

10th MEETING OF THE SCIENTIFIC COMMITTEE

26 - 30 September 2022, Seoul, Korea

SC10 – JM01 rev1

Trachurus murphyi catch history

Secretariat

1. Summary Paragraph

The Secretariat has provided an updated historical catch data series to 2022 as **Annex 1**. There are no notable changes to the historical catch history. As final annual catch figures are not due until September 30th, in many cases the 2021 data remain estimates.

Initial 2022 catch estimates, by fleet, have been provided by calculating the ratio of annual catch figures to the cumulative total catch reported through July of the corresponding year, on an annual basis. These ratios were then averaged to produce a multiplier for the 2022 catch estimates through July, to estimate total annual catches for the 2022 calendar year. The time frame over which these ratios were calculated varied by fleet, due to changes in fishing behaviour through time (Figure 1). Specifically, for Fleets 1-3 the mean ratio from 2019-2021 was used, and for Fleet 4, the mean ratio from 2017-2021 was used.

This approach for estimating the total annual catches for the present year (i.e., 2022) differs from the approach used in previous years, because averaging over the full time series (2010-2021) no longer seemed appropriate. For many of the fleets, fishing patterns throughout the year have changed considerably, and therefore a more tailored approach was predicted to yield more realistic estimates. It should be noted, that given these changes, estimating catches within the current year may be more accurate if considered on a flag/fleet basis.

Members are asked to either accept these initial estimates or provide adjustments based upon their knowledge of the current fishing season. Previous estimates for total current catches have always been within about 10% of the final figures. Last year's SC9 2021 estimates for total catch show a relative underestimation of 0.9% overall, with the previous 5 years having initial annual catch estimates deviating from the final figures in the range of -1 to 10.1%, with a mean of 3.4%.

Boxplots showing historical monthly catches for each of the major fleets are presented and compared with the current monthly catches from the first half of 2022.

This paper also provides a short explanation of the *Trachurus murphyi* (CJM) catch history as used in the SPRFMO jack mackerel stock assessment.

Section 6 has been included to show information provided by IATTC on catches of epipelagic forage fishes (including *Trachurus* spp) for the entire IATTC area.

2. Annual Catch Totals

Historical catch data for the years prior to 2007 were originally provided to the (Interim) SPRFMO Secretariat under the 2007 interim data standards. Thus, the SPRFMO Secretariat holds catch data for all major fish species (including CJM) caught in the SPRFMO Area, in many cases back to the 1970s. The 2007 interim data standards were revised and the term "annual catch total" was introduced in the 2012 interim data standards. This term persists in the current Conservation and Management Measure 02-2022 (Data standards). Members and



CNCPs provide annual catch totals raised to 'live' weight for all species caught during the previous calendar year.

A summary of this information was first published in 2008 (SPRFMO-V-SWG-10) and it is updated annually. In this paper, where possible, these annual catch totals are used to create the historical catch data series for the jack mackerel stock assessment up to and including 2021¹.

The 2021 annual catch totals are due on 30 September 2022 (after this paper was drafted); therefore, monthly catch reports were used to provide the 2021 catch estimates.

Initial 2022 (current year) catch estimates have been provided based on the monthly catch data provided through July and the estimation methodology described above. These catch estimates will be revised as necessary in advance of the meeting.

3. Monthly Catch Reports

CMM 01-2022 (*Trachurus murphyi*) requires Members and CNCPs to report monthly catches to the Secretariat within 20 days of the end of the calendar month, except that when total catches have reached 70% of the amount indicated in paragraph 10, Members and CNCPs agree to implement a 15-day reporting period, in which the calendar month is divided into two reporting periods, day 1 to 15 and day 16 to the end of the month.

In 2022, total catches reached 70% during the month of June, so the first 15-day reporting period was from the 1st until the 15th of July (Letter G92-2022). At the time of SC10 the Secretariat expects to have access to monthly/15-day catch reports through to the 15th of September (this current paper is based on catch information through to the end of July).

4. Fleets used in the assessment

The Joint Jack Mackerel model (JJM) used by the SC to assess jack mackerel stocks, recognises four distinct fleets. Fleet 1 is a coastal purse seine fishery in northern Chile. Fleet 2 is a purse seine fishery in central-south Chile that extends into the high seas. Fleet 3 combines the far-north coastal purse seine fisheries occurring in the EEZs and territorial waters of Ecuador and Peru. Finally, Fleet 4 corresponds to the offshore trawl fleet operating solely in the SPRFMO Area.

In most cases, data submitted to the Secretariat can be assigned to the correct Fleet. However, while the Secretariat has an estimate for the total Chilean catch it can only be split into the High seas and EEZ portions, and not into northern and central-south portions, so the Secretariat is not able to split the Chile catch between Fleets 1 and 2 (northern and central-south Chile). In previous years, Chile has provided these estimates at the SC meeting.

¹ Noting the fleet descriptions in Section 4

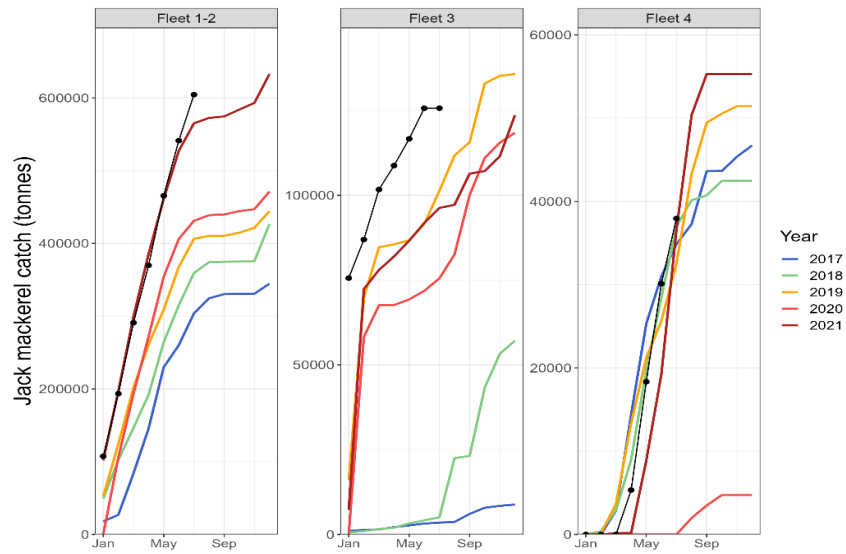


Figure 1. Cumulative catches of jack mackerel by year and fleet (noting Fleets 1 and 2 are combined). The black line with points represents the cumulative catches through July of 2022.

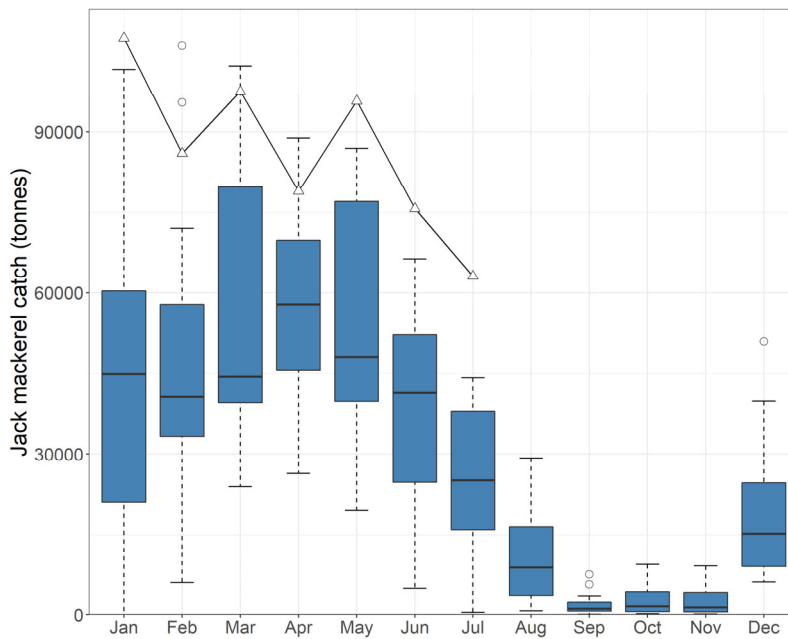


Figure 2: Box plots for 2010-2021 monthly catch reports of *Trachurus murphyi* from Fleets 1 & 2 combined (Northern and Central Chile). The line connecting triangles shows the 2022 catch from monthly catch reports.

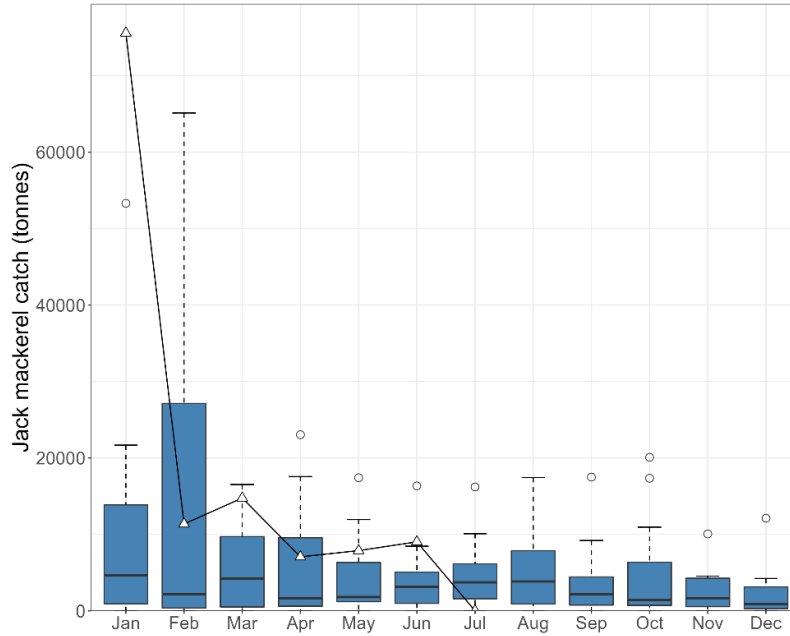


Figure 3: Box plots for 2011-2021² monthly catch reports of *Trachurus murphyi* from Fleet 3 (Far-North). The line connecting triangles shows the current 2022 catch from monthly catch reports.

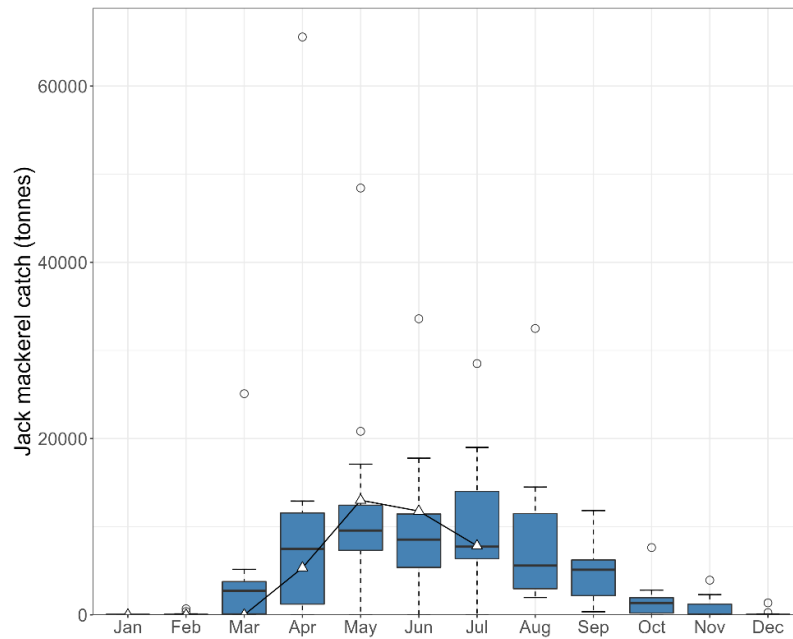


Figure 4: Box plots for 2010-2021 monthly catch reports of *Trachurus murphyi* from Fleet 4 (Offshore Trawl). The line connecting triangles shows the current 2022 catch from monthly catch reports.

² Fleet 3 Monthly catches for 2010 are not available.



5. Excel attachment

An Excel workbook is annexed to this paper (**Annex 1**).

- Tab 1 (CJM Stock Assess input) contains the jack mackerel annual catch totals by Member and CNCP and is structured by Fleet. There are various notes that reflect previous decisions taken by the SC about this data series. Underlined figures have been updated since last assessment (refer to table A10.1 of [SC9 Report Annex 10](#)).
- Tab 2 (2022 catch estimates) contains the initial catch estimates for 2022 and shows the underlying calculations.
- Tab 3 (Accuracy of previous estimates) shows the relative change associated with each of the current year catch estimates used in previous SC meetings.

6. IATTC provided information

Due to interest expressed by a Member in 2021, to better understand jack mackerel catches in the tuna purse seine fishery managed by IATTC, Table 1 was provided in 2021 in SC9-JM01 and has been updated for 2022. These data were obtained from the IATTC's 13th Scientific Advisory Committee meeting on Ecosystem Considerations ([SAC-13-10](#)). In Table J-7 of their paper there is a summary of the epipelagic forage fishes, including *Trachurus* species, catch from the purse seine fishery from the IATTC area.

Table 1 shows estimated purse-seine catches by set type in metric tons (t) of small forage fishes by observers onboard size-class 6 vessels with a carrying capacity >363 t and minimum reported longline (LL) catches of small forage fishes (gross-annual removals in t) as previously detailed in Table J-7 of IATTC paper SAC-13-10.

“Epipelagic forage fishes” include various mackerels and scad (*Decapterus* spp., *Trachurus* spp., *Selar crumenophthalmus*), Pacific saury (*Cololabis saira*), and tropical two-wing flyingfish (*Exocoetus volitans*).

The same paper also notes a minimum nominal purse-seine catch for “Epipelagic forage fishes” of <1 tonne in floating object sets for 2021 for size class 1-5 vessels with a carrying capacity <363 t (from observer records with 27% coverage).

As shown in Table 1 and noted by IATTC, the catches, across all the species included in the group, are relatively small (averaging 7.5 t per year since 2010 with a maximum of ~25 t in a single year). Small pelagic species are not targeted by these fisheries and are generally not associated with target species. These small pelagic fishes are likely to have very low gear selectivity due to their size relative to the mesh size of a tuna purse seine net. There is 100% observer coverage of the purse-seine fleet, so any substantial catches of small pelagics would be recorded, or at least noted if the observer was unable to make a thorough catch estimate for a set.

It is the Secretariat's understanding that these catches are unlikely to have been included in catch figures submitted to SPRFMO. In fact, one Member has raised the question about how to report jack mackerel bycatch from tuna fisheries that occur in SPRFMO waters. These catches are generally quite small, but as noted in recent years, can amount to several tons (14 t in 2021).

Because these figures include other species than *Trachurus murphyi* and include an area to the north not included in the SPRFMO area, these should be considered upper limits for the purpose of the Jack mackerel stock assessment.



Table 1: Extracted estimated catches of “Epipelagic forage fishes” from Table J-7 of IATTC paper SAC-13-10. A - indicates no catch whereas an * indicates that data were not available.

Method	Epipelagic forage fishes			
	Set type	Purse Seine		
		Floating object (OBJ)	Unassociated tuna schools (NOA)	Dolphins (DEL)
1993	-	-	-	-
1994	-	-	-	-
1995	-	-	-	-
1996	-	-	-	-
1997	-	-	-	-
1998	<1	-	-	-
1999	<1	-	-	-
2000	-	-	-	-
2001	-	-	-	-
2002	-	-	-	-
2003	<1	-	-	-
2004	<1	<1	-	-
2005	6	<1	<1	-
2006	7	1	-	-
2007	2	5	-	-
2008	3	<1	-	-
2009	<1	<1	-	-
2010	4	<1	<1	-
2011	2	<1	<1	-
2012	13	12	-	-
2013	4	-	<1	-
2014	3	<1	<1	-
2015	6	-	-	-
2016	21	-	<1	<1
2017	3	-	-	-
2018	5	<1	-	-
2019	5	8	<1	-
2020	4	<1	-	-
2021	14	-	-	*
Total (t)	102	28	1	<1