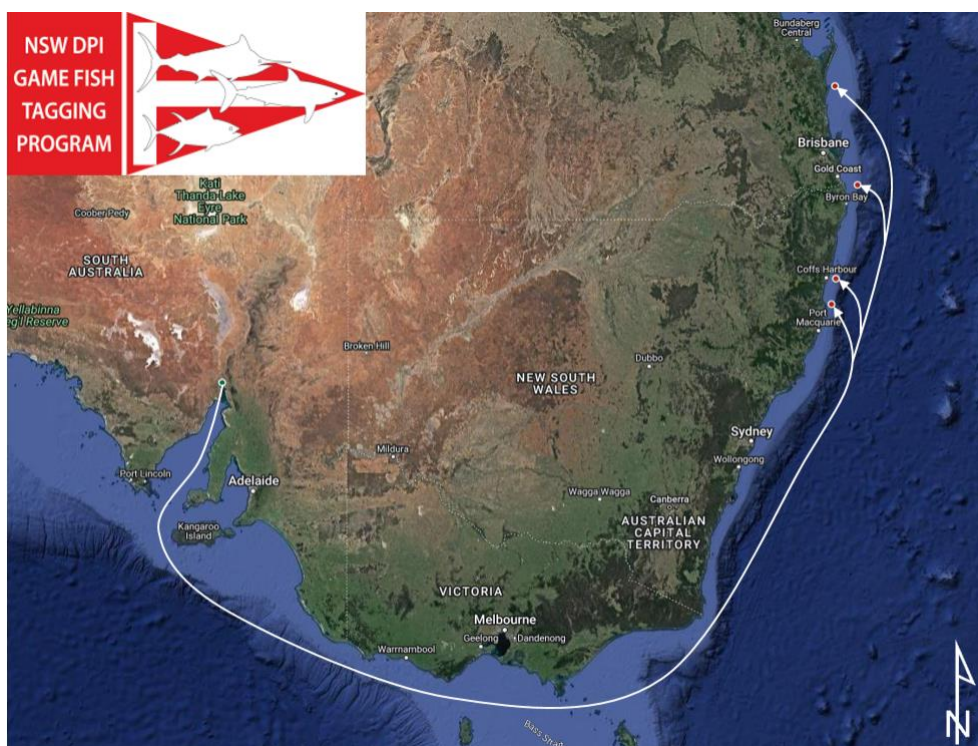


FIGURE 16. LONG DISTANCE MOVEMENTS OF YELLOWTAIL KINGFISH, SOUTH EASTERN AUSTRALIA, 2021/22

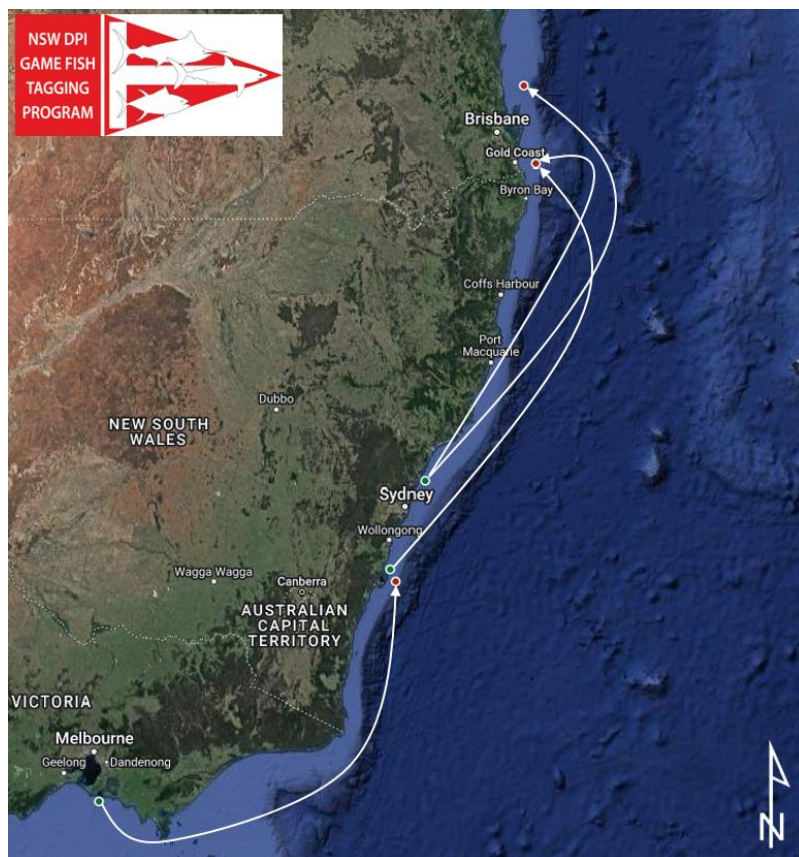
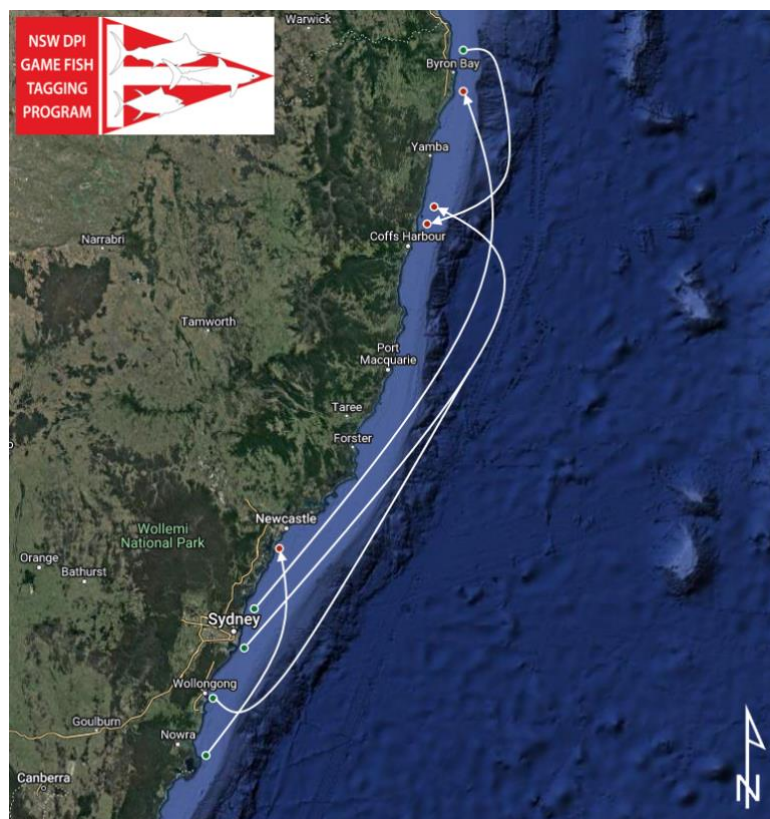


FIGURE 17. MOVEMENTS OF YELLOWTAIL KINGFISH ALONG THE NSW COAST RECORDED IN 2021/22



SAMSON FISH

Samson fish continue to be tagged in good numbers off South Australia and recaptures after lengthy periods continue to be reported. This year, 17 Samson fish were recaptured, mostly around islands in the vicinity of Coffin Bay/Port Lincoln SA. As was the case for the past three years, most of these tagged fish were recaptured within 50-70 nautical miles of their release points, 10 of them within 20 nautical miles, often after very lengthy times-at-liberty. For example, three fish that had been tagged and released near Rocky Island SA were recaptured 8, 9 and 22 miles away after 5 years, 5 years 11 months and 5 years 10 months respectively.

Emphasising the relative lack of movement of Samson fish in this region, the furthest distance travelled by a Samson fish for 2021/22 was 129 nautical miles by a fish tagged near Greenly Island SA and recaptured off Marion Bay SA one year and four months later.

Lastly, it is interesting to note that all of the recaptured tagged Samson fish were caught by recreational anglers, some of whom have been involved in tagging and releasing the species in South Australian waters for a number of years.

DOLPHINFISH

In the past, when dolphinfish have been tagged in large numbers, recaptures have usually shown coastal movements over relatively short times at liberty. As noted earlier in the report, numbers of dolphinfish tagged have been quite low in recent years resulting in relatively few recaptures.

This year, just two dolphinfish were recaptured, one of which was particularly significant. That fish was tagged off Sydney in November 2020 by well-known angler Vic Levett, who measured it at 95 cm and estimated its weight at 4.5 kg. Just over nine months later, the fish was recaptured by a New Caledonian longline vessel 270 nautical mile west of Noumea (Figure 17). It measured 131 cm long and weighed 14 kg. This is one of just a handful of dolphinfish to be recaptured beyond Australian waters since the Tagging Program began, and is also a great illustration of the very rapid growth rate attained by this species.

The other dolphinfish recapture was more typical – a fish tagged at a NSW DPI Fish Aggregating Device (FAD) off Port Hacking NSW and recaptured 137 nautical miles to the south, off Narooma NSW, 22 days later.



Image: Vic Levett releasing one of two dolphinfish to be recaptured this year. The fish was recaptured 280 days later between Australia and New Caledonia, just one of very few to be recaptured beyond Australian territorial waters.

FIGURE 18. MOVEMENTS OF THE TWO RECAPTURED DOLPHINFISH RECORDED IN 2021/22



STRIPED MARLIN

In contrast to the previous year, just one striped marlin recapture was recorded in 2021/22. It was tagged over the Tathra Canyons, southern NSW, in January 2022 and recaptured in the same general area 52 days later. As noted earlier, there had been quite a sharp drop in numbers of all three marlin species tagged this year, most likely due to effects of Covid-19 on activities, which no doubt also had an impact on the chances of recaptures as well.

SPANISH MACKEREL

Two narrow-barred Spanish mackerel were recaptured this year, both after substantial times at liberty. The first was released off Sandy Cape, Fraser Island QLD in November 2017 and recaptured 4 years 103 days later just 20 nautical miles away, inside Hervey Bay. During that time, it had grown from an estimated 8 kg to 25 kg. The second fish was tagged off Wigton Island, south of Proserpine QLD in July 2018 and recaptured 143 miles to the south 3 years 6.5 months later. It had grown from 95 cm to 115 cm during that time.

SHARKS

Recapture details for 17 tagged sharks were reported in 2021/22. These comprised five bronze whalers, four gummy sharks, three bull sharks, three tiger sharks, one blacktip shark and one unspecified whaler shark. The furthest distance moved by any of these sharks was by a bronze whaler released off Cape Jervis SA and recaptured 304 nautical miles to the west at Ceduna SA. This shark had also been a liberty for the longest period of any recaptured shark this year – 3 years, 3 months. During that time it had grown from an estimated 30 kg to 40kg, reinforcing evidence for very slow growth rates for this species. Another interesting recapture was a bull shark tagged inside Sydney Harbour in January 2020. Just over two years later, it was recaptured in the same location. This might suggest that the shark had not moved during that time, however, studies by NSW DPI researchers using acoustic tags have shown that bull sharks released in Sydney Harbour often make extensive movements well to the north, even as far as the Great Barrier Reef, before returning to the Harbour on an annual basis. Details for all other recaptured sharks are listed in Appendix I.

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 recaptured details on 17 fish for which no matching tag card had been received at the time of writing this report. These are shown in Table 4 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 4. DETAILS OF FISH RECAPTURED IN 2021/22 FOR WHICH NO TAG CARD HAS SO FAR BEEN RECEIVED.

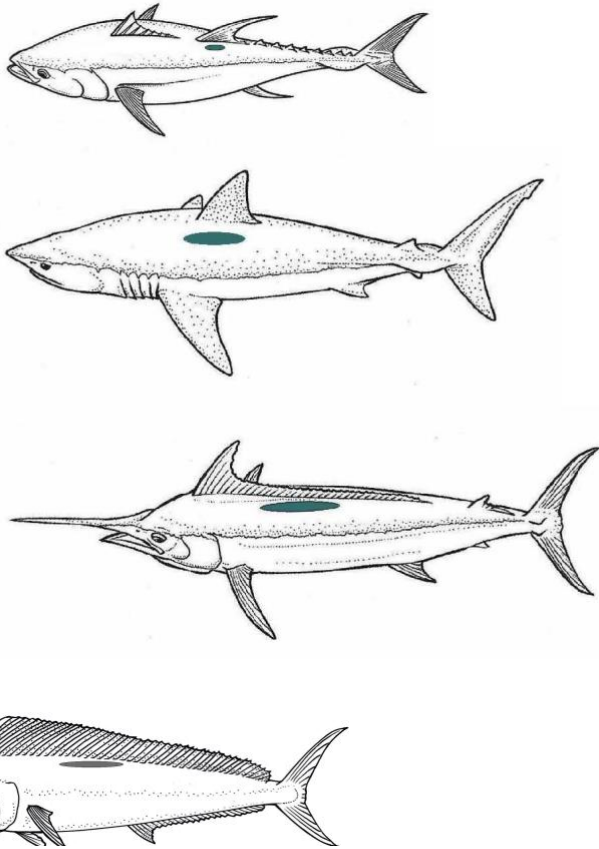
Tag No.	Species	Where recaptured	Date recaptured	Recapt Length (cm)	Recapt Wt (kg)
B113496	BLACK MARLIN	FRASER ISLAND (BREAKSEA SPIT) QLD	2/1/2022		55
B147457	BLACK MARLIN	SHOALHAVEN HEADS (EAST) NSW	31/1/2022	160	40
B167701	BLACK MARLIN	DRUM CANYONS SOUTH NSW	31/1/2022	200	60
S253763	MAKO SHARK	BARRAGGA POINT (15NM E)	1/3/2022	200	90
A639468	SAMSON FISH	ROCKY ISLAND SA	12/3/2022	99	
A629365	SOUTHERN BLUEFIN TUNA	BRUNY ISLAND (10NM SE) TAS	29/5/2022	98	18.8
A507814	YELLOWTAIL KINGFISH	NORTH SOLITARY ISLAND (1NM NE) NSW	7/8/2021	86	5.4
A657072	YELLOWTAIL KINGFISH	NORTH SOLITARY ISLAND (1NM NE) NSW	7/8/2021	76	3.8
A655205	YELLOWTAIL KINGFISH	MIDDLE HARBOUR NSW	13/8/2021	94	
A639448	YELLOWTAIL KINGFISH	COFFIN BAY SA	11/10/2021	135	23
A600828	YELLOWTAIL KINGFISH	BROUGHTON ISLAND NSW	20/11/2021	112	
A661195	YELLOWTAIL KINGFISH	MAROUBRA NSW	7/12/2021	70	
A661911	YELLOWTAIL KINGFISH	POINT LOWLY SA	16/12/2021	140	20
A639672	YELLOWTAIL KINGFISH	THE PEAK NSW	11/1/2022	102	
A652574	YELLOWTAIL KINGFISH	MALABAR NSW	14/3/2022	49	
A655177	YELLOWTAIL KINGFISH	LONG REEF NSW	14/5/2022	91	
A643122	YELLOWTAIL KINGFISH	LONG REEF NSW	26/6/2022	80	

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 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.

APPENDIX I: ALL RECAPTURES OF TAGGED FISH REPORTED IN 2021/22

Species	Date tagged	Release location	Days at liberty	Distance moved (nmi)	Direction
AMBERJACK	15/6/2021	SANDON (4NM E)	153	8	WSW
AUSTRALIAN SALMON	24/10/2021	AMERICAN RIVER (SA)	45	0	NW
BLACK MARLIN	14/1/2019	POINT PLOMER	1135	1335	NNW
BLACK MARLIN	16/8/2020	BUNDABERG (15 NM E)	542	624	SW
BLACK MARLIN	21/2/2021	CALOUNDRA CANYONS	455	1718	NE
BLACK MARLIN	15/1/2021	POINT PLOMER (4 NM E)	337	1377	NNE
BLACK MARLIN	4/1/2021	THE HARDY (QLD)	297	1051	NW
BLACK MARLIN	9/2/2021	GIBBER REEF (EAST)	273	1514	NE
BLACK MARLIN	10/1/2021	PORT MACQUARIE (9 NM E)	178	1624	NW
BLACK MARLIN	17/2/2022	PORT STEPHENS (V-REEF)	58	153	SSW
BLACK MARLIN	18/12/2021	CALOUNDRA (15NM NE)	27	77	SE
BLACK MARLIN	3/8/2021	OYSTER REEF (2NM W)	3	0	NW
BLACKTIP SHARK	14/4/2022	EXMOUTH GULF	26	0	NW
BLUE MARLIN	10/11/2019	RABAUL - PNG	714	2477	NW
BLUE MARLIN	3/4/2021	TAMI ISLAND (PNG)	90	1526	WNW
BRONZE WHALER	11/2/2018	CAPE JERVIS (SA)	1373	304	NW
BRONZE WHALER	30/1/2020	WESTERNPORT BAY (CORINELLA)	784	0	NW
BRONZE WHALER	14/11/2020	CAPE CONRAN (VIC)	381	70	SW
BRONZE WHALER	6/3/2021	LOCHSPORT BEACH (VIC)	226	156	ENE
BRONZE WHALER	20/12/2021	MANDURAH	6	17	SSE
BULL SHARK	14/1/2020	SYDNEY HARBOUR	743	0	NW
BULL SHARK	12/2/2022	SYDNEY HARBOUR	45	0	NW
BULL SHARK	4/3/2022	SYDNEY HARBOUR	9	14	SSW
COBIA	17/4/2022	WANGI WANGI	6	1	W
DOLPHINFISH	23/11/2020	SYDNEY EAST FAD	280	828	NE
DOLPHINFISH	27/1/2022	PORT HACKING FAD	22	137	SSW
GUMMY SHARK	14/6/2021	BLACKFELLOWS CAVES (SA)	55	0	NW
GUMMY SHARK	12/5/2022	HARMERS HAVEN (VIC)	24	10	SE
GUMMY SHARK	9/5/2022	PORT WELSHPOOL (10NM S)	21	126	WSW
GUMMY SHARK	9/5/2022	WESTERNPORT BAY (FLINDERS)	3	1	S
LONGTAIL TUNA	25/4/2021	SANDON (4NM E)	99	0	NW
SAMSON FISH	24/1/2016	ROCKY ISLAND (SA)	2182	9	NE
SAMSON FISH	29/12/2015	ROCKY ISLAND (SA)	2142	22	NE
SAMSON FISH	4/2/2017	ROCKY ISLAND (SA)	1835	8	NE
SAMSON FISH	13/1/2020	CABBAGE PATCH (SA)	798	0	NW
SAMSON FISH	16/2/2020	PERFORATED ISLAND (SA)	764	41	SSE
SAMSON FISH	10/2/2020	GREENLY ISLAND (SA)	698	57	SE
SAMSON FISH	7/3/2020	ROCKY ISLAND (SA)	687	0	NW

APPENDIX I: RECAPTURES OF TAGGED FISH REPORTED IN 2021/22 (CONTD)

Species	Date tagged	Release location	Days at liberty	Distance moved (nmi)	Direction
SAMSON FISH	21/12/2019	PONDALOWIE BAY (5NM NW)	571	19	ESE
SAMSON FISH	13/2/2021	GREENLY ISLAND (5NM SW)	483	129	SE
SAMSON FISH	29/12/2020	FOUR HUMMOCKS ISLAND (SA)	393	0	NW
SAMSON FISH	18/2/2021	PERFORATED ISLAND (SA)	378	22	SW
SAMSON FISH	22/1/2021	ROCKY ISLAND (SA)	359	0	NW
SAMSON FISH	22/1/2021	ROCKY ISLAND (SA)	356	0	NW
SAMSON FISH	11/6/2021	MARION BAY (SA)	312	11	SW
SAMSON FISH	28/3/2021	GREENLY ISLAND (SA)	294	57	SE
SAMSON FISH	16/12/2021	GREENLY ISLAND (SA)	31	19	SW
SAMSON FISH	14/1/2022	COFFIN BAY PENINSULA	24	39	WSW
SOUTHERN BLUEFIN TUNA	3/6/2017	TASMAN ISLAND	1501	376	NNE
SOUTHERN BLUEFIN TUNA	15/6/2021	MEWSTONE ROCK (TAS)	245	501	NW
SOUTHERN BLUEFIN TUNA	30/5/2021	MERRICKS REEF (ST HELENS)	105	147	WNW
SOUTHERN BLUEFIN TUNA	13/6/2022	CAPE NORTHUMBERLAND (4NM S)	14	0	NW
SOUTHERN BLUEFIN TUNA	27/2/2022	SANDERS BANK (SA)	4	0	NW
SPANISH MACKEREL	19/11/2017	FRASER ISLAND (SANDY CAPE)	1567	21	S
SPANISH MACKEREL	20/7/2018	WIGTON ISLAND (EAST)	1293	143	SE
STRIPED MARLIN	22/1/2022	TATHRA CANYONS	52	8	SSW
TIGER SHARK	22/12/2021	HORSE BEACH (WA)	44	0	NW
TIGER SHARK	27/11/2021	ROCKINGHAM	42	68	S
TIGER SHARK	7/8/2021	DAMPIER (WEST LEWIS ISLAND)	1	4	NW
WHALER SHARK	4/2/2022	FISHERMANS BEACH	13	2	NNE
YELLOWTAIL KINGFISH	23/7/2017	SYDNEY (THE PEAK)	1635	1	NW
YELLOWTAIL KINGFISH	8/10/2017	COFFIN BAY	1478	169	NE
YELLOWTAIL KINGFISH	2/10/2017	PORT AUGUSTA (SA)	1455	170	SW
YELLOWTAIL KINGFISH	19/11/2017	PORT AUGUSTA (SA)	1441	0	NW
YELLOWTAIL KINGFISH	16/11/2017	PORT AUGUSTA (SA)	1438	0	NW
YELLOWTAIL KINGFISH	25/12/2017	HUMMOCKS (SA)	1398	191	NE
YELLOWTAIL KINGFISH	20/12/2017	THE BANKS	1369	117	NNE
YELLOWTAIL KINGFISH	1/6/2018	12 MILE REEF	1322	10	WSW
YELLOWTAIL KINGFISH	9/10/2018	PORT PIRIE (SA)	1135	15	NW
YELLOWTAIL KINGFISH	21/10/2018	PORT AUGUSTA (SA)	1127	806	NE
YELLOWTAIL KINGFISH	4/11/2018	PORT AUGUSTA (SA)	1121	28	S
YELLOWTAIL KINGFISH	12/11/2018	DOUGLAS BANK (WHYALLA)	1113	12	SW
YELLOWTAIL KINGFISH	21/10/2018	PORT AUGUSTA (SA)	1092	788	E
YELLOWTAIL KINGFISH	6/7/2019	MIDDLE HARBOUR	933	70	SW
YELLOWTAIL KINGFISH	6/7/2019	MIDDLE HARBOUR	907	207	SSW
YELLOWTAIL KINGFISH	28/6/2019	12 MILE REEF	906	14	NW
YELLOWTAIL KINGFISH	6/7/2019	MIDDLE HARBOUR	854	80	SSW
YELLOWTAIL KINGFISH	18/1/2020	FOUR HUMMOCKS ISLAND (SA)	805	0	NW

APPENDIX I: RECAPTURES OF TAGGED FISH REPORTED IN 2021/22 (CONTD)

Species	Date tagged	Release location	Days at liberty	Distance moved (nmi)	Direction
YELLOWTAIL KINGFISH	2/10/2019	COFFIN BAY (NTH OF TOWN) SA	767	170	NE
YELLOWTAIL KINGFISH	5/10/2019	COFFIN BAY (NTH OF TOWN) SA	762	8	NW
YELLOWTAIL KINGFISH	8/10/2019	PORT AUGUSTA (SA)	748	0	NW
YELLOWTAIL KINGFISH	26/10/2019	PORT AUGUSTA (SA)	741	0	NW
YELLOWTAIL KINGFISH	28/10/2019	PORT AUGUSTA (SA)	741	0	NW
YELLOWTAIL KINGFISH	6/11/2019	COFFIN BAY	739	170	NE
YELLOWTAIL KINGFISH	4/7/2019	MIDDLE HARBOUR	731	1	SE
YELLOWTAIL KINGFISH	28/10/2019	COFFIN BAY (NTH OF TOWN) SA	730	863	E
YELLOWTAIL KINGFISH	25/10/2019	PORT AUGUSTA (SA)	730	170	SW
YELLOWTAIL KINGFISH	5/7/2019	MIDDLE HARBOUR	730	1	SE
YELLOWTAIL KINGFISH	11/10/2019	PORT AUGUSTA (SA)	725	860	NE
YELLOWTAIL KINGFISH	10/2/2020	ROCKY ISLAND (SA)	714	0	NW
YELLOWTAIL KINGFISH	13/10/2019	PORT AUGUSTA (SA)	712	0	NW
YELLOWTAIL KINGFISH	24/11/2019	PORT AUGUSTA (SA)	712	0	NW
YELLOWTAIL KINGFISH	14/11/2019	WHYALLA (SA)	709	41	NE
YELLOWTAIL KINGFISH	29/11/2019	POINT LOWLY (SA)	708	28	NW
YELLOWTAIL KINGFISH	7/12/2019	THORNY PASSAGE (SA)	706	759	E
YELLOWTAIL KINGFISH	2/11/2019	PORT AUGUSTA (SA)	702	898	ENE
YELLOWTAIL KINGFISH	22/11/2019	PORT AUGUSTA (SA)	700	0	NW
YELLOWTAIL KINGFISH	6/11/2019	PORT AUGUSTA (SA)	696	0	NW
YELLOWTAIL KINGFISH	10/11/2019	PORT AUGUSTA (SA)	695	0	NW
YELLOWTAIL KINGFISH	20/12/2019	12 MILE REEF	672	0	NW
YELLOWTAIL KINGFISH	2/2/2020	GREENLY ISLAND (SA)	627	196	ENE
YELLOWTAIL KINGFISH	27/4/2020	THE PEAK	626	0	NW
YELLOWTAIL KINGFISH	15/1/2020	PORT KEMBLA	570	307	NNE
YELLOWTAIL KINGFISH	21/8/2020	PARRAMATTA RIVER	568	7	NE
YELLOWTAIL KINGFISH	7/1/2020	CURRARONG BOMMIE	562	441	NNE
YELLOWTAIL KINGFISH	19/2/2020	LONG REEF	543	366	NNE
YELLOWTAIL KINGFISH	17/10/2020	PORT AUGUSTA (SA)	512	186	SSW
YELLOWTAIL KINGFISH	18/12/2020	THORNY PASSAGE (SA)	478	50	NW
YELLOWTAIL KINGFISH	8/5/2020	MIDDLE HARBOUR	468	5	WSW
YELLOWTAIL KINGFISH	2/9/2020	GOAT ISLAND (SYDNEY)	461	0	NW
YELLOWTAIL KINGFISH	25/8/2020	PARRAMATTA RIVER	450	2	E
YELLOWTAIL KINGFISH	6/9/2020	DRUMMOYNE (SYDNEY HARBOUR)	411	1	E
YELLOWTAIL KINGFISH	11/10/2020	PORT AUGUSTA (SA)	407	28	S
YELLOWTAIL KINGFISH	20/1/2021	HUMMOCKS (SA)	407	0	NW
YELLOWTAIL KINGFISH	21/2/2021	THE GAP	398	6	SW
YELLOWTAIL KINGFISH	19/10/2020	PORT AUGUSTA (SA)	398	0	NW

APPENDIX I: RECAPTURES OF TAGGED FISH REPORTED IN 2021/22 (CONTD)

Species	Date tagged	Release location	Days at liberty	Distance moved (nmi)	Direction
YELLOWTAIL KINGFISH	7/11/2020	PORT AUGUSTA (SA)	393	169	SSW
YELLOWTAIL KINGFISH	2/11/2020	PORT AUGUSTA (SA)	392	28	S
YELLOWTAIL KINGFISH	24/11/2020	WHYALLA (SA)	381	0	NW
YELLOWTAIL KINGFISH	12/9/2020	PORT AUGUSTA (SA)	380	0	NW
YELLOWTAIL KINGFISH	5/1/2021	THE PEAK	373	0	NW
YELLOWTAIL KINGFISH	22/1/2021	PORTLAND (NORTH SHORE)	371	2	E
YELLOWTAIL KINGFISH	1/11/2020	PORT AUGUSTA (SA)	369	170	SW
YELLOWTAIL KINGFISH	24/1/2021	CABBAGE PATCH (SA)	367	0	NW
YELLOWTAIL KINGFISH	27/9/2020	PORT AUGUSTA (SA)	364	170	SW
YELLOWTAIL KINGFISH	22/1/2021	PORTLAND (NORTH SHORE)	361	2	E
YELLOWTAIL KINGFISH	23/12/2020	CABBAGE PATCH (SW)	356	859	NE
YELLOWTAIL KINGFISH	6/3/2021	PORT WELSHPOOL (WHITE ROCK)	355	0	NW
YELLOWTAIL KINGFISH	14/12/2020	WHYALLA (SA)	343	41	NE
YELLOWTAIL KINGFISH	30/11/2020	FITZGERALD BAY (SA)	343	27	NE
YELLOWTAIL KINGFISH	14/11/2020	POINT LOWLY (SA)	342	0	NW
YELLOWTAIL KINGFISH	19/9/2020	PORT AUGUSTA (SA)	340	114	S
YELLOWTAIL KINGFISH	11/10/2020	BLUEFISH POINT	335	87	NNE
YELLOWTAIL KINGFISH	11/10/2020	BLUEFISH POINT	335	87	NNE
YELLOWTAIL KINGFISH	22/5/2021	GASCOYNE SEAMOUNT	335	0	NW
YELLOWTAIL KINGFISH	26/12/2020	HUMMOCKS (SA)	331	173	ENE
YELLOWTAIL KINGFISH	9/4/2021	JERVIS BAY (LONG NOSE POINT)	324	9	NNE
YELLOWTAIL KINGFISH	21/12/2020	LONG REEF	318	435	NE
YELLOWTAIL KINGFISH	3/2/2021	LONG REEF	313	9	SW
YELLOWTAIL KINGFISH	1/8/2021	MIDDLE HARBOUR	305	3	ENE
YELLOWTAIL KINGFISH	8/1/2021	CABBAGE PATCH (SA)	289	49	NW
YELLOWTAIL KINGFISH	16/2/2021	HUMMOCKS (SA)	288	173	ENE
YELLOWTAIL KINGFISH	24/1/2021	CABBAGE PATCH (SW)	286	195	NNE
YELLOWTAIL KINGFISH	14/5/2021	SOUTH HEAD	282	6	NE
YELLOWTAIL KINGFISH	20/8/2021	MIDDLE HARBOUR	269	71	SW
YELLOWTAIL KINGFISH	12/2/2021	FOUR HUMMOCKS ISLAND (SA)	252	192	NE
YELLOWTAIL KINGFISH	27/12/2020	WILLIAMS ISLAND (SA)	249	951	NE
YELLOWTAIL KINGFISH	31/3/2021	SOUTH HEAD	247	3	WSW
YELLOWTAIL KINGFISH	24/1/2021	SANDON (4NM E)	231	16	NW
YELLOWTAIL KINGFISH	25/11/2020	GYMEA BAY	223	0	NW
YELLOWTAIL KINGFISH	4/5/2021	CURRARONG BOMMIE	214	0	NW
YELLOWTAIL KINGFISH	28/12/2020	LONG REEF	210	324	NNE
YELLOWTAIL KINGFISH	6/4/2021	SEAL ROCKS (VIC)	207	354	ENE
YELLOWTAIL KINGFISH	13/5/2021	SOUTH HEAD	191	0	NW
YELLOWTAIL KINGFISH	17/10/2021	CURRARONG BOMMIE	180	3	WNW

APPENDIX I: RECAPTURES OF TAGGED FISH REPORTED IN 2021/22 (CONTD)

Species	Date tagged	Release location	Days at liberty	Distance moved (nmi)	Direction
YELLOWTAIL KINGFISH	16/4/2021	MARLEY POINT	179	2	WSW
YELLOWTAIL KINGFISH	13/11/2021	SOUTH HEAD	169	4	SW
YELLOWTAIL KINGFISH	13/4/2021	LONG REEF	163	6	SSW
YELLOWTAIL KINGFISH	14/5/2021	SOUTH HEAD	162	3	SE
YELLOWTAIL KINGFISH	30/5/2021	GOAT ISLAND (SYDNEY)	152	1	W
YELLOWTAIL KINGFISH	27/4/2021	SYDNEY ARTIFICIAL REEF	151	1	NW
YELLOWTAIL KINGFISH	31/3/2021	THE GAP	138	266	NNE
YELLOWTAIL KINGFISH	13/5/2021	SOUTH HEAD	135	257	NNE
YELLOWTAIL KINGFISH	1/4/2021	BRONTE HEADLAND	134	5	NW
YELLOWTAIL KINGFISH	19/4/2021	SOUTH HEAD	123	1	NW
YELLOWTAIL KINGFISH	2/5/2021	LONG REEF	122	0	NW
YELLOWTAIL KINGFISH	28/6/2021	MIDDLE HARBOUR	118	1	S
YELLOWTAIL KINGFISH	19/4/2021	SOUTH HEAD	116	1	NW
YELLOWTAIL KINGFISH	1/4/2021	BRONTE HEADLAND	110	5	NW
YELLOWTAIL KINGFISH	15/5/2021	MIDDLE HARBOUR (BANTRY BAY)	107	3	ESE
YELLOWTAIL KINGFISH	19/4/2021	LONG REEF	104	6	WSW
YELLOWTAIL KINGFISH	13/5/2021	SOUTH HEAD	101	1	NW
YELLOWTAIL KINGFISH	20/8/2021	MIDDLE HARBOUR	96	3	SSW
YELLOWTAIL KINGFISH	30/5/2021	GOAT ISLAND (SYDNEY)	91	3	WNW
YELLOWTAIL KINGFISH	23/9/2021	MIDDLE HARBOUR	87	6	NNE
YELLOWTAIL KINGFISH	23/9/2021	PORT AUGUSTA (SA)	86	198	SSW
YELLOWTAIL KINGFISH	23/7/2021	MIDDLE HARBOUR	85	0	NW
YELLOWTAIL KINGFISH	10/9/2021	WINDARRA BANKS	81	107	SW
YELLOWTAIL KINGFISH	2/8/2021	MIDDLE HARBOUR	80	2	SSE
YELLOWTAIL KINGFISH	7/8/2021	MIDDLE HARBOUR	78	6	SSE
YELLOWTAIL KINGFISH	15/2/2022	SOUTH WEST ROCKS (FISH ROCK)	72	5	NE
YELLOWTAIL KINGFISH	13/8/2021	MIDDLE HARBOUR	72	0	NW
YELLOWTAIL KINGFISH	13/8/2021	MIDDLE HARBOUR	71	0	NW
YELLOWTAIL KINGFISH	16/9/2021	MARION BAY (SA)	68	167	NE
YELLOWTAIL KINGFISH	14/11/2021	LONG REEF	63	0	NW
YELLOWTAIL KINGFISH	23/7/2021	MIDDLE HARBOUR	62	0	NW
YELLOWTAIL KINGFISH	6/8/2021	MIDDLE HARBOUR	61	4	SW
YELLOWTAIL KINGFISH	6/12/2021	PORT AUGUSTA (SA)	61	0	NW
YELLOWTAIL KINGFISH	1/10/2021	SOUTH WEST ROCKS (FISH ROCK)	59	0	NW
YELLOWTAIL KINGFISH	2/10/2021	PORT AUGUSTA (SA)	58	28	S
YELLOWTAIL KINGFISH	6/6/2021	MAROUBRA (2 NM E)	58	8	NNW
YELLOWTAIL KINGFISH	23/7/2021	MIDDLE HARBOUR	58	0	NW
YELLOWTAIL KINGFISH	18/8/2021	SOUTH WEST ROCKS (FISH ROCK)	57	0	NW
YELLOWTAIL KINGFISH	8/5/2021	LONG REEF	55	6	WSW
YELLOWTAIL KINGFISH	8/10/2021	PORT AUGUSTA (SA)	52	28	S

APPENDIX I: RECAPTURES OF TAGGED FISH REPORTED IN 2021/22 (CONTD)

Species	Date tagged	Release location	Days at liberty	Distance moved (nmi)	Direction
YELLOWTAIL KINGFISH	27/10/2021	TERRIGAL (6NM E)	49	14	WSW
YELLOWTAIL KINGFISH	14/12/2021	PORTLAND (MINERVA REEF)	49	0	NW
YELLOWTAIL KINGFISH	14/5/2021	SOUTH HEAD	48	3	WNW
YELLOWTAIL KINGFISH	29/8/2021	SOUTH WEST ROCKS (FISH ROCK)	48	0	NW
YELLOWTAIL KINGFISH	14/11/2021	PORT AUGUSTA (SA)	46	198	SSW
YELLOWTAIL KINGFISH	30/12/2021	ROCKY ISLAND (SA)	45	0	NW
YELLOWTAIL KINGFISH	23/3/2022	NORTH SOLITARY ISLAND	44	12	NW
YELLOWTAIL KINGFISH	3/9/2021	MIDDLE HARBOUR	44	0	NW
YELLOWTAIL KINGFISH	10/5/2022	LONG REEF	44	0	NW
YELLOWTAIL KINGFISH	30/7/2021	MIDDLE HARBOUR	43	0	NW
YELLOWTAIL KINGFISH	23/9/2021	PORT AUGUSTA (SA)	43	0	NW
YELLOWTAIL KINGFISH	26/9/2021	PORT AUGUSTA (SA)	43	0	NW
YELLOWTAIL KINGFISH	12/8/2021	LONG REEF	42	6	SSW
YELLOWTAIL KINGFISH	18/7/2021	MIDDLE HARBOUR	41	0	NW
YELLOWTAIL KINGFISH	7/11/2021	LONG REEF	40	0	NW
YELLOWTAIL KINGFISH	14/12/2021	PORTLAND (MINERVA REEF)	40	0	NW
YELLOWTAIL KINGFISH	18/8/2021	MIDDLE HARBOUR	38	0	NW
YELLOWTAIL KINGFISH	24/12/2021	PORTLAND (MINERVA REEF)	36	0	NW
YELLOWTAIL KINGFISH	20/2/2022	SOUTH HEAD	36	0	NW
YELLOWTAIL KINGFISH	14/12/2021	PORTLAND (MINERVA REEF)	35	0	NW
YELLOWTAIL KINGFISH	26/3/2022	PORT HACKING	33	2	W
YELLOWTAIL KINGFISH	14/12/2021	PORTLAND (MINERVA REEF)	33	0	NW
YELLOWTAIL KINGFISH	13/11/2021	SOUTH HEAD	32	6	NE
YELLOWTAIL KINGFISH	13/10/2021	PORT AUGUSTA (SA)	31	0	NW
YELLOWTAIL KINGFISH	3/9/2021	MIDDLE HARBOUR	30	0	NW
YELLOWTAIL KINGFISH	16/10/2021	PORT AUGUSTA (SA)	30	0	NW
YELLOWTAIL KINGFISH	22/10/2021	PORT AUGUSTA (SA)	30	0	NW
YELLOWTAIL KINGFISH	30/3/2022	PORT HACKING	29	2	W
YELLOWTAIL KINGFISH	6/8/2021	MIDDLE HARBOUR	29	0	NW
YELLOWTAIL KINGFISH	6/10/2021	NORTH SOLITARY ISLAND	29	0	NW
YELLOWTAIL KINGFISH	31/12/2021	PORTLAND (MINERVA REEF)	28	1	E
YELLOWTAIL KINGFISH	28/4/2022	LONG REEF	25	0	NW
YELLOWTAIL KINGFISH	20/7/2021	MIDDLE HARBOUR	24	0	NW
YELLOWTAIL KINGFISH	28/10/2021	SOUTH HEAD	22	7	SE
YELLOWTAIL KINGFISH	11/7/2021	MIDDLE HARBOUR	22	0	NW
YELLOWTAIL KINGFISH	7/11/2021	LONG REEF	22	0	NW
YELLOWTAIL KINGFISH	24/11/2021	BROUGHTON ISLAND	22	0	NW
YELLOWTAIL KINGFISH	24/12/2021	PORTLAND (MINERVA REEF)	22	0	NW
YELLOWTAIL KINGFISH	19/11/2021	LONG REEF	21	4	S
YELLOWTAIL KINGFISH	13/11/2021	SOUTH HEAD	20	6	NE

APPENDIX I: RECAPTURES OF TAGGED FISH REPORTED IN 2021/22 (CONTD)

Species	Date tagged	Release location	Days at liberty	Distance moved (nmi)	Direction
YELLOWTAIL KINGFISH	28/10/2021	SOUTH HEAD	20	0	NW
YELLOWTAIL KINGFISH	20/9/2021	PORT KEMBLA	19	2	S
YELLOWTAIL KINGFISH	26/4/2022	LONG REEF	18	0	NW
YELLOWTAIL KINGFISH	20/11/2021	SYDNEY HARBOUR	16	0	NW
YELLOWTAIL KINGFISH	30/12/2021	PORTLAND (MINERVA REEF)	16	0	NW
YELLOWTAIL KINGFISH	15/1/2022	PORTLAND (MINERVA REEF)	15	0	NW
YELLOWTAIL KINGFISH	28/10/2021	SOUTH HEAD	13	9	S
YELLOWTAIL KINGFISH	17/10/2021	SOUTH WEST ROCKS (FISH ROCK)	13	0	NW
YELLOWTAIL KINGFISH	30/10/2021	PORT AUGUSTA (SA)	13	0	NW
YELLOWTAIL KINGFISH	14/3/2022	LONG REEF	13	0	NW
YELLOWTAIL KINGFISH	13/6/2022	MIDDLE HARBOUR	13	0	NW
YELLOWTAIL KINGFISH	5/11/2021	NORTH HEAD (BLUEFISH POINT)	12	5	N
YELLOWTAIL KINGFISH	1/8/2021	MIDDLE HARBOUR	12	0	NW
YELLOWTAIL KINGFISH	27/4/2022	DEE WHY (SYDNEY)	11	4	ENE
YELLOWTAIL KINGFISH	14/2/2022	BOTANY BAY	11	0	NW
YELLOWTAIL KINGFISH	24/4/2022	THE GAP	10	4	NE
YELLOWTAIL KINGFISH	9/10/2021	PORT AUGUSTA (SA)	9	0	NW
YELLOWTAIL KINGFISH	5/5/2022	LONG REEF	9	0	NW
YELLOWTAIL KINGFISH	6/11/2021	PORT AUGUSTA (SA)	8	0	NW
YELLOWTAIL KINGFISH	16/10/2021	PORT AUGUSTA (SA)	6	0	NW
YELLOWTAIL KINGFISH	10/1/2022	PORT WELSHPOOL	6	0	NW
YELLOWTAIL KINGFISH	28/3/2022	SYDNEY HARBOUR	5	0	NW
YELLOWTAIL KINGFISH	1/10/2021	SOUTH WEST ROCKS (FISH ROCK)	4	0	NW
YELLOWTAIL KINGFISH	7/3/2022	ABROLHOS ISLANDS (13NM NW)	3	0	NW
YELLOWTAIL KINGFISH	21/10/2021	THE GAP	2	1	N
YELLOWTAIL KINGFISH	21/11/2021	SOUTH SOLITARY ISLAND	1	0	NW
YELLOWTAIL KINGFISH	22/8/2021	MIDDLE HARBOUR	0	0	
YELLOWTAIL KINGFISH	2/10/2021	PORT AUGUSTA (SA)	0	0	
YELLOWTAIL KINGFISH	3/10/2021	SOUTH WEST ROCKS	0	0	
YELLOWTAIL KINGFISH	3/10/2021	SOUTH WEST ROCKS	0	0	
YELLOWTAIL KINGFISH	29/10/2021	SANDON SHOALS	0	0	
YELLOWTAIL KINGFISH	10/11/2021	PORT AUGUSTA (SA)	0	0	
YELLOWTAIL KINGFISH	24/2/2022	PORT WELSHPOOL	0	0	
YELLOWTAIL KINGFISH	4/6/2022	LONG REEF	0	0	

APPENDIX II: TOP TAGGING BOATS AND ANGLERS FOR 2021/22

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 2021/022 season. We will continue to develop these end of season summaries and acknowledge the strong supporters of the tagging Program in future years.

Species	Top boat	Runner up boat
Billfish combined	97 – <i>Innkeeper</i> (WA) Exmouth GFC	46 – <i>Chaos</i> (QLD) Sunshine Coast GFC
Black Marlin	56 – <i>Innkeeper</i> (WA) Exmouth GFC	38 – <i>Chaos</i> (QLD) Sunshine Coast GFC
Blue Marlin (International)	19 – <i>Stayed On</i> (PNG) Lae GFC	18 – <i>Rage On</i> (PNG) Lae GFC
Blue Marlin (Australia)	14 – <i>The Wench</i> (WA) King Bay GFC	13 – <i>Innkeeper</i> (WA) Exmouth GFC
Striped Marlin	19 – <i>Dripping Wet</i> (NSW) Canberra GFC	18 – <i>Jambo</i> (NSW) Ulladulla GFC, <i>Shockwave</i> (NSW) Bermagui BGAC
Sailfish	34 – <i>Billseeker</i> (WA) King Bay GFC	33 – <i>Wine Down</i> (QLD) Weipa Billfish Club
Shortbill Spearfish	2 – <i>Cookie</i> (NSW) Port Hacking GFC	1 – <i>Malolo</i> (NSW) Newcastle GFC, <i>Watch This</i> (QLD) Gold Coast GFC
Swordfish	3 - <i>Tagged by Commercial Vessel</i> (NSW)	2 - <i>Rehab III</i> (VIC) South Gippsland GFC, <i>Terminator</i> (TAS) GFC of Northern Tasmania

Species	Top boat	Runner up boat
Shark combined	48 – Goodness (VIC) Orbest Angling Club	28 – Micx (WA) King Bay GFC
Mako Shark	8 – Makajax II (TAS) GFC of Northern Tasmania	4 – Buckled Up (TAS) Southern GFC
Blue Shark	3 – Makajax II (TAS) GFC of Northern Tasmania	2 – Okcaj (NSW) Lake Macquarie GFC, Barzerk (VIC) Warrnambool Offshore FC
Tiger Shark	17 – Triple H (WA) Perth GFC	6 – French Maid (WA) Nickol Bay SFC
Whaler Shark	27 - Micx (WA) King Bay GFC	26 - Tantrum (NSW) Sydney GFC
Hammerhead Shark	4 – Wild Thing (NSW) Newcastle & Port Stephens GFC	3 – Just Eat It (NSW) Shellharbour GFC
Thresher Shark	1 – Dirty Paws (VIC) South Gippsland GFC, Camel Whacker (VIC) Warrnambool Offshore FC	
Tuna combined	175 - Searider (SA) Port MacDonnell Offshore AC	125 – Just A Girl (SA) GFC of South Australia
Yellowfin Tuna	10 – Freedom (NSW) Batemans Bay GFC	9 – Scaly Tail (QLD) Gold Coast GFC
Southern Bluefin Tuna	175 - Searider (SA) Port MacDonnell Offshore AC	125 – Just A Girl (SA) GFC of South Australia
Bigeye Tuna		
Albacore Tuna	19 – Seahog (NSW) Eden S & GFC	5 – Playtime (TAS) GFC of Northern Tasmania

Species	Top boat	Runner up boat
Longtail Tuna	18 - <i>Micx</i> (WA) King Bay GFC	10 - <i>Ocean Hunter</i> (NSW) Ocean Hunter Sports Fishing
Dogtooth Tuna		
Spanish Mackerel	78 - <i>Anarchy</i> (QLD) Mackay GFC	26 - <i>Micx</i> (WA) King Bay GFC
Mahi Mahi	31 - <i>Dramatic</i> (NSW) Port Hacking GFC	20 – <i>Hooked Up</i> (NSW)
Yellowtail Kingfish	178 - <i>Fishabout</i> (NSW) Fishabout Tours	118 - <i>Ocean Hunter</i> (NSW) Ocean Hunter Sports Fishing
Samsonfish	33 – <i>Heat Seeker</i> (SA) GFC of South Australia	15 – <i>Legend</i> (SA)
Species	Top individual	Runner up individual
Billfish	31 - Darryl French (QLD) Weipa Billfish Club	27 – Deb Foster (WA) Exmouth GFC
Shark	49 – Josh Newstead (VIC) Orbost Angling Club	17 – Michael Grasso (WA) King Bay GFC
Tuna	63 - Buddy Cock (SA) Port MacDonnell Offshore AC	62 - Beau Ewens (SA) Port MacDonnell Offshore AC
Seriola	134 - Seamus McCleave (NSW) Fishabout Tours	133 - Zane Levett (NSW) Oceanhunter Sportsfishing

APPENDIX III

SCIENTIFIC PUBLICATIONS UTILIZING OR CITING DATA FROM THE TAGGING PROGRAM

- Osborne, F.E., J.G. Pepperell, R.G. Dwyer, A.D. Olds, D.J. Smith, S.M. Williams and B.L. Gilby. (2023). Changes in the size and distribution of dolphinfish *Coryphaena hippurus* on the Australian east coast. *In Review*
- 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.
- Corrigan, S., A.D. Lowther, L.B. Beheregaray, B.D Bruce, G. Cliff, C.A. Duffy, A. Foulis, M.P. Francis, S.D. Goldsworthy, J.R. Hyde, R. Jabado, D. Kacev, L. Marshall, G.R. Mucientes, G.J.P. Naylor, J.G. Pepperell, N. Queiroz, W.T. White, S.P. Wintner, P.J. Rogers (2018). Population connectivity of the highly migratory shortfin mako (*Isurus oxyrinchus* Rafinesque 1810) and implications for management in the Southern Hemisphere. *Frontiers in Ecology and Evolution*, section Conservation, 6:187, doi: 10.3389/fevo.2018.00187.

- 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.
- Brodie, S., A.J. Hobday, J.A. Smith, C.M. Spillman, J.R. Hartog, J.D. Everett, M.D. Taylor, C.A. Gray and I.M. Suthers. (2017). Seasonal forecasting of dolphinfish distribution in eastern Australia to aid recreational fishers and managers. Deep Sea Research Part II: Topical Studies in Oceanography 140, 222-229
- Heard, M., S. Sutton, P. Rogers and C. Huveneers (2016). Actions speak louder than words: Tournament angling as an avenue to promote best practice for pelagic shark fishing. Marine Policy, 64, 168-173.
- Hillary, R., A. Preece, D. Kolody, K. Evans and C. Davies (2016). Development of an approach to harvest strategy management of internationally managed multi-species fisheries, CSIRO, Hobart, Tasmania, Australia. FRDC Project No 2013/203
- Zischke, Mitchell T., Litherland, Lenore, Tilyard, Benjamin R., Stratford, Nicholas J., Jones, Ebony L. and Wang, You-Gan (2016). Otolith morphology of four mackerel species (*Scomberomorus* spp.) in Australia: species differentiation and prediction for fisheries monitoring and assessment. Fisheries Research 176, 39-47.
- Romanov, E. (2016). A preliminary summary of billfish tagging in the Indian Ocean. Indian Ocean Tuna Commission (IOTC) Working Party on Billfish (WPB) Victoria, Seychelles. IOTC–2016–WPB14–INF01
- Hill, N.J., A.J. Tobin, A.E. Reside, J.G. Pepperell and T.C.L. Bridge (2015). Dynamic habitat suitability modelling reveals rapid poleward distribution shift in a mobile apex predator. Global Change Biology, doi: 10.1111/gcb.13129.
- Brodie, S., A.J. Hobday, J.A. Smith, J.D. Everett, M.D. Taylor, C.A. Gray and I.M. Suthers. (2015). Modelling the oceanic habitats of two pelagic species using recreational fisheries data. Fisheries Oceanography, 24 (5), 463-477.
- Bridge, T., A. Tobin, A. Reside, J. Pepperell and N. Hill (2015). Anglers have helped detect a shift in the habitat of black marlin. The Conversation, December 2, 2015.

- Williams, S., M.B. Bennett, J. G. Pepperell, J.A.T. Morgan and J.R. Ovenden (2015) Spatial genetic subdivision among populations of the highly-migratory black marlin, *Istiompax indica*, within the central Indo-Pacific. Marine and Freshwater Research, <http://dx.doi.org/10.1071/MF14370>
- Holmes, B., J. Pepperell, S Griffiths, F. Jaime, I. Tibbetts and M Bennett (2014). Tiger shark (*Galeocerdo cuvier*) movement patterns and habitat use determined by satellite tagging in eastern Australian waters. Marine Biology, DOI 10.1007/s00227-014-2536-1.
- Moore, A., Hall, K., Khageswor, G., Tracey, S., Hansen, S., Stobutzki, I., Ward, P., Andrews, J., Nicol, S. & Brown, P. (2015). Developing robust and cost- effective methods for estimating the national recreational catch of Southern Bluefin Tuna in Australia, Australian Bureau of Agricultural and Resource Economics and Sciences, Canberra, December. CC BY 3.0.
- Bruce, B. and 24 co-authors (2014). Shark futures: A synthesis of available data on mako and porbeagle sharks in Australasian waters. Current status and future directions – August 2014. FRDC 2011/045 Tactical Research Fund, 137pp.
- Pepperell, J., P. Bolton, A. Welfare and S. Boyd (2013). Forty years of conventional billfish tagging. Successes, failures and lessons learned. Paper presented at the Fifth International Billfish Symposium, Taipei, Taiwan, November 2013.
- Domeier, M.L. and P. Speare. (2012). Dispersal of adult black marlin (*Istiompax indica*) from a Great Barrier Reef spawning aggregation. PLoS ONE 7, e31629.
- Zischke, M.T., Griffiths, S.P. and Tibbetts, I.R. (2012). Catch and effort from a specialized recreational pelagic sport fishery off eastern Australia. Fisheries Research 127-128: 61-72.
- Ghosn, D., D. Collins, C. Baiada and A. Steffe (2012). Catch per unit effort and size composition of striped marlin caught by recreational fisheries in southeast Australian waters. Fisheries Research Report Series No. 30, NSW Dept Primary Industries, 34pp.
- Pepperell, J.G., R.K. Kopf and B.E. Malseed (2011). Use of historic fisheries data to determine trends in relative abundance and body size of sailfish, *Istiophorus platypterus*, off northwestern Australia. Journal of the Royal Society of Western Australia, 94(2), 333-344.
- Miller, P.A., A.J. Fitch, M. Gardner, K.S. Hutson and G. Mair (2011). Genetic population structure of Yellowtail Kingfish (*Seriola lalandi*) in temperate Australasian waters inferred from microsatellite markers and mitochondrial DNA. Aquaculture, 319 (3-4), 328-336.
- Ceccarelli, D.M. (2011). The value of oceanic marine reserves for protecting highly mobile pelagic species: Coral Sea case study. Report prepared for the Protect Our Coral Sea campaign, 36 pp.
- Ward, P, Mazur, K, Stenekes, N, Kancans, R, Curtotti, R, Summerson, R, Gibbs, C, Marton, M, Moore, A & Roach, J. (2012). A socioeconomic evaluation of three eastern Australian game-fishing regions, ABARES report to client prepared for the Fisheries Research and Development Corporation, Canberra, August 2012. CC BY 3.0.
- Pepperell, J. (2010). Fishes of the Open Ocean: A Natural History and Illustrated Guide, UNSW Press.

- Pepperell, J., P. Bolton and A. Welfare (2010). Recreational-based tagging Programs. Utility of release data using black marlin tagging off eastern Australia as a case study. Presented at the International Symposium on Billfish and Tuna Tagging, Chenggong, Taiwan, Nov 7-12, 2010.
- Babcock, E. (2008). Recreational fishing for pelagic sharks worldwide. In: *Sharks of the Open Ocean: Biology, Fisheries and Conservation*, Edited by M. D. Camhi, E. K. Pikitch and E. A. Babcock © 2008 Blackwell Publishing Ltd. ISBN: 978-0632-05995-9
- McLoughlin, K. and G. Eliason (2008). Review of information on cryptic mortality and the survival of sharks and rays released by recreational fishers. Bureau of Rural Sciences, Canberra. SEDAR21-RD-22, 22 pp.
- Hutson, K.S., B.P. Smith, R.T. Godfrey, I.D. Whittington, C.B. Chambers, I. Ernst and B. M. Gillanders. A tagging study on yellowtail kingfish (*Seriola lalandi*) and samson fish (*S. hippos*) in South Australian waters. *Transactions of the Royal Society of South Australia*, 131 (1), 128-134.
- Epe, S., Phillips, K., Hender, J. and Ward, P. (2007). Australian National Tuna Fishery Report presented at the third meeting of the Scientific Committee of the Western and Central Pacific Fisheries Commission, 13–24 August 2007, Honolulu, USA. WCPFC, Pohnpei, Federated States of Micronesia.
- Griffiths, S.P. and Pepperell, J.G. 2006. A preliminary synopsis of existing recreational fisheries data sources and the potential for monitoring recreational fishing activities in Commonwealth fisheries: a discussion paper. Final Report for Project R06/822 to the Australian Fisheries Management Authority, Canberra, pp. 94.
- Campbell, R., T. Davis, B. Edwards, G. Henry, J. Kalish, B. Lamason, J. G. Pepperell and P. Ward (2006). Assessment of black marlin and blue marlin in the Australian fishing zone. Report of the Black and Blue Marlin Working Group. Department of Agriculture, Forestry and Fisheries, Canberra Australia, 190pp. + Appendices.
- Knight, E., Park, T., Bromhead, D., Ward, P., Barry, S. and Summerson, R. (2006) Analyses of interactions between longline and recreational gamefish fisheries taking or tagging striped marlin off New South Wales. Bureau of Rural Sciences. Canberra, 62 pp.
- Bromhead, D., T. Park, E. Lawrence, B. Wise, J. Pepperell and R. Summerton. (2005). Multi-sector indices for striped marlin off eastern Australia. Paper presented at Fourth International Billfish Symposium, Catalina Island, California, November 2005.
- Pepperell J. and D. Bromhead (2004). Review of the domestic recreational fishery for striped marlin. In: *Striped marlin: biology and fisheries*. (Bromhead et al.). Bureau of Rural Sciences: Canberra, Australia, ISBN: 0 642 47593 8, 119-144.
- Bromhead, D, J. Pepperell, B. Wise and J. Findlay (2004). *Striped marlin: Biology and Fisheries*. Bureau of Rural Sciences, Canberra. ISBN: 0 642 47593 8. 260 pp.
- Ward, P. and D. Bromhead (2004). Tuna and billfish fisheries of the eastern Australian Fishing Zone and adjacent high seas. 17th Meeting of the Standing Committee on Tuna and Billfish, Majuro, Marshall Islands, 9-18 August 2004. National Fishery Report, NFR-2. 18 pp.

- Ortiz, M., E.D. Prince, J.E. Serafy, D.B. Holts, K.B. Davy, J.G. Pepperell, M.B. Lowry and J.C. Holdsworth (2003). A global overview of the major constituent-based billfish tagging Programs and their results since 1954. *Marine and Freshwater Research*, 54 (4), 489-507.
- Campbell, R., J. Pepperell and T. Davis (2003). Use of charter boat data to infer the annual availability of black marlin, *Makaira indica*, to the recreational fishery off Cairns, Australia. *Marine and Freshwater Research*, 54 (4), 447-457.
- Lowry, M. and J. Murphy (2003). Monitoring the recreational gamefish fishery off south-eastern Australia. *Marine and Freshwater Research* 54(4) 425 - 434
- Pepperell, J.G. (2003). The potential for sportfish tagging of tunas in the Indian Ocean. Preliminary investigation of regions and scope. Report prepared for the Indian Ocean Tuna Commission, September 2003, 19pp.
- Gillanders, B.M., D.J. Ferrell and N.L. Andrew (2001). Estimates of movement and life-history parameters of yellowtail kingfish (*Seriola lalandi*): how useful are data from a cooperative tagging Programme? *Marine & Freshwater Research*, 52(2) 179 – 192.
- Williams, P.G. and A.W. Whitelaw (2000). Preliminary estimates of annual catches for billfish species taken in commercial and recreational fisheries of the western and central Pacific Ocean. 13th Meeting of the Standing Committee on Tuna and Billfish, Noumea, New Caledonia, 5-12 July 2000. 33pp.
- Pepperell, J.G. (2000). Large scale sportfish tagging Programs: Pros and Cons. Indian Ocean Tuna Commission Proceedings No. 3, 243-248.
- Davis, T., J. Gunn and J. Pepperell (1999). Residence times, exchange rates, migration patterns and behaviour of black marlin in the NW Coral Sea: Pilot study to evaluate interaction between recreational and commercial fishing sectors in Area E. Final Report, Fisheries Research and Development Corporation, FRDC Project 97/113, 29pp.
- Kingsford, M.J. and A. Defries (1999). The ecology and fishery for *Coryphaena* spp. in the waters around Australia and New Zealand. *Scientia Marina*, 63 (3-4), 267-275.
- Campbell, R.A., G.N. Tuck, J.G. Pepperell, and J.W.P. Larcombe (1998). Synopsis on the billfish stocks and fisheries within the western Australian Fishing Zone (AFZ) and the Indian Ocean. Australian Fisheries Management Authority, Canberra, 122pp.
- Speare, P. (1995). Parasites as biological tags for sailfish *Istiophorus platypterus* from east coast Australian waters. *Marine Ecology Progress Series*, 118, 43-50.
- Pepperell, J.G. (1994). Dispersal and homing of black marlin in the southwest Pacific: 25 years of recreational tagging. Proceedings of the 45th Annual Tuna Conference, Lake Arrowhead California, May 23-26 1994, 105.
- Williams, D.McB., M.J. Milicich. and R. Kearney (1993) Trends in marlin abundance and stock composition off Eastern Australia as indexed by catch, effort and tagging data. Draft Final report to ECTUNAMAC. Australian Institute of Marine Science. 81 pp.

- Pepperell, J.G. (1992). A review of tuna and billfish tagging in the eastern Australian Fishing Zone. In: P. Ward (editor), East Coast Tuna and Billfish Research and Monitoring Workshop, 15-16 March 1990, Bureau of Rural Resources, 23-33.
- Speare, P. (1992). A technique for tetracycline injecting and tagging billfish. Bulletin of Marine Science, 51 (2), 197-203.
- Pepperell, J.G. (1992). Trends in the distribution, species composition and size of sharks caught by gamefish anglers off south-eastern Australia, 1961-1990. Australian Journal of Marine and Freshwater Research, 43(1), 213-225
- Pepperell, J.G. (1990). Movements and variations in early year class strength of black marlin *Makaira indica* off eastern Australia. In R. H. Stroud (editor), Proceedings of the second International Billfish Symposium, Kailua-Kona, Hawaii, August 1-5, 1988. Part 2: Contributed Papers, 51-66. ISSN 0161-522X.
- Pepperell, J.G. (1990). The Australian cooperative gamefish tagging Program, 1973-1987: Status and evaluation of tags. Proceedings of the International Symposium and Educational Workshop on Fish Marking Techniques, 27 June - 1 July 1988 Seattle Washington: American Fisheries Society Symposia. 7: 765-774.

CURRENT UNIVERSITY THESES

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

- Hammond, Matthew. Charles Darwin University. Movements and hot-spots of billfish habitat use in the emerging recreational fishing grounds of northern Australia. Ph.D Program.
- 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.

PREVIOUS ANNUAL REPORTS

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 <https://www.dpi.nsw.gov.au/fishing/recreational/resources/fish-tagging/game-fish-tagging/game-fish-tagging-annual-reports>