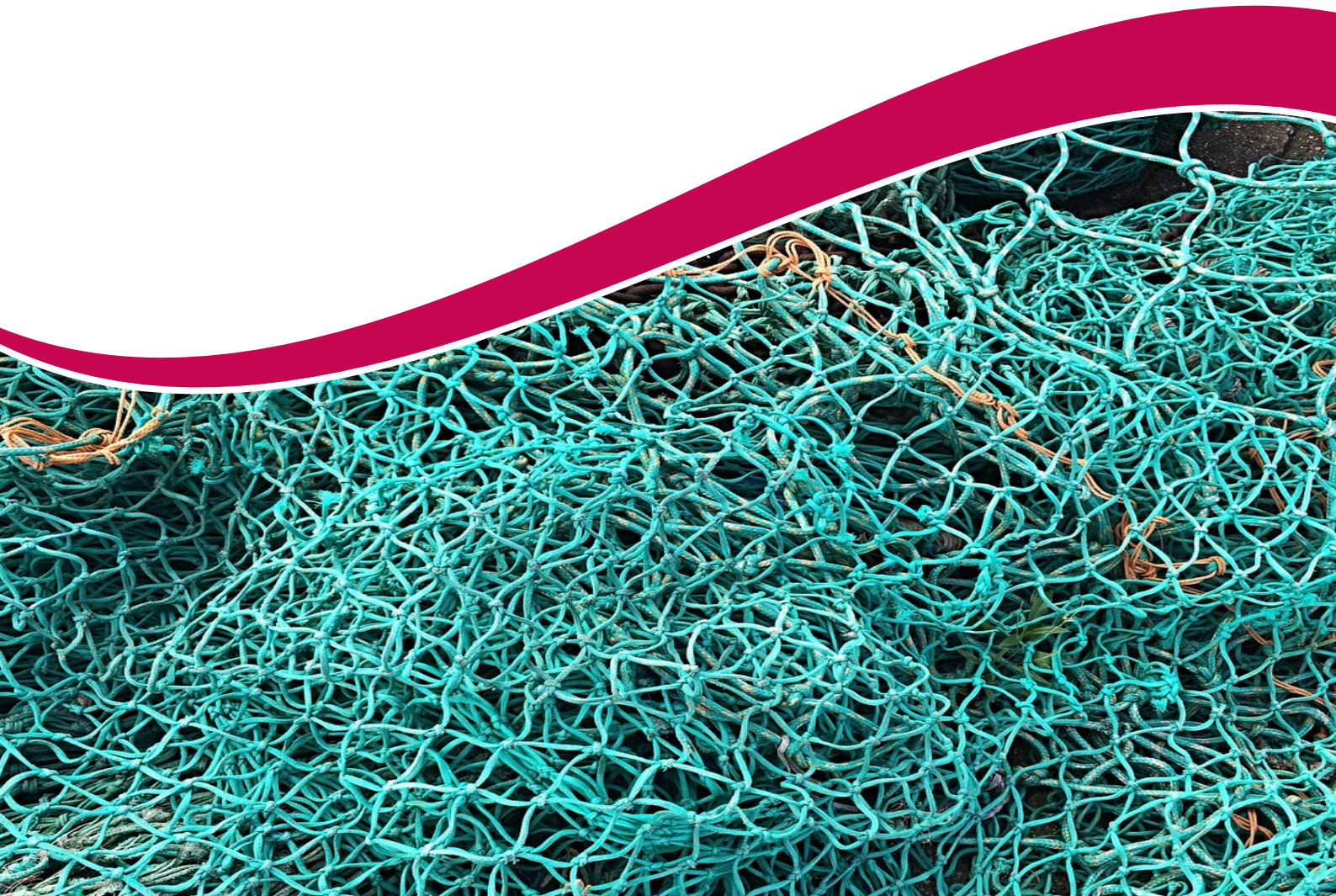
Australian Government

Australian Fisheries Management Authority

Coral Sea Fishery

2020-21 Trigger report



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1. Purpose of the report

The purpose of the Trigger Report is to assess logbook catch and effort data for the Coral Sea Fishery (CSF) against the trigger limits detailed in harvest strategies for each respective CSF fishing sector. There are currently four sectors in the CSF: Line (previously Trawl, Trap and Line); Aquarium; Hand Collection (sea cucumber) and Lobster and Trochus. For the 2020-21 fishing year, no effort occurred in the Lobster and Trochus sector hence this sector is not included in the report.

Harvest strategies for the CSF sectors can be found on the AFMA website: https://www.afma.gov.au/sustainability-environment/harvest-strategies.

2. Line Sector

The line sector of the CSF landed 14.4 tonnes of fish during the 2020-21 fishing year (1 July- 30 June), 14 per cent more than 2019-20 (12.6 tonnes), and 44 per cent less compared to 2019-19 (25.7 tonnes). Effort has declined since 2018-19, with 87 689 hooks set in 2020-21, 32 per cent less compared to 2019-20 (128 871 hooks set) and 57 per cent less compared to 2018-19 (204 046 hooks set). Table 1 outlines the catch and effort in the line sector for the past three fishing seasons.

Overall, there has also been a declining catch trend in recent years, from 25 tonnes in 2018-19 to 12.6 tonnes in 2019-20 with a slight increase to 14.4 tonnes in 2020-21. This reduction in catches, reflect an overall decline in effort in the sector, rather than a decline in biomass. A number of factors has influenced the decline in effort. Fishing effort in the CSF is constrained generally by the long distance from shore to fishing grounds and weather. Operators in the fishery also tend to fish primarily in other fisheries which means effort in the CSF is dependent on how much or how little they are fishing in other fisheries. More recently, declining effort is also partially attributed to the removal of fishing grounds with the implementation of the Coral Sea Marine Park on 1 July 2018. The COVID-19 pandemic since early 2020 is also understood to have had impacts on export markets and therefore fishing effort.

Table 1 Catch and effort for the Line sub-fisheries over the past three seasons

	Catch (tonnes)			Effort (number of hook set)		
	2018-19	2019-20	2020-21	2018-19	2019-20	2020-21
Line	25	12.6	14.4	204 046	128 871	87 689

Of the 14 species caught in total in 2020-21, only seven species had catches greater than 0.1 tonne and of these, only two had catches greater than one tonne. The top ten species by weight for the last three season are listed in Table 2.

Table 2 The top ten species caught by weight (tonnes) in the line sector of the Coral Sea Fishery for 2018-19, 2019-20 and 2020-21.

2018-19		2019-20		2020-21	
Species	Weight (t)	Species	Weight (t)	Species	Weight (t)
flame snapper	10.5	flame snapper	10.2	flame snapper	9
rosy snapper	3	long tail rubbies/snapper	1.2	blue-eye trevalla	3.9
bar rockcod	2	bar rockcod	0.4	long tail rubies/snapper	0.6
ruby snapper	1.7	ornate jobfish	0.3	amberjack	0.3
amberjack	1.6	amberjack	0.2	bar rockcod	0.2
long tail rubies/snapper	1.3	imperador	0.1	ornate jobfish	0.2
paddletail seabream	1	ruby snapper	0.06	rusty jobfish	0.1
blue-eye trevella	0.6	rosy snapper	0.03	redbait (mixed)	0.04
gummy shark	0.5	blotched bigeye	0.008	oblique-banded snapper	0.1
ornate jobfish	0.4	emperor	0.006	saddletail snapper	0.04

The Triggers

Triggers and the associated management response for the Line sector are outlined in the Line, Trap and Trawl Harvest Strategy (noting the trawl and trap sectors no longer exist).

Overarching catch trigger

i. *Must be less than total highest catches across the main species caught to date. A 'main species' is a species that has an average catch over 1 tonne over a five year period.*

In 2020-21 four species, flame snapper, rosy snapper, bar rockcod and ruby snapper, fell into the category of a 'main species' and the catch in 2020-21 did not trigger a Level 1 response.

ii. Overarching Level 1 trigger for total fishery catch: 450 t
iii. Overarching Level 2 trigger for total fishery catch:1000 t

Total catch for the line sector for 2020-21 was 14.4 tonnes, well below the Level 1 trigger.

Species- specific triggers (high risk/ vulnerable AND key species)

There was no reported interaction with any protected species under the species-specific triggers category in 2020-21.

Whitetip reef shark

i. *Level 1: 2.5 tonnes (1/6 historical high catch)*
ii. *Level 2: 5 tonnes (1/3 historical high catch)*

There was no whitetip reef shark reported by the line sector in the 2020-21.

Grey reef shark

i. *Level 1: 13 tonnes (1/2 historical high catch)*
ii. *Level 2: 26 tonnes (historical high catch)*

There was no grey reef shark reported by the line sector in the 2020-21 fishing season.

Triggers pertaining to changes in catch proportion

i. *If the relative catch proportion of any species changes by >30% from its historical average AND the catch of this species is greater than 1 tonne, invoke a level 1 response for the relevant species. If this is accompanied by an ≥50% overall decline in the CPUE over the last three years, invoke a Level 2 response*

Flame snapper and blue-eye trevalla exceeded the Level 1 trigger for the 2020-21 season. The total catch and proportion of total catch for this species is detailed in Table 3.

Table 3 The species that exceeded the Level 1 trigger in the line sector of the Coral Sea Fishery for 2020-21 pertaining to changes in catch proportion.

	2020-21 catch (t)	Proportion of catch	Historic average proportion
Flame snapper	9	62.7%	39.5%
Blue-eye trevalla	3.9	26.9%	1.7%

Flame snapper and blue-eye trevalla only exceeded Trigger Level 1 with 9 tonnes and 3.9 tonnes of catch in 2020-21 respectively, equating to 62.7 per cent and 26.9 per cent respectively, of the relative proportion of catch that year. In comparison, the ten year historical relative catch proportion for these species of 39.5 per cent and 1.7 per cent respectively.

While in 2020-21 the relative proportion of flame snapper of 62.7 per cent is much higher than the historical average, the total catch of 9 tonnes in 2020-21 is lower than the 10 year historical average catch of 15.5 tonnes, and lower than the total catch in 2018-19 and 2019-20 of around 10 tonnes.

Blue-eye trevalla catch proportion in 2020-21 also met the criteria for a level 1 trigger with 26.9 per cent of proportion catch. However the total catch in 2020-21 of 3.9 tonnes is lower than the highest historical catch of 6 tonnes.

The change in relative catch proportion of this species is likely due to relatively low effort and catch levels overall by this sector in the CSF resulting in large changes in relative proportions of species when there is even a slight change in catch level. For these reasons, the risk to this species posed by recent catch levels is considered low.

ii. *If the relative proportion of any species in the catch declines inter-annual by 10% or greater over 3 consecutive years, invoke a Level 1 response. If this accompanied by ≥50% overall decline in CPUE over the last 3 years, invoke a Level 2 response*

No species had a decline in relative proportion of catch by 10% or greater over three consecutive years.

Triggers pertaining to spatial changes

For the purposes of this report, 'hillgrids' are used to represent areas fished. Each hillgrid is a square approximately 15 nautical miles wide. Fishing effort typically occurs in only a proportion of each hillgrid and so the analysis is spatially broad.

If the following changes occur invoke a Level 1 response to determine why, with the added option of imposing spatial management measures, such a closures or move-on provisions:

i. *The percentage of areas fished increased by ≥40% (fishery expansion), OR*
ii. *The percentage of areas fished decreases by ≥40% (fishery contraction), OR*
iii. *If ≥40% of the total catch is taken from a single area (fishery contraction/ undue fishing pressure on one area) OR*
iv. *If ≥40% of once- exploited areas are no longer fished*

A Level 1 response was triggered in relation to (i), (iii) and (iv) in 2020-21.

With respect to (i), there was an 80 per cent increase in the number of hillgrids fished in 2020-21 (9 hillgrids) compared to 2019-20 (5 hillgrids) (Table 4).

Table 4 Summary of hillgrid areas fished by the line sector of the Coral Sea Fishery for 2017-18, 2018-19 and 2019-20. Note: the change in areas fished are relative to the year prior.

2018-19			2019-20			2020-21		
Areas fished (hillgrids)	Areas fished (km^2)	Change in area fished	Areas fished (hillgrids)	Areas fished (km^2)		Areas fished (hillgrids)	Areas fished (km^2)	Change in area fished
18	13878	↓ 25%	5	3855	↓ 72%	9	6939	↑ 80%

With respect to (iii), of the 14.3 tonnes caught in total by the line sector in 2020-21 the highest contribution from a single area was 7.7 tonnes, 54 per cent.

With respect to (iv), 'once exploited areas' are defined as the 'total number of individual areas fished over the past three years' for the purpose of assessing this trigger. Of the 66 areas which were once exploited, nine of those were exploited in 2020-21 which means that 86 per cent of once-exploited areas were not fished in 2020-21. Seven new area were fished in 2020-21 that had not been fished in the previous two years.

Implementation of the Coral Sea Marine Park in July 2018 removed some fishing grounds for the line sector. This, combined with an overall decline in fishing effort for factors not related to stock abundance (i.e. high operating costs due to the fishery location which results in operators prioritising fishing in other fisheries along with the export and market impacts from the COVID-19 pandemic), are the most likely the primary reasons for the changes to the spatial fishing effort. Further, while a large proportion of the catch came from nine areas, the overall tonnage caught is relatively low and the result of a small number of fishing trips.

v. *If any of the above triggers (i – iv) are accompanied by a ≥50% overall decline in CPUE over the last three years, invoke a Level 2 response*

This trigger was not reached in the 2020-21 season. A summary of logbook catch, effort and CPUE (kg per hook set) for each gear type in the line sector for fishing years 2018-19 to 2020-21 is provided in Table 5.

Table 5 Logbook catch, effort and CPUE (kg / hook set) for the line sector of the Coral Sea Fishery for fishing years 2018-10 to 2020-21.

Fishing year	Dropline hooks [1]	Catch (t, whole weight)	CPUE (kg/hook set)
2018-19	3,136	1.6	0.51
2019-20	486	0.2	0.41
2020-21	2,864	3.9	1.35
Fishing year	**Longline hooks**	**Catch (t, whole weight)**	**CPUE (kg/hook set)**
2018-19	200,910	16.5	0.08
2019-20	128,385	12.4	0.10
2020-21	84,825	10.5	0.12

[1] Hook numbers for dropline are calculated by multiplying the number of lines lifts by the average number of hooks per line.

Triggers pertaining to CPUE

i. *If CPUE for any species shows a decline over the last 3 years, but without any of the above indicators being triggered, a Level 1 response shall be invoked if the decline is less than or equal to 50%, and a Level 2 response shall be invoked if the decline is greater than 50%*

For the assessment of this trigger, the CPUE is calculated for both drop line and longline together (i.e. using the total weight landed relative to the number of hooks set for each method combined).

The CPUE Level 1 and Level 2 trigger was exceeded for a total of 49 species in 2020-21. However, only three of these species that also recorded catches in 2020-21 are listed in in Table 6. Of the 46 remaining species, either no or low catches (100kgs or less) were also recorded in 2019-20.

Table 6 Species, catch (tonnes), ten year historical average catch (tonnes), highest historical catch in tonnes, catch per unit effort (CPUE) by fishing year for the period 2018-19 to 2020-21, and whether the level 1 or level 2 trigger was reached in 2020-21. Blue squares indicate the highest trigger reached.

Species	2020-21 Catch (t)	10 year Historical Average Catch (t)	Highest historical catch (tonne/s)	2018-19 CPUE	2019-20 CPUE	2020-21 CPUE	L1 decline CPUE (last 3 yrs)	L2 >50% decline CPUE (last 3 yrs)
Rosy Snapper	0.004	3.4	64.2	0.015	0.000	0.000	TRUE	TRUE
Bar Rockcod	0.238	2.6	9.9	0.010	0.002	0.003	TRUE	TRUE
Amberjack	0.260	0.9	2.97	0.008	0.001	0.003	TRUE	TRUE

These triggers are only considered for species that have not met any other triggers in the harvest strategy. Three species caught in 2020-21 that had not breach any previous triggers, reached level 1 and 2 triggers. However, none of these species have total catch of over one tonne and the total catch in 2020-21 of these species are lower than the historical average catch in the last 10 years. Consequently, no further management action is currently considered warranted.

The appropriateness of CPUE-based triggers was also discussed at the September 2016 stakeholder meeting. Highly variable catch composition, relatively low catch rates and spatial distribution of effort mean that these triggers are overly sensitive. Considering the above, AFMA will continue to monitor the total catch of these species over time and will review the appropriateness of CPUE based triggers as part of the upcoming review of the line harvest strategy.

Discussion

Some of the Level 1 and Level 2 triggers were breached in 2020-21, including the spatial, catch proportion and CPUE triggers. However, on closer examination of the data in relation to historical total catch estimates and considering the low level of catch, effort and spatial extent of fishing overall, no further management action was considered warranted.

The implementation of the Coral Sea Marine Park in 2018 saw the removal of trawl and trap licences from the fishery and a reduction in the area open to line fishing from late 2019. In addition to this, the complexity of the triggers for the level of risk posed by the fishery are two of the key drivers for a review of the line harvest strategy which is scheduled to be undertaken over the next two years.

3. Aquarium

For the 2020-21 season, 33 652 individual fish were harvested in the aquarium sector. This is an increase from the previous 25 437 fish taken in 2019-20.

The revised Aquarium Sector Harvest Strategy came into effect in mid-2019. A summary of the catch against the revised trigger in line with the updated Harvest Strategy is provided in Table 7. No triggers were reached in the 2020-21 fishing year.

Table 7 Standing stock size estimates, catch triggers and 2020-21 catch (number of individuals) for the six key commercial Family groups in the Aquarium Sector of the CSF. Note: Level 1 trigger is 0.02 per cent of the minimum stock size and the Level 2 trigger.

Family	Min stock estimate	Max stock estimate	Level 1 Trigger (0.02%)	Level 2 Trigger (0.04%)	2020-21 catch
Serranidae	56 627 823	459 144 510	11 000	22 000	5 992
Labridae	91 828 902	459 144 510	18 000	36 000	8 599
Pomacentridae	1 346 823 896	15 304 817 000	20 000	40 000	5 297
Acanthuridae	168 352 987	487 917 566	20 000	40 000	1 859
Blenniidae and Gobiidae	61 219 268	18365 780 400	12 000	24 000	1 497
Pomacanthidae	61 525 364	N/A	12 000	24 000	1 631

Other species

Level 1: *Equal to the highest historical catch for all 'other' species.*

Level 2 Catch Trigger: Equal to twice the highest historical catch for all 'other' species.

In the 2020-21 fishing year, the total catch for 'other' species was 8 777 individuals, well below the highest historical catch of 16 934 individuals in 2012-13.

Acroporidae: 40 tonnes of the coral family Acroporidae is permitted to be harvested annually from the CSF. This limit is regulated and consistent with the conditions of the CSF Wildlife Trade Operation (WTO) accreditation based on a Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) Non-Detriment Finding (NDF). The NDF used estimates of density and annual production across the fishery.

Level 1 Catch Trigger: 20 tonnes.

Level 2 Catch Trigger: 40 tonnes.

In the 2020-21 fishing year, no coral was harvested.

Live rock: 40 tonnes of live rock is permitted to be harvested annually from the CSF.

Level 1 Catch Trigger: 20 tonnes.

Level 2 Catch Trigger: 40 tonnes.

There was 4.3 tonnes of live rock collected in the 2020-21, well below the trigger although slightly higher (a 2.28 tonne increase) than the 2019-20 season[2].

This trigger was intended to pick up a potential decrease in the catch per unit effort for live rock. However, the take of live rock is largely market driven and the low level of harvest is reflective of a low market demand.

Humphead Maori wrasse: Aquarium sector fishing permit holders are authorised to take a total of 50 specimens during the season (25 per concession holder). Operators are required to record the number of specimens taken per trip, their size and latitude/longitude information in the 'comments' section of their logbook. The annual catch triggers have been set to review catch and effort data whenever 10 individuals are caught, or when 50 individuals are caught within a season.

Level 1 Catch Trigger: Each time 10 individuals caught (i.e. 10, 20, 30 and 40 individuals).

Level 2 Catch Trigger: 50 individuals.

In the 2020-21 season, only one Humphead Maori wrasse were harvested, well below the Level 1 catch trigger.

Discussion

No catch triggers for the Aquarium sector were reached in 2020-21.

[2] Total catch of live rock in 2019-20 has been revised from 0.8 tonnes to 2.02 tonnes.

4. Hand Collection (Sea Cucumbers)

No activities were reported in the Hand collection (sea cucumbers) sector in the 2020-21 season.