

WHY WE SHOULD #GiveFlakeABreak



Cover Image: Shark with school of fish by Alex Kydd.

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**Shark
Conservation
Fund**

Aussie sharks and the humble piece of flake

Australian waters are home to one quarter of the world's sharks and rays. More than 320 species live in Australian waters, half of them aren't found anywhere else in the world but in our blue backyard (1).

Aussie sharks end up in our fish and chips shops as the humble serving of 'flake'. Since around the 1920s it's been an Australian staple of many meals at the beach or a Friday night dinner with the family. Despite its popularity, one third of Australians don't know that 'flake' is actually shark meat! (2)

This report surveyed 70 fish and chip shops across Australia that sell shark meat and found that less than one third (29%) of shark meat on offer was labelled as a species.

The rest were labelled generically as 'flake' and in one case, 'boneless baby shark'. Species labelled included, hammerhead, bronze whaler, thresher shark, and the critically endangered school shark.

Why should we #GiveFlakeABreak?

Endangered sharks are being sold as 'flake' and you could be eating/selling them without knowing. Flake should only refer to shark meat from gummy and rig sharks which aren't endangered. Alarming, critically endangered sharks (school sharks, scalloped hammerheads, whitefin swellshark) are legally harvested and can still find a way onto the plate without you knowing (3–5). **There's no legal obligation in Australia to call shark meat for what species it is or where it's from.**

Shark fisheries can be destructive if poorly managed. Gillnets over a kilometre long are used in places like the Great Barrier Reef and throughout southern Australia to harvest sharks. But this indiscriminate fishing method results in the deaths of threatened species of turtles, dolphins, dugongs, seals and protected shark species (e.g. critically endangered grey nurse shark). Sharks are apex predators and are critical to keeping food webs in balance. Without sharks, food webs can potentially become unstable and collapse, compromising the future of the seafood we enjoy.

By giving flake a break, we're giving our endangered sharks some breathing space by sending a loud signal that these species need better protection and we deserve better seafood labelling laws.

How can we make our fisheries better and protect endangered sharks?

The power of your choice can and does influence how our fisheries operate. The first and easiest step is choosing sustainable alternatives using **GoodFish: Australia's Sustainable Seafood Guide**¹ to give threatened and endangered sharks the break they need. Until we can be assured of what is being sold and where it's come from, choosing sustainable alternatives can reduce demand for 'unidentifiable' shark meat, and provide incentive for better fishing practices.

Across 70 fish and shops in Australia that sold shark meat, this survey found that sustainable alternatives are widely accessible with at least 40% of these shops selling a sustainable alternative. Unfortunately, not all shops label where (the local fisher? The same state?) their fish is caught, and we'd encourage you to ask so you can best determine its sustainability using **GoodFish: Australia's Sustainable Seafood Guide**.

Australians are becoming more conscious of their choices, and are increasingly preferring sustainable seafood (6). Seven in 10 Australians would even consider switching from shark meat to sustainable alternatives, once aware of environmental challenges associated with shark fisheries in Australia²(2). What's great is that choosing sustainable alternatives still supports local fish and chip shops and the fishers who do a great job.

+\$2.04 – the average price difference across Australia between a green-listed sustainable alternative or possibly eating an endangered shark. With respect to your state/territory, the average difference for a green-listed sustainable alternative ranges between \$0.64 less in New South Wales and \$4.64 extra in Western Australia.



**The difference
between eating an
endangered shark and a
sustainable alternative.**

¹ Visit goodfish.org.au to help you make sustainable seafood choices.

² Gillnets and longlines are typically used in Australian shark fisheries, gillnets being the predominant method. In 2013 and 2018, gillnet fishing exclusion zones were put in place around endangered Australian sea lion colonies across WA and SA waters, many of which are located in Australia's largest shark fishery, the Southern and Eastern Scalefish and Shark Fishery (SESSF) (7, 8). Queensland's east coast net fishery has had no independent observation of fishing activities since 2012 and can harvest roughly 120,000 (600t) sharks per year, including from the Great Barrier Reef with gillnets up 1.2km long. Underreporting of fishing interactions with threatened marine species is a widely acknowledged issue and for the seven years following 2012, Queensland fisheries are responsible for an estimated 422 dolphins caught when only 5 were reported, 422 dugongs (estimated) against 19 reported, 14,700 turtles (estimated) against 1043 reported, and 26,000 sawfish (estimated) against 7 reported (9). Incremental improvements to sustainability are being made in gillnet fisheries, and in 2019 a Dolphin Mitigation Strategy was released to limit the numbers of dolphins caught by gillnets in the SESSF (10).

Can't we just fix labelling laws?

Changing laws can take several years and this is time some endangered species may not have. The whitefin swellshark was listed as 'Vulnerable' in 2011 and as we learned more about it, it became 'Critically Endangered' in 2019 (3). The school shark was listed as 'Vulnerable' in 2006 and in 2020 became 'Critically Endangered' (4).

In 2014, Australia had a chance to make the accurate labelling of shark meat a legal requirement but failed, and it still remains voluntary today (11). As recently as 2015, DNA results revealed seven of nine retailers in Victoria were selling school shark as gummy shark (12). In 2020, the call for accurate labelling has reignited and while this plays out we need to give sharks the breathing room they need, and improve our fisheries.

What can I do today?

Sign the pledge to #GiveFlakeABreak and choose sustainable alternatives.

It's E.E.Easy - Explore your sustainable options using the GoodFish app, **Enquire** with your fishmonger about alternative seafood options – "What species of flathead is this and where does it come from?", and **Enjoy** truly sustainable seafood knowing you're supporting healthy oceans, the local fish and chip shop, and the fisher who's doing a great job so we can fish for the future.

By pledging to #GiveFlakeABreak, you're joining over 50,000 Shark Champions who are already using their voice to both protect Australia's threatened sharks and have a direct impact on how Australia fishes.

Awesome! I pledge to #GiveFlakeABreak

If you'd like to learn more about sharks and how to help save our endangered species, join over 50,000 supporters and take part in a range of actions at **SharkChampions.org.au**

Whether you're a consumer or retailer and you'd like to learn about Australia's sustainable fisheries, seafood alternatives, or how to be a part of the GoodFish program, get in contact with us at **GoodFish.org.au**



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Food for Thought - Why We Should #GiveFlakeABreak

Australia is a global biodiversity hotspot for sharks and rays (hereafter referred to as 'sharks'), with a quarter of the world's species present in its waters. More than 320 species that call our waters home, half of which are found nowhere else in the world but in Australia (1). Globally, **33% of shark species are threatened with extinction, commercial fishing being their biggest threat (13)**. Sharks are vulnerable to overfishing because they're long-lived and reproduce slowly in low numbers. **Most sharks mature at 10 years old and produce four to six pups every two years (14)**. Put simply, they're fished faster than they can replace themselves.

The population of many Australian shark species are considered to be in a relatively healthy state when compared to most countries, however significant issues remain in our backyard. **Six species of shark are declining** (including tiger (*Galeocerdo cuvier*) and shortfin mako (*Isurus oxyrinchus*) sharks), **18 species are overfished** (including the great white (*Carcharodon carcharias*), scalloped (*Sphyrna lewini*), and great hammerhead (*Sphyrna mokarran*) sharks) (15), and current laws – or lack thereof – still allow the harvest of endangered or critically endangered sharks (including school shark (*Galeorhinus galeus*), whitefin swellshark (*Cephaloscyllium albipinnum*), scalloped hammerhead) for flesh and fins.

We still harvest endangered sharks – legally

Australia continues to legally harvest endangered and critically endangered sharks. A quirk in Australia's environmental laws, the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act), results in a unique category called 'Conservation Dependent' (CD) which legally allows fish to be commercially harvested despite qualifying for endangered or critically endangered under the EPBC Act³, simply because of their commercial value. Of the eight species listed as CD, all are marine fish, and half are sharks including the critically endangered scalloped hammerhead and school sharks. The whitefin swellshark – which only lives in Australian waters – although not EPBC listed, is acknowledged as critically endangered yet is still legally harvested with no fishing rules in place to protect it (15). Despite formal plans in place to assist the recovery of several threatened species of sharks, there have been no measurable recoveries in any species, mainly because these plans are not being actioned (16).

33%

Shark species are threatened with extinction

Most sharks mature at

10yrs

and produce

4-6

pups every

2yrs

6

species of shark are declining and

18

species are overfished

3. For a fish to be CD listed, a management plan (also referred to as a 'strategy') must be put in place, without which the fish's conservation status would be adversely affected. For the list of CD species, see environment.gov.au/epbc/about/epbc-act-lists#species

We're eating endangered sharks and don't know it

Alarminglly, poor seafood labelling and traceability laws in Australia mean endangered sharks are ending up on Australian plates and we don't know it.

One in three Australians are not aware that the humble piece of 'flake' from the fish and chip shop is shark meat, despite half of Australians consuming it at least 'once every few months' (2).

Any shark can be called 'flake' at the point of sale because there is no legal obligation to accurately label cooked shark meat (or other fish) nor its origin (source) in places like fish and chip shops, cafes, pubs or restaurants (11). This is despite the Australian Fish Names Standard (AFNS) indicating that 'flake' should only reference two sharks, gummy (*Mustelus antarcticus*) and rig (*Mustelus lenticulatus*) sharks (17), both of which are not endangered.

Not knowing what shark we're eating is problematic when critically endangered sharks (scalloped hammerhead, school shark, whitefin swellshark) are harvested from Australian waters and can be marketed as 'flake'. Furthermore, not knowing the source of shark meat means you could also be causing environmental damage elsewhere - an unsustainable South African shark fishery which is overfishing critically endangered school shark (also known as 'tope' or 'soupfin'), exports this and other shark meat to Australia (18), and is possibly responsible for the disappearance of the famous 'flying' white sharks in False Bay (Fig 1)^{4, 5}.

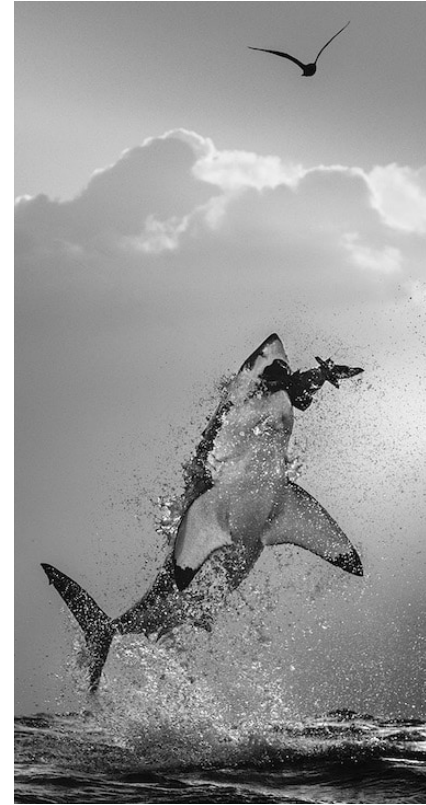
We don't know what we don't know

Making an informed choice aided by accurate seafood labelling is currently not possible. The system is broken between the boat and the plate – fishers record what they catch and at some or several points in the supply chain, information is lost or difficult to access, and often the retailer is none-the-wiser or at worst, complicit. Making the AFNS mandatory would go a long way to resolve the current issues aforementioned. However, fixing labelling and improving protection for endangered sharks is not possible without public support and direct action.

The aim of #GiveFlakeABreak is to raise awareness for the protection of our endangered sharks by considering sustainable alternatives.

Voting with our mouths, choosing sustainable seafood, and supporting conservation initiatives will drive positive change that supports local retailers, local fishers, and the protection and recovery of Australia's threatened shark species.

To achieve this aim, the report investigates the availability of sustainable alternatives to shark meat across 70 of Australia's most popular & award-winning fish and chip shops. Using GoodFish: Australia's Sustainable Seafood Guide, we offer consumers and retailers solutions to further promote the sustainable consumption of seafood and protection of Australia's threatened shark species.



Above: Figure 1.
The Final Act by Chris Fallows.
A South African white shark performing its famous breaching behaviour

4. Imports of shark flesh from South Africa between 2015-19 increased by more than threefold starting at 233 tons in 2015 and reaching 813 tons in 2019, which coincidentally aligned with the first (and continued) absence of white sharks in False Bay in 2015. Imports of shark meat to Australia from South Africa were absent prior to 2015. Data recording export and import data between 2012 and 2019 was obtained by request in September 2019 from the Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES).
5. There has been widespread international media coverage of the possible link between overfishing and the disappearance in white sharks; See ABC News (<https://www.abc.net.au/news/2020-05-02/false-bay-great-white-sharks-australian-fish-and-chips-flake/12172090>), Forbes (<https://www.forbes.com/sites/melissacristinamarquez/2020/05/04/missing-south-african-great-white-sharks-the-reason-australian-appetites>), and Yale Environment 360 (<https://e360.yale.edu/features/shark-mystery-where-have-south-africas-great-whites-gone>).

Methodology

Selecting retailers for analysis

Ten leading retailers were sampled from each Australian state/territory by using the 'Top 40 People's Choice Awards' in the Australian Fish & Chips Awards (hereafter referred to as 'Awards') (19). To be eligible for sampling, each retailer had to have at least one shark meat offering.

Where a total of 10 retailers could not be obtained from the Awards list (e.g. not enough eligible retailers listed, menus of eligible retailers not available online, eligible retailers ceased operating) additional retailers were randomly selected in the respective state/territory via Google search or were accessed in person. A total of 10 retailers (5 x New South Wales (NSW); 1 x Queensland (QLD); 4 x Northern Territory (NT)) were sourced outside of the Awards list.

Only cooked fish were selected from retailers' menus for determination of their sustainability, availability, and price (per serving) comparisons.

Shark meat and species labelling

In Australia, 'flake' is used as a generic term for shark meat and any instances of species-specific labelling of shark meat were recorded and calculated as a proportion of all shark meat on offer.

Determining the sustainability of fish sold

Fish sold by retailers were ranked for their sustainability using GoodFish: Australia's Sustainable Seafood Guide which identified species as either green ('Better Choice'), amber ('Eat Less') or red ('Say No').

Where a fish can have mixed ratings (because the species and/or source fishery could not be identified from the menu description) and one of those ratings is green, we identified the fish as 'potentially-green-listed'. An example includes 'flathead' which has mixed ratings that includes dusky flathead (green) and deepwater flathead (amber) species.

If a fish had mixed ratings but the retailer explicitly advertised the product on the menu as 'local', the

assumption was made that 'local' referred to the state/territory of the retailer and the fish was rated accordingly. An example includes 'local' snapper sold by a Victorian retailer which would then be ranked as green (versus Western Australia (WA) = amber, NSW/QLD/New Zealand = red). Although 'local' is vague and can also refer to 'Australia' rather than a state or regional town, for the purpose of this report the benefit of the doubt was applied in the retailer's favour.

Where a rating could not be determined, the fish was still recorded and was only accounted for when calculating the total number of fish on offer across retailers.

Analysis of availability and price of fish on offer

To provide an indication of the availability of sustainable alternatives, the number of retailers which sold green and potentially-green-listed fish were calculated as a proportion of the total retailers sampled by state/territory. To provide an indication of the popularity of sustainable alternatives, green and potentially-green-listed fish were calculated as a proportion of the total amount of fish on offer available by state/territory. Fish that did not have a sustainability rating were only included in the calculating total number of fish on offer.

Prices of a single serve of cooked fish on offer were averaged across state/territory by their sustainability category, and also separately for shark meat. Where fish were only priced 'with chips' and not individually, the minimum value of chips in the respective retailer was subtracted from the total price. Where the price of fish was 'by weight' or 'market price' the fish was counted as an offering in the respective sustainability category, but was not included in price calculations. The averages were used to calculate the difference between shark meat and both green and potentially-green-listed alternatives. The top three fish on offer for both green and potentially-green-listed categories were also calculated with respect to each state/territory.

Results

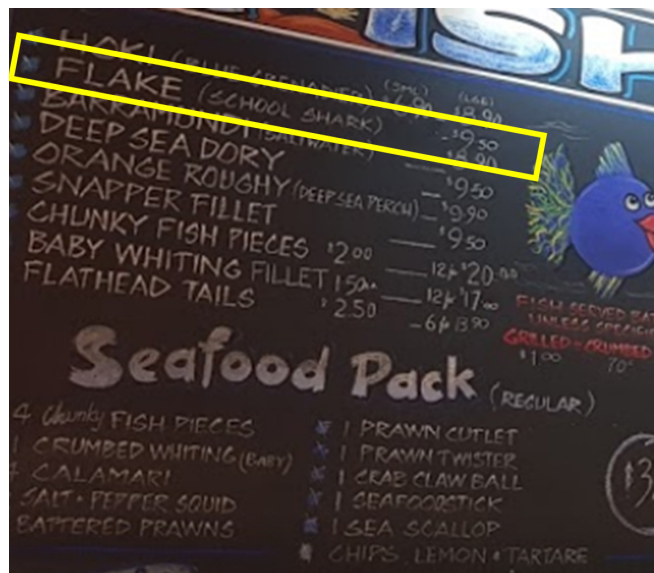
'Flake' vs species-specific labelling

Nearly three quarters (71%) of shark meat on offer across Australia was labelled using the generic term 'flake' or a variant such as 'baby boneless shark' which was used by one NSW retailer. (Fig. 2).

Ten of the 76 shark meat offerings across Australia were labelled as a range of species other than gummy shark (school shark, sawshark (*Pristiphorus spp.*), thresher shark (*Alopias spp.*), elephant fish (*Callorhynchus milii*), seven gill shark (*Notorhynchus cepedianus*), blacktip shark (x2; *Carcharhinus tilstoni*, *Carcharhinus limbatus*, *Carcharhinus melanopterus*), bronze whaler (x2; *Carcharhinus plumbeus*) and hammerhead shark (*Sphyrna spp.*), and an additional twelve offerings were labelled as gummy shark.

Tasmania (TAS) and Western Australia (WA) were the only states to label a variety of species other than gummy shark – three retailers in WA (bronze whaler and hammerhead), and one retailer in TAS (sawshark, thresher shark, elephant fish, seven gill shark).

One shop in NSW explicitly and incorrectly referred to 'flake' as school shark.



Below: Figure 2. Retailer selling shark meat as "boneless baby shark" (yellow box).

Above: Figure 3. NSW retailer incorrectly labelling 'flake' as endangered school shark (yellow box). Flake should only refer to gummy or rig sharks which are not endangered.

FISH & CHIPS		COOKED FISH (battered or crumbed)		
House Fish & Chips for 1	\$9.90	Flathead Fillets	\$13.90	Fish
Barramundi Fish & Chips for 1	\$13.90	Whiting (crumbed only)	\$13.90	Cal
Family Pack (Serves 4)	\$38.00	Perch Fillets	\$13.90	Salt
6 Boneless Fish Cocktails (no chips)	\$9.90	Boneless Baby Shark	\$11.90	Tha
		Leatherjacket	\$11.90	Gar
		CHIPS		BBC
		Small	\$4.50	Half
		SALADS		
		Garden	\$5.50	

RESULTS

Availability of green-listed, and potentially-green-listed fish

The highest proportion of retailers by state/territory that offer green-listed fish were South Australia (SA) and WA, both at 70% (Fig. 4). TAS and QLD were the only state/territory to have no retailers with green-listed fish (Fig. 4). The highest contribution of green-listed fish to the total amount of fish on offer was 19% in WA (Fig. 5).

The proportion of retailers selling potentially-green-listed fish ranged from 40% in WA to 100% in TAS (Fig. 4). The contribution of potentially-green-listed fish to the total amount of fish on offer ranged between 14% (SA) and 32% (NSW) (Fig. 5).

The maximum potential number of sustainable alternatives (i.e. green + potentially-green combined) on offer averaged 31% \pm 2.63 across Australia, ranging between 17% (TAS) and 38% (Victoria; VIC) (Fig 5).

See Appendix Table 1 for comprehensive breakdown of availability by state/territory.

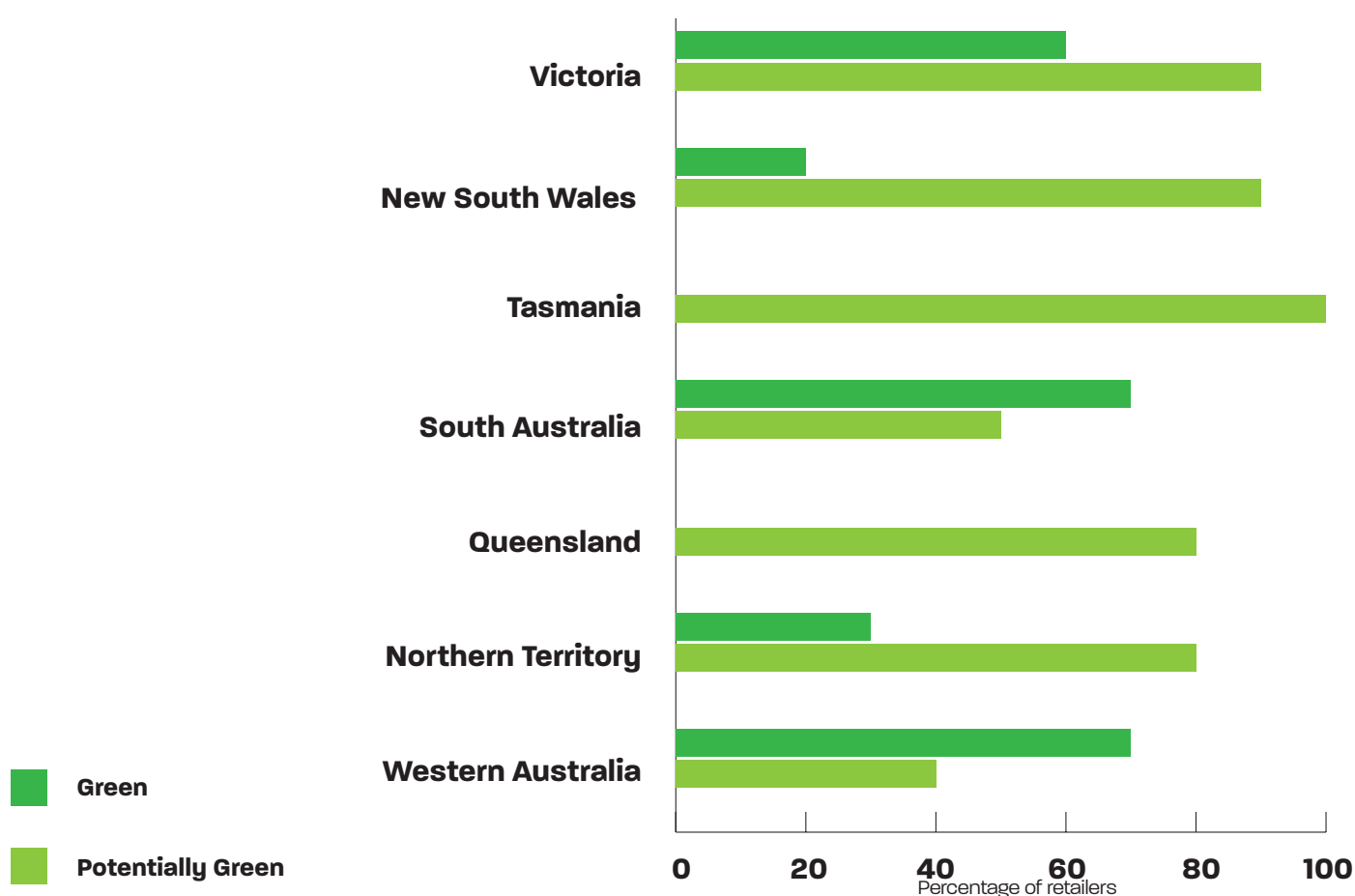


Figure 4: Availability of sustainable alternatives to shark meat indicated by proportion of retailers selling at least one green or potentially green option

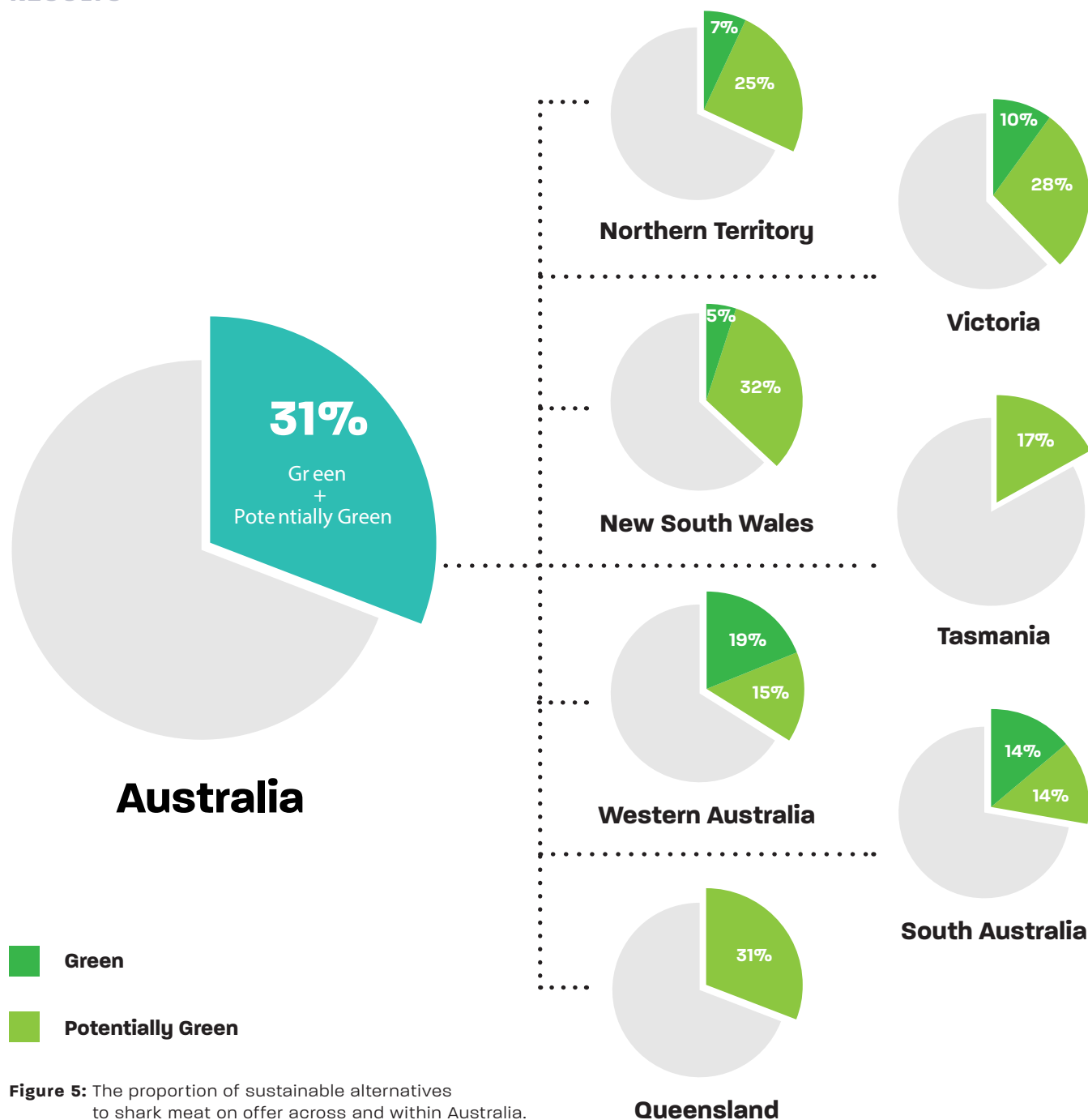


Figure 5: The proportion of sustainable alternatives to shark meat on offer across and within Australia.

Average (\pm standard error) price comparisons (single serve) of shark meat vs green and potentially-green-listed alternatives

The difference in average prices of a green-listed fish compared to shark meat ranged between $-\$0.68$ (NSW) and $+\$4.64$ (WA).

The difference in average prices of potentially-green-listed fish serving compared to shark meat ranged between $-\$0.05$ (WA) and $+\$2.99$ (NSW).

The average price difference across states/territory between shark meat and green-listed fish was $+\$2.04$ (± 0.90).

The average price of shark meat ranged between $\$7.13 \pm 0.16$ (SA) and $\$11.84 \pm 0.50$ (WA).

The average price of a green-listed fish ranged between $\$8.88 \pm 0.19$ (VIC) and $\$16.48 \pm 1.30$ (WA).

The average price of a potentially-green-listed fish ranged between $\$8.86 \pm 0.59$ (SA) and $\$13.51 \pm 0.67$ (NSW)

See Appendix Table 1 for a comprehensive breakdown of prices by state/territory.

Discussion

Accessibility of sustainable alternatives to shark meat

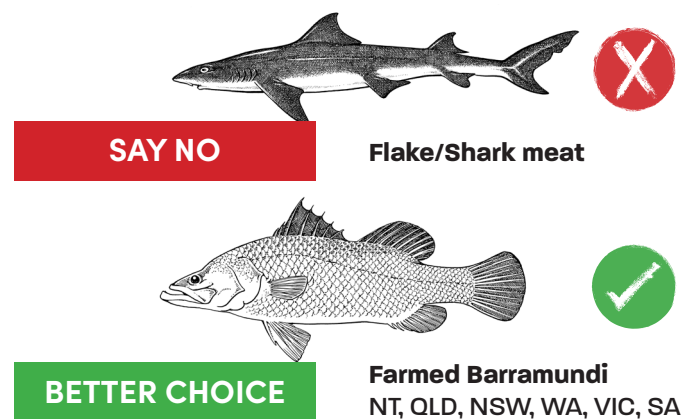
Sustainable alternatives to shark meat are not only widely available but are also popular with consumers. At least 40% of retailers in any given state/territory have sustainable options, with a third of all fish on average being either green or potentially-green-listed. Although the proportion of green-listed fish on offer varied widely by state/territory, it's possible that the proportions are underestimated and the scope of green-listed species available is greater than we surveyed.

Providing more informative and accurate labelling by species and source is critical to informing consumers of sustainable options. For example, clarifying what species of 'flathead' and specifying what 'local' specifically refers to (regional/state/Australian) can resolve ambiguity in species with mixed sustainability ratings. Furthermore, such labelling allows retailers to promote and support local (regional/state) fishers. In QLD, consumers were willing to pay an average of 11% more for seafood if it came from a QLD fisher (20). Currently, in the absence of a retailer being able to confidently determine the species of fish, labelling its source fishery by state/territory at a minimum can assist consumers in choosing sustainable alternatives.

The value of sustainable alternatives to shark meat

Half of Australians are willing to pay more for sustainable seafood (6), reflective of a growing global trend whereby eight in 10 people are willing to take further action to support healthy oceans (21). When looking specifically at consumer attitudes towards shark meat, seven in 10 Australians would consider switching from shark meat to sustainable alternatives, once aware of environmental challenges - including the trade and consumption of endangered sharks - associated with shark fisheries in Australia⁽²⁾.

The price differences between shark meat and green-listed alternatives in most states is primarily driven by King George whiting (*Sillaginodes punctatus*) – a fish which typically is a premium offering rather than a volume offering like 'flake'. However, in NSW a green-listed alternative was cheaper than shark meat by an average of 70 cents and the fish offerings were varied, including luderick (*Girella tricuspidata*), bream (*Acanthopagrus australis*), and mullet (*Mugil cephalus*) (Appendix Table 1). Compared to green-listed offerings, potentially green-listed offerings were more varied in species and the price difference with shark meat across Australia was generally lower (Appendix Table 1; 2). In short, reducing the price difference of sustainable alternatives with shark meat can be achieved by offering a wider variety of sustainably sourced fish species. Furthermore, Australian salmon (*Arripis trutta*, *Arripis truttaceus*) or farmed barramundi (*Lates calcarifer*) can be sold at a similar price point to shark meat, are green-listed and can be widely sourced across Australian waters making them ideal candidates to be swapped in for flake as a product in fish and chip shops.



Interestingly, the disruption caused by COVID-19 in the seafood supply chain in 2020, combined with the change in demand for directly sourced product, could further lower the cost for seafood lovers whilst boosting profits for fishers and retailers. Digital platforms for example are facilitating easier access and a more direct connection to fishers for consumers and retailers, reducing the need for multiple intermediaries (processor, wholesaler etc.).

6. Gillnets and longlines are typically used in Australian shark fisheries, gillnets being the predominant method. In 2013 and 2018, gillnet fishing exclusion zones were also put in place around endangered Australian sea lion colonies across Western Australian and South Australian waters, many of which are located in Australia's largest shark fishery, the Southern and Eastern Scalefish and Shark Fishery (SESSF) (7, 8). Queensland's east coast net fishery has had no independent observation of fishing activities since 2012 and can harvest roughly 120,000 (600t) sharks per year, including from the Great Barrier Reef with gillnets up 1.2km long. Underreporting of fishing interactions with threatened marine species in Queensland is a widely acknowledged issue and for the seven years following 2012, Queensland fisheries were responsible for an estimated 422 dolphins caught when only 5 were reported, 422 dugongs (estimated) against 19 reported, 14,700 turtles (estimated) against 1043 reported, and 26,000 sawfish (estimated) against 7 reported (9). Incremental improvements to sustainability are being made in gillnet fisheries, and in 2019 a Dolphin Mitigation Strategy was released to limit the numbers of dolphins caught by gillnets in the SESSF (10).

DISCUSSION

This provides opportunities for fishers to receive greater profit margins and a reduction in costs being passed onto consumers by retailers. Consequently, the lowering of price barriers can further incentivise not only the volume and variety of sustainable alternatives on offer, but most importantly, the continual improvement in sustainable fishery practices.

Can shark meat be sustainable?

Some, albeit few species, have been identified as candidates for sustainable harvest (e.g. blacktip shark, spot-tail shark, gummy sharks) (22). However, to be an environmentally sustainable shark fishery, necessary and sufficient resources must be provided and directed to the appropriate fisheries. These resources are to not only to manage a harvested shark species, but also to sufficiently mitigate broader environmental impacts such as protecting other threatened and endangered species (e.g. seals, dolphins, turtles) incidentally caught, and allowing their populations to recover as quickly as possible. Australia has the potential to do so but is not there yet. What is desperately needed, at least at the outset, are clearer environmental and labelling laws which foster ecologically sustainable outcomes, and adequate funding to support the recovery of threatened species impacted by commercial fishing.

Gummy shark is claimed as 'sustainable' in Australia, however this is misleading. Although gummy shark numbers are well managed in Australia, its harvest currently comes at the cost of the critically endangered school shark whose numbers have declined in Australian waters by around 90%⁷. Although a recovery plan for school shark was implemented in 2010, it projected school shark to take another 66 years to climb back to 20% of its original biomass while allowing for gummy shark fishing to continue. To date, the school shark has shown no measurable recovery (16) and indications from latest population assessments suggest a high degree of uncertainty that school shark will meet its 20% target (23). For gummy shark to be 'green-listed' it would have to be fished in a way that allows school shark to recover to healthy numbers (i.e. >20%) considerably faster⁸, and possibly transition to a shark fishery using longlines rather than gillnets so that school shark thrown back have a much better chance of survival (25, 26).

A claim of 'sustainably sourced shark' is redundant if, at the end point, a consumer cannot tell what species it is and where it comes from. The accurate labelling of shark meat (cooked or otherwise) at the point of sale by species and fishery-source must be enforced by law to ensure confidence for both the consumer and retailer. A NSW retailer in this survey incorrectly labelled school shark as 'flake' (Fig. 3), and DNA tests of shark meat in 2015 identified seven of nine stores in VIC selling school shark as gummy shark (12). Under current laws and practices, one cannot confidently differentiate between a blacktip shark or a critically endangered scalloped hammerhead sold in QLD, nor can one be assured that their flake is gummy shark sourced from a small-scale local hook-and-line fisher in VIC, or if it is an imported and endangered shark from South Africa. Mandating the use of the AFNS can help achieve accurate labelling laws for shark meat in Australia. At the time of writing, elements of labelling laws were being discussed again, with calls for country of origin labelling to be extended to restaurants serving cooked seafood - if mandated, you would at least know if you were selling or eating endangered 'flake' from South Africa (18, 27).

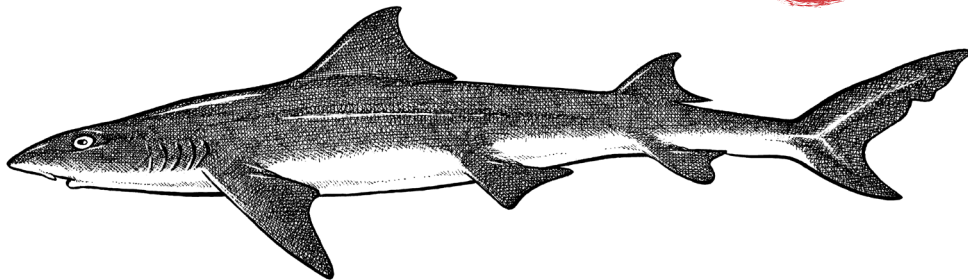
In conclusion...

Consumers and retailers don't know what they don't know and are thus limited in making informed choices. For shark meat in particular, despite some fisheries improving their sustainable fishing practices, the inability for consumers to confidently distinguish species - including endangered species - or their source makes any current claims of sustainability redundant. Fixing environmental laws to better protect endangered species, and mandating the accurate labelling of shark meat and its origin using the existing AFNS is critical in allowing Australians to exercise their desire in making ethical and responsible choices. It would also support sustainable fishing practices. Until these challenges are resolved, sustainable alternatives to shark meat are readily available and popular, providing opportunities for consumers and retailers alike to support a resilient environment and fisheries into the future.

7. The vast majority (1,775 t) of gummy shark are caught from Australia's largest shark fishery, the SESSF which predominantly uses gillnets. Up to 195 t of school shark is allowed to be caught as 'unavoidable' bycatch when fishing for gummy shark. The school shark bycatch was worth \$1.87 million in 2017-18 (16) and there is evidence that deliberate targeting of the species may have been occurring in recent years (24).
8. At the time of writing, the school shark recovery plan is currently being reviewed by the Federal Government, Australian Fisheries Management Authority and a range of stakeholders. We hope that the school shark's recovery time frame is significantly shortened from 66 years to a period whereby at least 20% of its original biomass can be reached within the lifetime of anyone reading this document (at the time of writing).

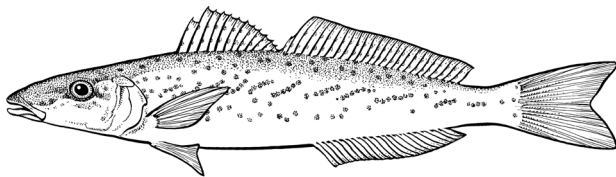
Commonly Available Sustainable Alternatives

SAY NO



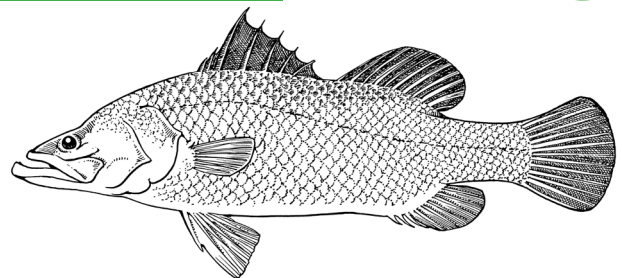
Flake/Shark meat

BETTER CHOICE



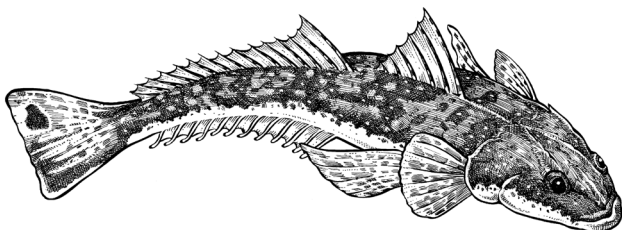
King George Whiting
WA, VIC, SA

BETTER CHOICE



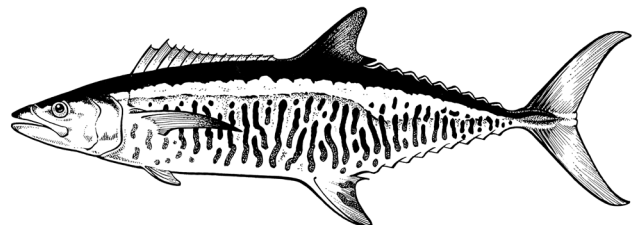
Farmed Barramundi
NT, QLD, NSW, WA, VIC, SA

BETTER CHOICE



Dusky Flathead
NSW, VIC

BETTER CHOICE



Spanish Mackerel
NT, QLD, WA

Solutions that protect endangered sharks and support sustainable fishing into the future.

Consumers can...

- Avoid eating endangered sharks and pledge to #GiveFlakeABreak.
- Remember it's E.E.Easy – Explore a range of options using GoodFish. Enquire with your retailer and select their green-listed alternatives. Enjoy your meal knowing you're supporting a healthy ocean, the local shop, and responsible fishers for the future.
- Support shark conservation initiatives like Shark Champions⁹ that improve the overall sustainability of Australian fisheries.
- Support the accurate labelling of seafood, including species name and its source fishery.

Retailers can...

- Stock green-listed species, sourcing from local fishers where possible.
- Let your customers know exactly where your fish comes from.
- Reach out to GoodFish and have a chat about how you can improve the sustainability of your offerings.



Figure 6. Sustainably harvested King George whiting from Victoria. Image by AMCS.

9. Shark Champions is a national campaign led by Australian Marine Conservation Society and the Humane Society International. Become a Shark Champion at sharkchampions.org.au

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Appendix

Table 1. Average price comparisons of shark meat to alternatives by state/territory, including the proportions of retailers and of fish on offer by sustainability category.

STATE/ TERRITORY	SHARK MEAT + SUSTAINABILITY RATING OF FISH	AVERAGE PRICE (± S.E.)	DIFFERENCE IN AVERAGE PRICES (\$) WITH SHARK MEAT	PROPORTION OF RETAILERS (%)	PROPORTION OF FISH ON OFFER (%)*
Victoria	Shark meat	7.85 (0.44)			
	Green	8.88 (0.19)	1.03	60	10
	Potentially Green	9.60 (0.69)	1.75	90	28
	Combined (Green + Pot. Green)				38
	Red#	9.54 (0.68)	1.69	100	33
New South Wales	Shark meat	10.53 (0.67)			
	Green	9.85 (0.83)	- 0.68	20	5
	Potentially Green	13.51 (0.67)	2.99	90	32
	Combined (Green + Pot. Green)				37
	Red#	11.47 (0.97)	0.94	10	30
Tasmania	Shark meat	8.13 (0.44)			
	Green				
	Potentially Green	9.37 (0.76)	1.23	100	17
	Combined (Green + Pot. Green)				17
	Red#	10.79 (1.23)	2.66	100	38
South Australia	Shark meat	7.13 (0.16)			
	Green	9.22 (0.67)	2.10	70	14
	Potentially Green	8.86 (0.59)	1.73	50	14
	Combined (Green + Pot. Green)				29
	Red#	6.71 (0.59)	- 0.42	100	50
Queensland	Shark meat	8.67 (0.52)			
	Green				
	Potentially Green	9.25 (0.69)	0.58	80	31
	Combined (Green + Pot. Green)				31
	Red#	11.52 (0.59)	2.85	100	38
Northern Territory	Shark meat	9.54 (0.52)			
	Green	12.67 (2.62)	3.12	30	7
	Potentially Green	11.22 (0.77)	1.68	80	25
	Combined (Green + Pot. Green)				32
	Red#	9.99 (0.77)	0.45	100	41
Western Australia	Shark meat	11.84 (0.50)			
	Green	16.48 (1.30)	4.64	70	19
	Potentially Green	11.79 (1.06)	-0.05	40	15
	Combined (Green + Pot. Green)				33
	Red	9.53 (0.74)#	-2.31#	100	39

*Fish with 'Amber' 'Amber/Red' or 'unknown' ratings are not reported here but contribute to the total number of fish (and their respective ratings) calculated. Their collective contribution can be considered as the summed percentage of 'Combined' and 'Red' subtracted from 100%.

#Excludes shark meat which is red-listed

APPENDIX

Table 2. Top 3 alternative fish per category (by proportion on offer in category) compared to shark meat by state/territory.

STATE/ TERRITORY	SUSTAINABILITY RATING	TOP 3 FISH (% OFFERINGS)	AVERAGE PRICE (± S.E.)
Victoria	Shark meat		7.85 (0.44)
	Green	King George Whiting (75)	8.88 (0.19)
		Snapper (12.5)	n/a*#
		Dusky flathead (12.5)	n/a*#
	Potentially Green	Barramundi (32)	9.96 (1.12)
		Flathead (27)	9.16 (2.01)
		Snapper (23)	9.96 (1.31)
New South Wales	Shark meat		10.53 (0.67)
	Green	Bream (25)	8.50##
		Luderick (25)	10.50#
		Mullet (25)	8.50#
	Potentially Green	Flathead (29)	13.22 (1.43)
		Barramundi (25)	11.45 (1.30)
		Snapper (17)	14.31 (1.94)
Tasmania	Shark meat		8.13 (0.44)
	Green	n/a	n/a
	Potentially Green	Flathead (80)	9.08 (0.65)
		Barramundi (10)	14.00#
		Whiting (10)	7.00#
South Australia	Shark meat		7.13 (0.16)
	Green	King George Whiting (75)	9.88 (0.69)
		Barramundi - farmed (12.5)	7.5#
		Yelloweye mullet (12.5)	7.00#
	Potentially Green	Barramundi (37.5)	9.50 (1.39)
		Flathead (37.5)	7.80 (0.62)
		Whiting (12.5)	9.50#
Queensland	Shark meat		8.67 (0.52)
	Green	n/a	n/a
	Potentially Green	Snapper (32)	10.48 (0.78)
		Barramundi (25)	10.97 (0.99)
		Whiting (28)	7.34 (1.47)
Northern Territory	Shark meat		9.54 (0.52)
	Green	Spanish Mackerel (50)	11.00 (3.5)
		King George Whiting (50)	16.00#
	Potentially Green	Barramundi (37.5)	13.91 (0.77)
		Snapper (33.3)	10.19 (0.46)
		Whiting (26.7)	8.48 (1.44)
Western Australia	Shark meat		11.84 (0.50)
	Green	King George Whiting (50)	17.20 (1.71)
		Spanish Mackerel (40)	13.73 (0.63)
		Red Emperor (10)	23.90#
	Potentially Green	Barramundi (50)	12.30 (1.58)
		Snapper (37.5)	9.70 (0.36)
		Emperor (12.5)	16.00#

*Menu price determined by market price

#Single offering, no average available.

