



## MarinTrust Standard V2

### Whole fish Fishery Assessment

### *WF08: Jack Mackerel, Chilean EEZ Regions*

### *X-XV*

**MarinTrust Programme**

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**Table 1 Application details and summary of the assessment outcome**

Application details and summary of the assessment outcome			
<b>Name(s):</b> Corpesca; Fiordo Austral			
<b>Country:</b> Chile			
<b>Email address:</b>		<b>Applicant Code:</b>	
Certification Body Details			
<b>Name of Certification Body:</b>		LRQA	
Assessor Name	CB Peer Reviewer	Assessment Days	Initial/Surveillance/ Re-approval
Sam Peacock	Kate Morris	5	Re-approval
Assessment Period	August – September 2022		
Scope Details			
Management Authority (Country/State)	Chile & South Pacific Regional Fisheries Management Organisation (SPRFMO), FAO 87		
Main Species	Jack Mackerel ( <i>Trachurus murphyi</i> )		
Fishery Location	Chilean EEZ, Regions X-XV		
Gear Type(s)	Purse seine		
Outcome of Assessment			
Overall Outcome	APPROVE		
Clauses Failed	None		
CB Peer Review Evaluation	APPROVE		
Fishery Assessment Peer Review Group Evaluation	Approve <a href="#">see report</a>		
Recommendation	APPROVE		

## Table 2. Assessment Determination

Assessment Determination
<p>The purse seine fishery is relatively clean, catching only jack mackerel (IUCN Data Deficient) and chub mackerel (IUCN Least Concern) in significant quantities. Neither species occurs in the CITES appendices.</p> <p>Jack mackerel in the Southeast Pacific is widely distributed and caught in four main management units. Science and management across these units are coordinated by the South Pacific Regional Fisheries Management Organisation (SPRFMO), and the total catch is limited by an international quota. Jack mackerel was therefore assessed under Category A. There are no quotas or reference points established for chub mackerel, which was assessed under Category D.</p> <p>Effective management and research structures are in place at the national and international levels, and fisheries control and enforcement in Chile are active and effective.</p> <p>Jack mackerel is subject to an annual stock assessment. The stock structure is not certain and therefore two separate stock hypotheses are assessed: (1), that a single stock exists throughout the Southeast Pacific; and (2) that two separate stocks exist, roughly separated around the border between Peru and Chile. Under both hypotheses, the stock biomass is substantially higher than <math>SSB_{MSY}</math>, and fishing mortality is well below <math>F_{MSY}</math>.</p> <p>Chub mackerel was awarded a Productivity score of 1.29 and a Susceptibility score of 2.5, leading to a Pass against Table D3.</p> <p>The available evidence suggests that the fishery has minimal impact on ETP species or ecosystems, and purse seine gears are widely considered to have minimal impact on physical habitats.</p> <p>Overall, the Chilean jack mackerel fishery meets the Marin Trust whole fish requirements and should be approved for use as a raw material in MT-certified products.</p>
Fishery Assessment Peer Review Comments
<p>The whole fishery under assessment here is the Chilean jack mackerel (<i>Trachurus murphyi</i>) fishery which is pursued by Chilean and international vessels in Chile's Fisheries Management Regions XI, X, XIV, IX, VIII. Jack mackerel is managed under managed by the South Pacific Regional Fisheries Management Organisation (SPRFMO), the Chilean Ministry (MINECOM) and the Instituto de Fomento Pesquero (Fisheries Development Institute, IFOP). For this Marin Trust assessment, Jack mackerel is scored as a Type 1 category A species.</p> <p>Chub mackerel is also recorded as by-catch, although to a much lower degree (&lt;5% of total catch). Chub mackerel is not managed to species-specific reference points, and the auditor has correctly identified target stock as Category D species.</p> <p>All species scoring tables have been completed by the auditor with sufficient evidence presented to support their final determination.</p> <p>As the fishery uses purse seines which are deployed in the pelagic environment, the associated impact to ETP species, habitats and the wider ecosystem is duly considered. ETP interactions are discussed in detail and indicate there has not been a significant number of incidental capture events.</p> <p>The peer review supports the auditor's recommendation to Pass this fishery under the Marin Trust IFFO RS v2.0 whole-fishery standard for the production of fishmeal and fish oil.</p>
Notes for On-site Auditor

Cross-reference catch profile with that recorded here and in *I. Mateo & E. Saa (2022). MSC Certification surveillance report: Chilean jack mackerel industrial purse seine, Surveillance 2.*  
<https://fisheries.msc.org/en/fisheries/chilean-jack-mackerel-industrial-purse-seine-fishery/@assessments>

### Table 3 General Results

General Clause	Outcome (Pass/Fail)
M1 - Management Framework	PASS
M2 - Surveillance, Control and Enforcement	PASS
F1 - Impacts on ETP Species	PASS
F2 - Impacts on Habitats	PASS
F3 - Ecosystem Impacts	PASS

### Table 4 Species- Specific Results

List all Category A and B species. List approximate total percentage (%) of landings which are Category C and D species; these do not need to be individually named here

Category	Species	% landings	Outcome (Pass/Fail)	
Category A	Jack mackerel ( <i>Trachurus murhpyi</i> )	>95%	A1	PASS
			A2	PASS
			A3	PASS
			A4	PASS
Category B	No Category B Species			
Category C	No Category C Species			
Category D	Pacific chub mackerel ( <i>Scomber japonicus</i> )	<4.5%	PASS	

## Table 5 Species Categorisation Table

Common name	Latin name	Stock	IUCN Redlist Category <sup>1</sup>	% of landings	Management	Category
Jack mackerel	<i>Trachurus murphyi</i>	SE Pacific; see notes	Data-Deficient <sup>2</sup>	>95%	Yes	A
Chub mackerel	<i>Scomber japonicus</i>	Chilean	Least Concern <sup>3</sup>	<4.5%	No	D

### Species categorisation rationale

The July 2022 MSC surveillance assessment which covers this stock includes a summary table of catch composition for 2016 – 2021<sup>4</sup>, based on data collected by the on-board observer programme. Over that time, the proportion of jack mackerel in the yearly catch has not fallen below 94.7% and has consistently been above 97%. Therefore, for the purposes of this assessment, jack mackerel is the only Type 1 species.

Around 18 other species have been present in the catch in differing proportions over time. Caballa (Chub mackerel, *Scomber japonicus*) has consistently represented at least 0.3% of the catch, and in several years has made up virtually the entire non-jack mackerel proportion of landings (up to 4.5%). Therefore, for the purposes of this assessment, chub mackerel is clearly a Type 2 species.

Since 2019 only one other species has been present in the catch in significant quantities: jibia (Humboldt squid, *Dosidicus gigas*), which made up 0.1% of the catch in 2020. However, it was not recorded at all in 2019 or 2021 and represented less than 0.1% of the catch in 2016 and 2017. For this reason, it has been decided not to include the species in this assessment.

No other species has represented more than 0.1% of the catch in the last three years, nor regularly in the years prior to 2019. The absence of other species in the catch is further confirmed by the SPRFMO, which describes the fishery as mono-specific<sup>5</sup>.

Jack mackerel is subject to species-specific management regimes including TACs, and has been assessed under Category A. Chub mackerel is not subject to TACs nor are there reference points established for the stock, and therefore it has been assessed under Category D.

Note that the stock structure of jack mackerel in the South-East Pacific is not certain. The distribution of the species covers most of the west coast of South America and reaches nearly as far west as Australia (see map below). The SPRFMO describes five potential stocks, four stock structure hypotheses and conducts two parallel stock assessments<sup>5</sup>. These follow the two main hypotheses: (1), that jack mackerel caught off the coasts of Chile and Peru constitute a single stock unit which extends into the high seas, and (2), that jack mackerel caught off the coasts of Chile and Peru constitute separate stocks which straddle the high seas.

Whatever the stock structure, there are five management units for jack mackerel in the Southeast Pacific: one in Ecuadorian waters, one in Peru, two in Chile, and one on the high seas<sup>6</sup>. This assessment considers both Chilean management units (the northern fishery in Regions XV-II and the southern-central fishery in Regions III-X). Stock assessment occurs at the international level, as described

<sup>1</sup> <https://www.iucnredlist.org/>

<sup>2</sup> <https://www.iucnredlist.org/species/183965/8207652>

<sup>3</sup> <https://www.iucnredlist.org/species/170306/6737373>

<sup>4</sup> I. Mateo & E. Saa (2022). MSC Certification surveillance report: Chilean jack mackerel industrial purse seine, Surveillance 2. <https://fisheries.msc.org/en/fisheries/chilean-jack-mackerel-industrial-purse-seine-fishery/@assessments>

<sup>5</sup> SPRFMO SC9-Report, Annex 10. Jack Mackerel Technical Annex. <https://www.sprfmo.int/assets/2021-SC9/Report/SC9-Report-Annex-10-Jack-mackerel-Technical-advice-RS.pdf>

<sup>6</sup> Fishsource: Chilean jack mackerel. [https://www.fishsource.org/stock\\_page/756](https://www.fishsource.org/stock_page/756)

above, and is coordinated by the South Pacific Regional Fisheries Management Organisation (SPRFMO). Sections of this report refer to the entire stock where appropriate.



Distribution of jack mackerel in the Southeast Pacific. From the FishSource profile page<sup>7</sup>.

<sup>7</sup> FishSource profile, jack mackerel in the SE Pacific. [https://www.fishsource.org/stock\\_page/756](https://www.fishsource.org/stock_page/756)

## MANAGEMENT

The two clauses in this section (M1, M2) relate to the general management regime applied to the fishery under assessment. The clauses should be completed by providing sufficient evidence to justify awarding each of the requirements a pass or fail rating. A fishery must meet all the minimum requirements in every clause before it can be recommended for approval.

M1	Management Framework – Minimum Requirements		
	<b>M1.1</b>	There is an organisation responsible for managing the fishery.	PASS
	<b>M1.2</b>	There is an organisation responsible for collecting data and assessing the fishery.	PASS
	<b>M1.3</b>	Fishery management organisations are publicly committed to sustainability.	PASS
	<b>M1.4</b>	Fishery management organisations are legally empowered to take management actions.	PASS
	<b>M1.5</b>	There is a consultation process through which fishery stakeholders are engaged in decision-making.	PASS
	<b>M1.6</b>	The decision-making process is transparent, with processes and results publicly available.	PASS
<b>Clause outcome:</b>			PASS
<p><b>M1.1 There is an organisation responsible for managing the fishery.</b></p> <p>Jack mackerel is widely distributed in the south and east Pacific, and the management of the stock(s) is coordinated by the South Pacific Regional Fisheries Management Organisation (SPRFMO). The SPRFMO was officially established and entered into force on the 24<sup>th</sup> August 2012 (SPRFMO 2022), as an outcome of the Convention of the Conservation and Management of High Seas Fishery Resources in the South Pacific Ocean (“The Convention”) (SPRFMO 2015).</p> <p>The management of fisheries in Chilean waters falls under the jurisdiction of the Undersecretary of Fisheries and Aquaculture, known as SUBPESCA, within the Ministry of Economy, Development and Tourism. SUBPESCA is responsible for managing and regulating fisheries and aquaculture through “management policies, regulation and measures supported by technical reports based on scientific research and social and economic variables” (SUBPESCA 2022).</p> <p>Within SUBPESCA, the National Fisheries and Aquaculture Service (SERNAPESCA) is an organisation responsible for executing fisheries policy, including monitoring and enforcement.</p> <p>There are organisations responsible for managing the fishery, and M1.1 is met.</p> <p><b>M1.2 There is an organisation responsible for collecting data and assessing the fishery.</b></p> <p>The SPRFMO Scientific Committee (SC) was established by Article 10 of the Convention with the primary purpose of conducting stock assessments and providing advice to the SPRFMO Commission based on the outcomes of the assessments. The SC also assesses and provides advice relating to the potential impacts of the fishery on marine ecosystems and encourages international cooperation in scientific research (SPRFMO 2022b). Annual jack mackerel stock assessments are conducted by the SPRFMO SC.</p> <p>The work of the SC is supported by the national fishery research bodies of participating nations. Relevant organisations within Chile include:</p> <ul style="list-style-type: none"> <li>• The Instituto de Fomento Pesquero (Institute of Fisheries Development, IFOP), a non-profit organisation “whose public role is to support the sustainable development of the country’s fishing and aquaculture sector” (IFOP, 2022).</li> <li>• The Instituto de Investigación Pesquera (Fisheries Research Institute, INPESCA), a private research institute which aims “to develop multidisciplinary scientific research aimed at the evaluation, diagnosis, prediction and analysis of the main fisheries under exploitation in the central-southern region of Chile, as well as evaluating the environmental impact of the production process through environmental management” (INPESCA 2022).</li> </ul>			



- The Soceidad Nacional de Pesca (National Fisheries Society, SONAPESCA), an industry body created to promote the development of industrial fishing in Chile but with a role in the collection and dissemination of fishery-dependent data (SONAPESCA 2022).

There are scientific bodies responsible for collecting data and assessing the fishery, and M1.2 is met.

**M1.3 Fishery management organisations are publicly committed to sustainability.**

The SPRFMO states that “The objective of the SPRFMO Convention is, through the application of the precautionary approach and an ecosystem approach to fisheries management, to ensure the long-term conservation and sustainable use of fishery resources and, in so doing, to safeguard the marine ecosystems in which these resources occur” (SPRFMO 2022a).

SUBPESCA states that their institutional mission is to “Regulate and manage fishing and aquaculture activities, through policies, standards and management measures, under a precautionary and ecosystem approach that promotes the conservation and sustainability of hydrobiological resources for the productive development of the sector” (SUBPESCA 2022).

SERNAPESCA states that their mission is to “contribute to the sustainability of the sector and the protection of hydrobiological resources and their environment, through comprehensive control and management. influencing sectoral behaviour by promoting compliance with standards” (SERNAPESCA 2022).

Management organisations are publicly committed to sustainability, and M1.3 is met.

**M1.4 Fishery management organisations are legally empowered to take management actions.**

The core legal document of the SPRFMO is the Convention on the Conservation and Management of High Seas Fishery Resources in the South Pacific Ocean (SORFMO 2015). The Convention, to which Chile is a signatory, established the SPRFMO and set out its role and powers. The implementation of SPRFMO measures in Chilean waters, along with other fishery management rules and regulations, is legally based in the General Law on Fisheries and Aquaculture (LGPA), No. 18,892 of 1989, as amended (SUBPESCA 2019). SUBPESCA was established by DFL No. 1 of 1992 and is further empowered by a series of laws including, most recently, Law No. 20,597 of 2012 (SUBPESCA 2022).

Fishery management organisations are empowered to take management actions, and M1.4 is met.

**M1.5 There is a consultation process through which fishery stakeholders are engaged in decision-making.**

The main mechanism through which Chilean fishery stakeholders are consulted are the 16 Fishery Management Committees established by SUBPESCA. Committees meet regularly, and have a membership made up of representatives of government, industry, and other stakeholders. Details of the committees, including minutes of committee meetings, are made available on the SUBPESCA website (SUBPESCA 2022a). There is a consultation process and therefore M1.5 is met.

**M1.6 The decision-making process is transparent, with processes and results publicly available.**

The processes, discussions, and outcomes of the SPRFMO scientific and commission meetings are made available on the SPRFMO website; for example, the most recent scientific committee meeting documentation, which includes the jack mackerel stock assessment documentation, is available at <https://www.sprfmo.int/meetings/scientific-committee/9th-sc-2021/>. All of the evidence sources used to produce this MT assessment report were publicly available and did not need to be requested. The decision-making process is transparent, and M1.6 is met.

**References**

- IFOP (2022). IFOP website, “About us”. <https://www.ifop.cl/en/quienes-somos/>
- INPESCA (2022). INPESCA website, “About”. <http://www.inpesca.cl/index.php/nosotros/acerca-de/>

SERNAPESCA (2022). SERNAPESCA website, “What is SERNAPESCA?”. <http://www.sernapesca.cl/que-es-sernapesca>

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SPRFMO (2015). Convention on the Conservation and Management of High Seas Fishery Resources in the South Pacific Ocean. <https://www.sprfmo.int/assets/Basic-Documents/Convention-web-12-Feb-2018.pdf>

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SPRFMO (2022a). SPRFMO website, “Basic documents”. <https://www.sprfmo.int/about/docs/>

SPRFMO (2022b). SPRFMO website, “Scientific committee”. <https://www.sprfmo.int/science/>

SUBPESCA (2019). General Law on Fisheries and Aquaculture (updated text incorporating amendment to Law No. 21,437). <https://www.subpesca.cl/portal/615/w3-article-88020.html>

SUBPESCA (2022). SUBPESCA website, “The Undersecretariat”. <https://www.subpesca.cl/portal/616/w3-article-86158.html>

SUBPESCA (2022a). SUBPESCA website, “Management Committees”. <https://www.subpesca.cl/portal/616/w3-propertyvalue-38010.html>

Links	
MarinTrust Standard clause	1.3.1.1, 1.3.1.2
FAO CCRF	7.2, 7.3.1, 7.4.4, 12.3
GSSI	D.1.01, D.4.01, D2.01, D1.07, D1.04,

M2	Surveillance, Control and Enforcement - Minimum Requirements		
	M2.1	There is an organisation responsible for monitoring compliance with fishery laws and regulations.	PASS
	M2.2	There is a framework of sanctions which are applied when laws and regulations are discovered to have been broken.	PASS
	M2.3	There is no substantial evidence of widespread non-compliance in the fishery, and no substantial evidence of IUU fishing.	PASS
	M2.4	Compliance with laws and regulations is actively monitored, through a regime which may include at-sea and portside inspections, observer programmes, and VMS.	PASS

**Clause outcome:** PASS

**M2.1 There is an organisation responsible for monitoring compliance with fishery laws and regulations.**  
 The National Fisheries and Aquaculture Service (SERNAPESCA) is responsible for the enforcement of fisheries rules and regulations in Chilean waters. SERNAPESCA employs a staff of 900 throughout the 16 administrative regions of Chile, via 46 provincial offices (SERNAPESCA 2022).

**M2.2 There is a framework of sanctions which are applied when laws and regulations are discovered to have been broken.**  
 A framework of sanctions is set out under Title 9 of the General Law on Fisheries and Aquaculture (LGPA), No. 18,892 of 1989, as amended (SUBPESCA 2019). These include fines; suspension or revocation of the captain’s licence; removal of fishing quota; seizure of gear or vessels; confiscation of catch; and closure of fishing and processing facilities. The law also allows for an increase in severity of sanctions for multiple offences in a short period (less than 2 years). There were 46 incidents in 2021 which led to the application of sanctions under SERNAPESCA (SERNAPESCA 2021). Relatively few offenses with which an individual species was associated related to jack mackerel, with the most frequently associated species being common hake

(11.2% of offences). Examples of seizures and other SERNAPESCA activity are occasionally reported in the industry press (e.g., SeafoodNews 2021; 2022).

**M2.3 There is no substantial evidence of widespread non-compliance in the fishery, and no substantial evidence of IUU fishing.**

No substantial evidence of widespread non-compliance was encountered during the drafting of this assessment report. The jack mackerel fishery has been estimated to have relatively low levels of illegal activity compared to other Chilean fisheries (Donlan *et al*, 2020). In 2021, a special control and monitoring operation was carried out specifically to address possible underreporting of catch and bycatch in industrial pelagic fisheries. The operation included remote monitoring, on-board cameras and inspections carried out by field agents (SERNAPESCA 2021). The main conclusion of this special operation was that no underreporting was occurring.

Overall, there is no evidence of widespread IUU activity and the available evidence suggests control and enforcement is effective. M2.3 is met.

**M2.4 Compliance with laws and regulations is actively monitored, through a regime which may include at-sea and portside inspections, observer programmes, and VMS.**

Inspection activities were limited by the pandemic in 2020, but the most recent control and enforcement report states that 76,200 inspection activities were conducted in 2021, a 67.3% increase on the previous year. The industrial fishery is monitored by VMS, with an average of 105 fishing vessels monitored per day, and VMS monitoring detected 39 infractions over the course of the year. Cameras on board vessels are used to monitor discarding and other fishing activity. Just over 20,000 portside inspections were carried out, alongside around 24,000 at-sea inspections (SERNAPESCA 2021).

**References**

Donlan, C.J., Wilcox, C., Luque, G.M., and Gelcich, S. (2020). *Estimating illegal fishing from enforcement officers*. Nature Scientific Reports (2020) 10:12478. [https://advancedconservation.org/wp-content/uploads/2020/08/donlan\\_etal\\_2020.pdf](https://advancedconservation.org/wp-content/uploads/2020/08/donlan_etal_2020.pdf)

SeafoodNews (2021). Sernapesca seizes more than 68 tons of products. April 14, 2021. <https://www.seafoodnews.com/Story/1196570/Sernapesca-Seizes-More-Than-68-Tons-of-Products>

SeafoodNews (2022). Chile’s Sernapesca seizes 200 tons of illegally caught anchovy. April 14, 2022. <https://www.seafoodnews.com/Story/1223524/Chiles-Sernapesca-Seizes-200-Tons-of-Illegally-Caught-Anchovy>

SERNAPESCA (2021). Control in fisheries and aquaculture: activity report of the national fisheries and aquaculture service, 2021. [http://www.sernapesca.cl/sites/default/files/ifpa\\_2021\\_0.pdf](http://www.sernapesca.cl/sites/default/files/ifpa_2021_0.pdf)

SERNAPESCA (2022). SERNAPESCA website, “What is SERNAPESCA?”. <http://www.sernapesca.cl/que-es-sernapesca>

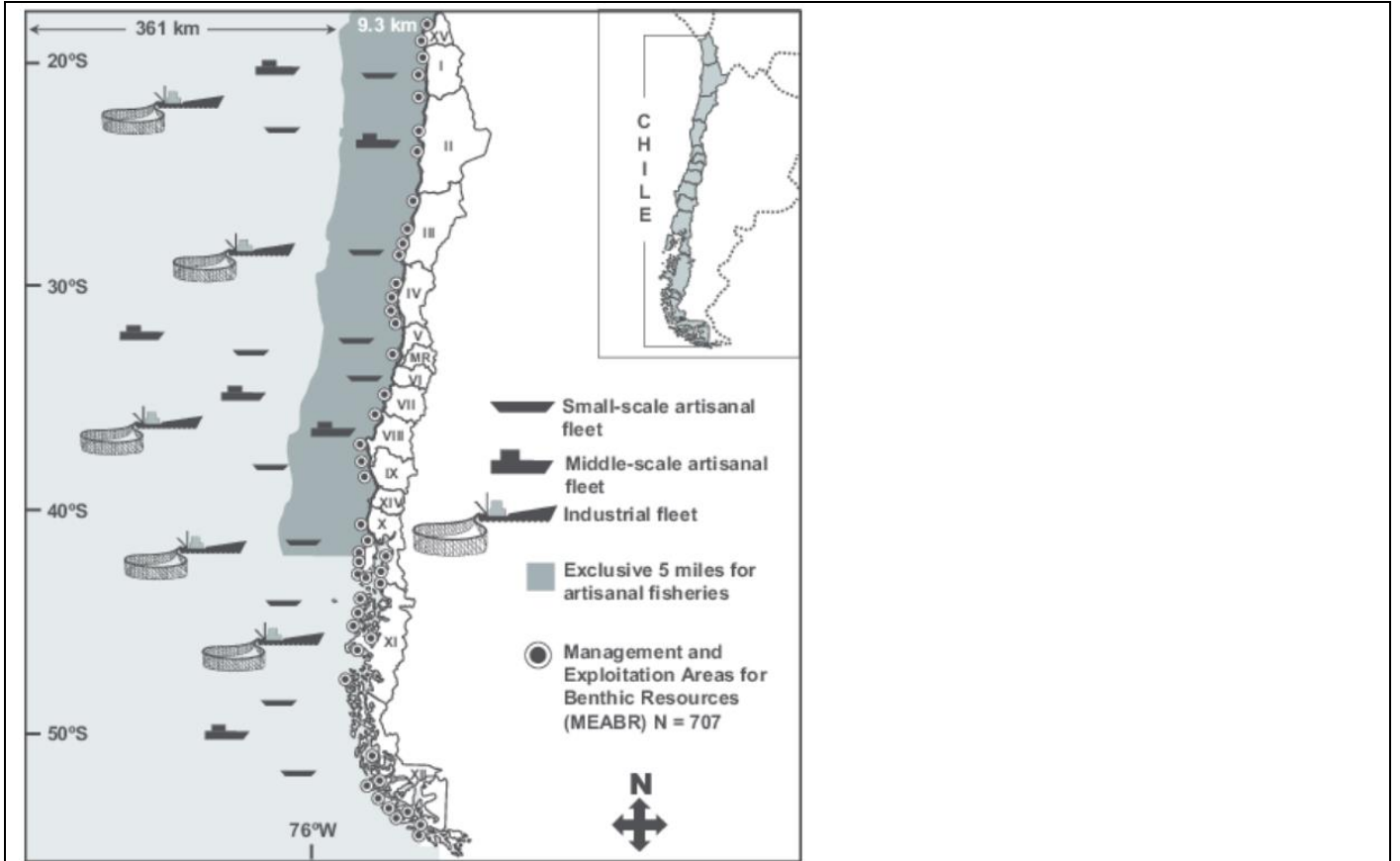
SUBPESCA (2019). General Law on Fisheries and Aquaculture (updated text incorporating amendment to Law No. 21,437). <https://www.subpesca.cl/portal/615/w3-article-88020.html>

Links	
MarinTrust Standard clause	1.3.1.3
FAO CCRF	7.7.2
GSSI	D1.09

## CATEGORY A SPECIES

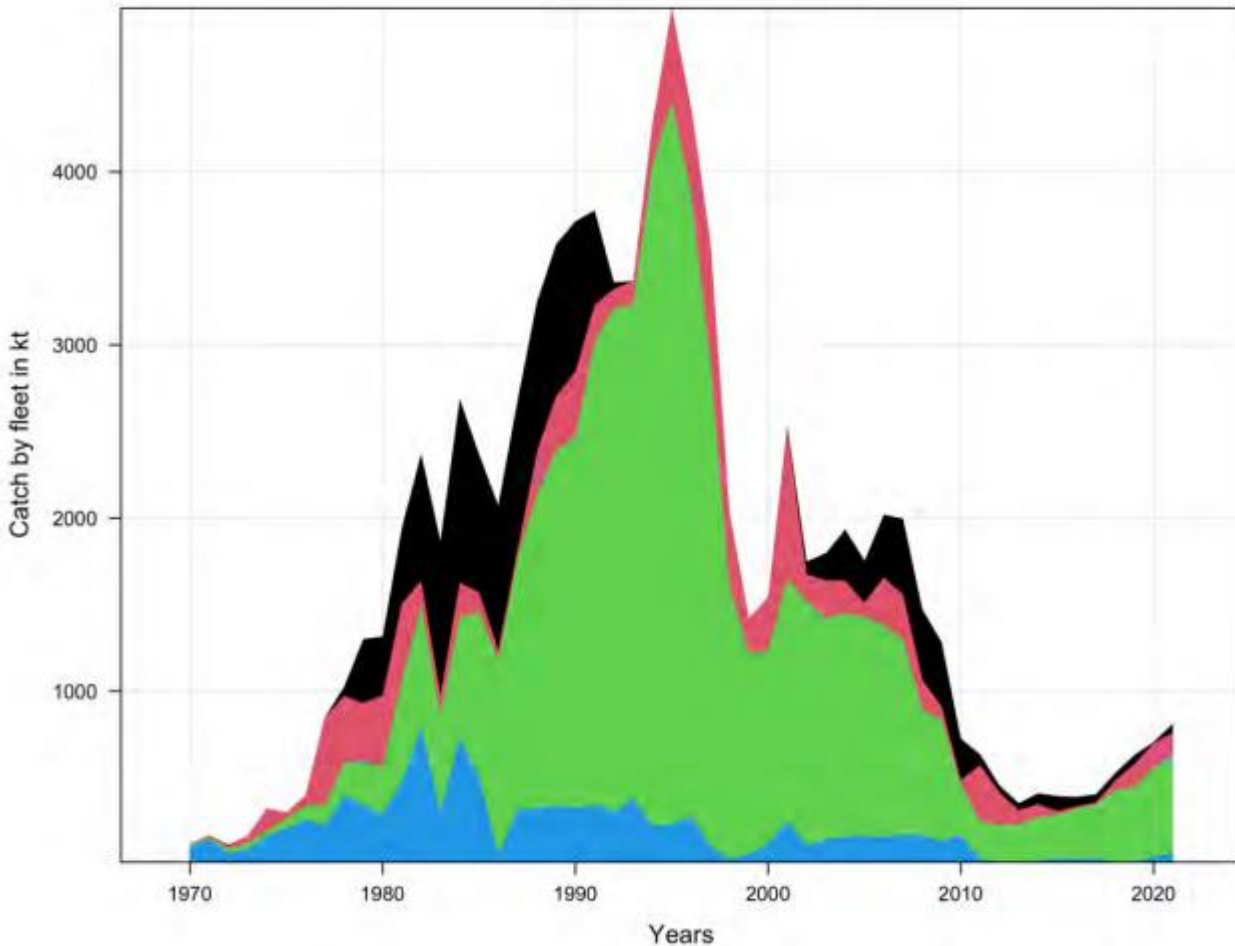
The four clauses in this section apply to Category A species. Clauses A1 - A4 should be completed for **each** Category A species. If there are no Category A species in the fishery under assessment, this section can be deleted. A Category A species must meet the minimum requirements of all four clauses before it can be recommended for approval. The clauses should be completed by providing sufficient evidence to justify awarding each of the requirements a pass or fail rating. The species must achieve a pass rating against all requirements to be awarded a pass overall. **If the species fails any of these clauses it should be re-assessed as a Category B species.**

<b>Species Name</b>		Jack mackerel ( <i>Trachurus murphyi</i> )	
<b>A1</b>	<b>Data Collection - Minimum Requirements</b>		
	<b>A1.1</b>	Landings data are collected such that the fishery-wide removals of this species are known.	PASS
	<b>A1.2</b>	Sufficient additional information is collected to enable an indication of stock status to be estimated.	PASS
<b>Clause outcome:</b>			PASS
<p><b>A1.1 Landings data are collected such that the fishery-wide removals of this species are known.</b></p> <p>Landings data are collected across the entire distribution of the jack mackerel stock(s). These are divided into four “fleets”: Fleet 1 is the Northern Chilean fleet, covering Chilean administrative Regions XV-II (see map); Fleet 2 is the south-central Chilean fleet, covering Regions III-X; Fleet 3 is the far north fleet, covering fishing activity in Peruvian and Ecuadorian waters, with some catch also taken by Cook Islands, and (historically) Cuba, and USSR vessels; and Fleet 3, the offshore fleet, with catches in recent years taken primarily by Russia, China and EU vessels, but also by Korea, Peru and Vanuatu, and historically by Belize, Cuba, the Faroe Islands and Ukraine (SPRFMO 2021). Catches are recorded for each country and grouped by fleet.</p> <p>Fishery-wide landings data are collected, and total international removals are likely well understood. A1.1 is met.</p>			



Fisheries zoning in Chile, with administrative Regions marked using Roman numerals. Map not to scale (Gelcich *et al* 2010).

**Total catch by fleet**



Catch of jack mackerel in the Southeast Pacific by fleet. Blue is the northern Chilean fleet, green in the south-central Chilean fleet, red is the far north fleet (including Peruvian and Ecuadorian vessels), and black is the offshore trawl fleet (SPRFMO 2021)

**A1.2 Sufficient additional information is collected to enable an indication of stock status to be estimated.**

The stock assessment conducted by the SPRFMO is supported by additional information provided by the various fishery participants, and further by fishery-independent data sources. Length and age distribution data are available for catches by each country, along with CPUE time series.

Hydro-acoustic and Daily Egg Production Method (DEPM) surveys have been conducted in Chilean waters and estimates of hydroacoustic biomass are available for 2006 – 2019 in the northern region and 1997 – 2009 in the south-central region. Outside of the Chilean EEZ acoustic surveys have been conducted intermittently and extend from 1984 to the present day. Information from these survey indices is summarised in the table below.

Sufficient additional information is collected, and A1.2 is met.

Year	Chile (1)	Chile (2)	Chile (3)	Chile (4)	Peru(2)	Peru(3)	Offshore
1983	-	-	0.858	-	-	-	-
1984	-	99	0.792	-	-	-	-
1985	-	324	0.703	-	94.316	-	-
1986	-	123	0.591	-	108.116	-	-
1987	-	213	0.706	-	109.789	-	-
1988	-	134	0.626	-	114.18	-	-
1989	-	-	0.616	-	157.394	-	-
1990	-	-	0.529	-	229.757	-	-
1991	-	242	0.596	-	231.672	-	-
1992	-	-	0.561	-	180.355	-	-
1993	-	-	0.5	-	145.726	-	-
1994	-	-	0.543	-	95.245	-	-
1995	-	-	0.491	-	54.257	-	-
1996	-	-	0.492	-	29.967	-	-
1997	3530	-	0.405	-	31.664	-	-
1998	3200	-	0.344	-	43.994	-	-
1999	4100	-	0.352	5724	52.681	-	-
2000	5600	-	0.343	4688	105.784	-	-
2001	5950	-	0.417	5627	131.586	-	-
2002	3700	-	0.367	-	96.661	4.146	-
2003	2640	-	0.324	1388	67.471	4.976	-
2004	2640	-	0.349	3287	51.853	5.462	-
2005	4110	-	0.319	1043	75.171	4.348	-
2006	3192	112	0.361	3283	111.259	5.778	-
2007	3140	275	0.263	626	79.75	8.056	-
2008	487	259	0.184	1935	24.251	4.099	1749.79
2009	328	18	0.153	-	-	1.482	1278.03
2010	-	440	0.116	-	7.247	2.8	913.461
2011	-	432	0.065	-	35.283	7.057	829.268
2012	-	230	0.199	-	50.332	6.269	733.962
2013	-	144	0.176	-	64.504	2.773	855.072
2014	-	87	0.14	-	-	3.865	908.79
2015	-	459	0.115	-	-	3.136	1311.44
2016	-	587.244	0.21	-	-	2.706	942.706
2017	-	610.47	0.253	-	-	3.512	1220.59
2018	-	374.11	0.257	-	-	9.756	1214.57
2019	-	1487.07	0.285	-	-	16.687	1424.29
2020	-	1728.27	0.376	-	-	18.474	2367.2
2021	-	1886.27	0.371	-	-	22.862	-

Summary of abundance indices used within the jack mackerel stock assessment model. Chile (1) is the acoustic survey for the Chilean south-central region. Chile (2) is the acoustic survey for the Chilean northern region. Chile (3) is the CPUE for Fleet 1. Chile (4) is the DEPM. Peru (1) is the Peruvian acoustic index for Fleet 3. Peru (2) is the Peruvian CPUE for Fleet 3. Offshore is the combined CPUE for China, EU, South Korea, Russia and Vanuatu in Fleet 4 (SPRFMO 2021).

#### References

Gelcich, S., Hughes, T.P., Olsson, P., Folke, C. (2010). *Navigating transformations in Governance of Chilean Marine Coastal Resources*. PNAS 107(39): 16749-9.  
[https://www.researchgate.net/publication/46255495\\_Navigating\\_Transformations\\_in\\_Governance\\_of\\_Chilean\\_Marine\\_Coastal\\_Resources](https://www.researchgate.net/publication/46255495_Navigating_Transformations_in_Governance_of_Chilean_Marine_Coastal_Resources)

SPRFMO (2021). SPRFMO SC9-Report, Annex 10. Jack mackerel technical annex. <a href="https://www.sprfmo.int/assets/2021-SC9/Report/SC9-Report-Annex-10-Jack-mackerel-Technical-advice-RS.pdf">https://www.sprfmo.int/assets/2021-SC9/Report/SC9-Report-Annex-10-Jack-mackerel-Technical-advice-RS.pdf</a>	
<b>Links</b>	
<b>MarinTrust Standard clause</b>	1.3.2.1.1, 1.3.2.1.2, 1.3.2.1.4, 1.3.1.2
<b>FAO CCRF</b>	7.3.1, 12.3
<b>GSSI</b>	D.4.01, D.5.01, D.6.02, D.3.14

A2	Stock Assessment - Minimum Requirements																						
A2.1	A stock assessment is conducted at least once every 3 years (or every 5 years if there is substantial supporting information that this is sufficient for the long-term sustainable management of the stock), and considers all fishery removals and the biological characteristics of the species.		PASS																				
A2.2	The assessment provides an estimate of the status of the biological stock relative to a reference point or proxy.		PASS																				
A2.3	The assessment provides an indication of the volume of fishery removals which is appropriate for the current stock status.		PASS																				
A2.4	The assessment is subject to internal or external peer review.		PASS																				
A2.5	The assessment is made publicly available.		PASS																				
<b>Clause outcome:</b>			PASS																				
<p><b>A2.1 A stock assessment is conducted at least once every 3 years (or every 5 years if there is substantial supporting information that this is sufficient for the long-term sustainable management of the stock), and considers all fishery removals and the biological characteristics of the species.</b></p> <p>Stock assessments have been conducted annually for jack mackerel in the southeast Pacific since 2013, via the SPRFMO Scientific Committee (SC). The most recent available stock assessment was conducted in 2021, although the 2022 SC meeting is scheduled to occur in Seoul from the 26<sup>th</sup> – 30<sup>th</sup> September and therefore some of the stock assessment information is already available (SPRFMO 2022). The stock assessment incorporates biological parameters including maturity-at-age, weight-at-age, natural mortality, and growth function (SPRFMO 2021). The full details of all datasets used in the stock assessment process are also published and made available (SPRFMO 2015).</p> <p>A stock assessment is conducted every year and considers all fishery removals and the biological characteristics of the species, and A2.1 is met.</p> <p><b>A2.2 The assessment provides an estimate of the status of the biological stock relative to a reference point or proxy.</b></p> <p>The stock assessment conducted by the SPRFMO provides estimates of the current spawning stock biomass and fishing mortality of jack mackerel under each of the two stock hypotheses. The most recent outcomes for each hypothesis, published in 2021, are summarised in the table below. Reference points are calculated dynamically and updated for each new stock assessment (SPRFMO 2021).</p> <p>Summary of stock assessment outcomes for Southeast Pacific jack mackerel in 2021. Estimated Spawning Stock Biomass (SSB), <math>SSB_{MSY}</math>, fishing mortality (F), and <math>F_{MSY}</math> for (1) the combined stock assumed by the single stock hypothesis, and (2) the separate southern and northern stocks assumed by the two-stock hypothesis. MSY values are a function of time-varying selectivity and average weight. Reconstructed from multiple tables in the SPRFMO technical annex (SPRFMO 2021).</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th>Hypothesis / Stock</th> <th>SSB</th> <th><math>SSB_{MSY}</math></th> <th>F</th> <th><math>F_{MSY}</math></th> </tr> </thead> <tbody> <tr> <td>Single stock hypothesis</td> <td>9,960,000t</td> <td>5,495,000t</td> <td>0.08</td> <td>0.13</td> </tr> <tr> <td>Two-stock hypothesis, southern stock</td> <td>7,621,000t</td> <td>4,798,000t</td> <td>0.08</td> <td>0.13</td> </tr> <tr> <td>Two-stock hypothesis, northern stock</td> <td>2,936,000t</td> <td>603,000t</td> <td>0.03</td> <td>0.09</td> </tr> </tbody> </table>				Hypothesis / Stock	SSB	$SSB_{MSY}$	F	$F_{MSY}$	Single stock hypothesis	9,960,000t	5,495,000t	0.08	0.13	Two-stock hypothesis, southern stock	7,621,000t	4,798,000t	0.08	0.13	Two-stock hypothesis, northern stock	2,936,000t	603,000t	0.03	0.09
Hypothesis / Stock	SSB	$SSB_{MSY}$	F	$F_{MSY}$																			
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Two-stock hypothesis, northern stock	2,936,000t	603,000t	0.03	0.09																			



**A2.3 The assessment provides an indication of the volume of fishery removals which is appropriate for the current stock status.**

The SPRFMO stock technical annex for jack mackerel includes management advice for the coming year, based on the jack mackerel rebuilding plan (see table below). The 2021 stock annex stated that because SSB was estimated to be above  $SSB_{MSY}$ , the HCR established by the rebuilding plan would usually result in  $F_{MSY}$  being used as the basis for catch advice. However, an adjustment to the rebuilding plan introduced a rule that the TAC could not vary from year to year by more than 15% (SPRFMO 2014a). This restriction resulted in a recommendation that the 2022 TAC for jack mackerel across its entire range should not exceed 900,000t. The technical annex also recommended the rebuilding plan should be revisited, as “projections show a high likelihood of the biomass being above  $B_{MSY}$  in 2023 even under the most conservative recruitment productivity scenario evaluated” (SPRFMO 2021).

The stock assessment provides an indication of the volume of fishery removals which is appropriate for the stock, and A2.3 is met.

Stock status	TAC calculation method
$SSB_t \leq 80\%$ of $B_{MSY}$ (or proxy)	1) Compute yield ( $C_{trial}$ ) at estimated $F_{2013}$ or $F_{MSY}$ (whichever is smaller) <i>If <math>C_{trial} &lt; C_{replacement}</math></i> Set catch at or below $C_{trial}$ <i>(the stock will increase)</i> <i>Else if <math>C_{trial} &gt; C_{replacement}</math></i> Set catch at or below $C_{replacement}$ <i>(the stock remains stable)</i>
$SSB_t > 80\%$ of $B_{MSY}$ (or proxy) and $SSB_t \leq B_{MSY}$ (or proxy)	2) Compute yield ( $C_{trial}$ ) at estimated $F_{MSY}$ (or proxy) <i>If <math>C_{trial} &lt; C_{replacement}</math></i> Set catch at or below $C_{trial}$ <i>(the stock will increase)</i> <i>Else if <math>C_{trial} &gt; C_{replacement}</math></i> Use method 1)
$SSB_t > B_{MSY}$ (or proxy)	3) Set catch at or below value based on $F_{MSY}$

Summary of the harvest control rules (HCR) of the jack mackerel rebuilding plan. As SSB in 2021 was estimated to be above  $B_{MSY}$ , the third tier (“Set catch at or below value based on  $F_{MSY}$ ”) was used to produce a TAC recommendation (SPRFMO 2014).

**A2.4 The assessment is subject to internal or external peer review.**

Stock assessments and their underlying data are submitted to the SPRFMO Scientific Committee for review at their annual meetings. This is in addition to the internal peer reviews carried out by each organisation submitting data; for example, the summary of the jack mackerel fishery in Chilean waters produced by SUBPESCA is reviewed internally before submission.

Documentation is subject to internal and external peer review, and A2.4 is met.

**A2.5 The assessment is made publicly available.**

The processes, discussions, and outcomes of the SPRFMO scientific and commission meetings are made available on the SPRFMO website; for example, the most recent scientific committee meeting documentation, which includes the jack mackerel stock assessment documentation, is available at <https://www.sprfmo.int/meetings/scientific-committee/9th-sc-2021/>. All of the evidence sources used to produce this MT assessment report were publicly available and did not need to be requested.

**References**

SPRFMO (2014). Proposed jack mackerel rebuilding plan. <https://www.sprfmo.int/assets/Meetings/Meetings-2013-plus/Commission-Meetings/2nd-Commission-Meeting-2014-Manta-Ecuador/Annex-K-Proposed-Jack-Mackerel-Rebuilding-Plan.pdf>

SPRFMO (2014a). SPRFMO Scientific Committee. Report of the 2<sup>nd</sup> scientific committee meeting, Honolulu, Hawaii, 1-7 October 2014. <https://www.sprfmo.int/assets/Meetings/Meetings-2013-plus/SC-Meetings/2nd-SC-Meeting-2014/Report/SC-02-Final-Report-21Oct-accepted.pdf>

SPRFMO (2015). SPRFMO Scientific Committee. Report of the 2015 data workshop, Port Vila, Vanuatu, 26-28 September 2015. <http://www.sprfmo.int/assets/Meetings/Meetings-2013-plus/SC-Meetings/3rd-SC-Meeting-2015/Data-Workshop/SC03-DataWorkshopReport-6Oct15.pdf>

SPRFMO (2021). SPRFMO SC9-Report, Annex 10. Jack mackerel technical annex. <https://www.sprfmo.int/assets/2021-SC9/Report/SC9-Report-Annex-10-Jack-mackerel-Technical-advice-RS.pdf>

SPRFMO (2022). 10<sup>th</sup> meeting of the SPRFMO Scientific Committee, summary and documents. <https://www.sprfmo.int/meetings/scientific-committee/10th-sc-2022/>

**Links**

<b>MarinTrust Standard clause</b>	1.3.2.1.2, 1.3.2.1.4, 1.3.1.2
<b>FAO CCRF</b>	12.3
<b>GSSI</b>	D.5.01, D.6.02, D.3.14

<b>A3 Harvest Strategy - Minimum Requirements</b>		
<b>A3.1</b>	There is a mechanism in place by which total fishing mortality of this species is restricted.	PASS
<b>A3.2</b>	Total fishery removals of this species do not regularly exceed the level indicated or stated in the stock assessment. Where a specific quantity of removals is recommended, the actual removals may exceed this by up to 10% ONLY if the stock status is above the limit reference point or proxy.	PASS
<b>A3.3</b>	Commercial fishery removals are prohibited when the stock has been estimated to be below the limit reference point or proxy (small quotas for research or non-target catch of the species in other fisheries are permissible).	PASS
<b>Clause outcome:</b>		PASS
<b>A3.1 There is a mechanism in place by which total fishing mortality of this species is restricted.</b>		
National catch quotas have been in place in Peru since 1995 and Chile since 1999; additionally, the catch of jack mackerel for reduction purposes has been banned in Peru since 2002. In international waters, restrictions on the total number of fishing vessels have been in place since 2010 and catch limits have been in place since 2011 (SPRFMO 2021). In recent years, the large majority of total international catch has been taken in Chilean waters.		
The quota system allows for the transfer of national quota between countries, which can lead to total catches within the Chilean EEZ exceeding the national TAC. This occurred in 2021, where the Chilean national TAC was exceeded in the first half of the year		

(SPRFMO 2021a). For this reason, catch data must be considered across the entire SPRFMO area rather than a country-by-country basis.

There is a quota system in place by which the total fishing mortality of jack mackerel is restricted, and A3.1 is met.

**A3.2 Total fishery removals of this species do not regularly exceed the level indicated or stated in the stock assessment. Where a specific quantity of removals is recommended, the actual removals may exceed this by up to 10% ONLY if the stock status is above the limit reference point or proxy.**

Since 2013 the total international TAC for jack mackerel has been set at or below the level recommended by the SPRFMO Scientific Committee. Between 2013 and 2019, catch fell short of the TAC. Since 2019 the TAC has been exceeded every year by 1.5-6.8%, although the level of excess catch appears to be declining. According to the MT fishery assessment guidance, landings may exceed the recommended level by up to 10% if the stock biomass is estimated to be at or above the limit reference point. Both potential stock structure hypotheses produce results indicating that the jack mackerel stock(s) are above the target reference point and therefore also above any possible limit reference point. For this reason, the level of catches in the jack mackerel fishery in recent years meets the MT requirements and A3.2 is met.

A summary of catch advice, quotas, and landings since 2013 is provided in the table below.

Jack mackerel in the Southeast Pacific, summary of catch advice, TAC and total catch for each year since 2013. Most data extracted from the SC9 final report (SPRFMO 2021b); entries marked with an asterisk are taken from the SC10 Jack Mackerel working group papers (SPRFMO 2022). Total catch for 2022 is an estimate based on available catch data to date. All quantities in tonnes.

Year	Catch advice	TAC	Catch	TAC exceeded by
2013	441,000	438,000	353,120	n/a
2014	440,000	440,000	410,703	n/a
2015	460,000	460,000	394,332	n/a
2016	460,000	460,000	389,067	n/a
2017	493,000	493,000	404,845	n/a
2018	576,000	576,000	526,323	n/a
2019	591,000	591,000	631,545	6.8%
2020	680,000	680,000	706,675	3.9%
2021	782,000	782,000	807,566*	3.3%
2022	900,000	900,000	913,602*	1.5%

**A3.3 Commercial fishery removals are prohibited when the stock has been estimated to be below the limit reference point or proxy (small quotas for research or non-target catch of the species in other fisheries are permissible).**

There have been no recent occasions when the stock has been estimated to be below the limit reference point. The HCR established by the rebuilding plan sets out the process by which annual catch should be calculated and includes a reduction in that recommendation as any potential limit reference point is approached. There is also clear evidence that the HCR has been followed, and has been successful in rebuilding the stock, with SSB estimates showing an increasing upward trend since the plan was implemented in 2014.

The MT assessment guidance states that “Management measures should specify the actions to be taken in the event that the status of the stock under consideration drops below levels consistent with achieving management objectives that allow for the restoration of the stock to such levels within a reasonable timeframe”. Such management measures are in place in the jack mackerel fishery and have been demonstrated to be effective. A3.3 is met.

References	
SPRFMO (2021). SPRFMO SC9-Report, Annex 10. Jack mackerel technical annex. <a href="https://www.sprfmo.int/assets/2021-SC9/Report/SC9-Report-Annex-10-Jack-mackerel-Technical-advice-RS.pdf">https://www.sprfmo.int/assets/2021-SC9/Report/SC9-Report-Annex-10-Jack-mackerel-Technical-advice-RS.pdf</a>	
SPRFMO (2021a). SPRFMO SC9-Doc24. Chile Annual Report – Jack Mackerel. <a href="https://www.sprfmo.int/assets/2021-SC9/SC9-Doc24-Chile-Annual-Report-Jack-Mackerel.pdf">https://www.sprfmo.int/assets/2021-SC9/SC9-Doc24-Chile-Annual-Report-Jack-Mackerel.pdf</a>	
SPRFMO (2021b). SPRFMO Scientific Committee. 9 <sup>th</sup> Scientific Committee meeting report, 27/28 September – 2/3 October 2021, Remote meeting. <a href="https://www.sprfmo.int/assets/2021-SC9/Report/SC9-Report-Final.pdf">https://www.sprfmo.int/assets/2021-SC9/Report/SC9-Report-Final.pdf</a>	
SPRFMO (2022). SC10-JM01, <i>Trachurus murphyi</i> catch history. <a href="https://www.sprfmo.int/assets/02-SC10/Meeting-Papers/SC10-JM01-CJM-catch-data.pdf">https://www.sprfmo.int/assets/02-SC10/Meeting-Papers/SC10-JM01-CJM-catch-data.pdf</a> (catch data at annex 1, <a href="https://www.sprfmo.int/assets/02-SC10/Meeting-Papers/SC10-JM01-Annex1-CJM-catch-history-data.xlsx">https://www.sprfmo.int/assets/02-SC10/Meeting-Papers/SC10-JM01-Annex1-CJM-catch-history-data.xlsx</a> ).	
<i>Standard clause 1.3.2.1.3</i>	
Links	
<b>MarinTrust Standard clause</b>	1.3.2.1.3, 1.3.2.1.4
<b>FAO CCRF</b>	7.2.1, 7.22 (e), 7.5.3
<b>GSSI</b>	D3.04, D6.01

A4 Stock Status – Minimum Requirements	
<b>A4.1</b>	<p>The stock is at or above the target reference point, OR IF NOT:</p> <p>The stock is above the limit reference point or proxy and there is evidence that a fall below the limit reference point would result in fishery closure OR IF NOT:</p> <p>The stock is estimated to be below the limit reference point or proxy, but fishery removals are prohibited.</p>
PASS	
<b>Clause outcome:</b>	
PASS	
<p><b>A4.1 The stock is at or above the target reference point, OR IF NOT:</b></p> <p><b>The stock is above the limit reference point or proxy and there is evidence that a fall below the limit reference point would result in fishery closure OR IF NOT:</b></p> <p><b>The stock is estimated to be below the limit reference point or proxy, but fishery removals are prohibited.</b></p> <p>The most recent stock assessment produced the estimates of stock status summarised in the table in A2.2, above. Under the single stock hypothesis, the stock was estimated to have an SSB in 2021 of 9.960,000t, against a target reference point (<math>B_{MSY}</math>) of 5,495,000t (SPRFMO 2021). Under the two-stock hypothesis, the southern stock was estimated to have an SSB of 7,621,000t in 2021, against <math>B_{MSY}</math> of 4,798,000t; and the northern stock an SSB of 2,936,000t against <math>B_{MSY}</math> of 603,000t. In all three cases, the current stock biomass is considerably above the target reference point, meeting the first requirement of this clause. Additionally, the most recent stock annex notes that “the stock [or stocks] has consistently been estimated as rebuilt since 2018, and not subject to overfishing since 2013, relative to the dynamically estimated MSY reference points” (SPRFMO 2021).</p> <p>The stock is at or above the target reference point, and A4.1 is met.</p>	

<b>References</b>	
SPRFMO (2021). SPRFMO SC9-Report, Annex 10. Jack mackerel technical annex. <a href="https://www.sprfmo.int/assets/2021-SC9/Report/SC9-Report-Annex-10-Jack-mackerel-Technical-advice-RS.pdf">https://www.sprfmo.int/assets/2021-SC9/Report/SC9-Report-Annex-10-Jack-mackerel-Technical-advice-RS.pdf</a>	
<b>Links</b>	
MarinTrust Standard clause	1.3.2.1.4
FAO CCRF	7.2.1, 7.2.2 (e)
GSSI	D6 01

## CATEGORY D SPECIES

Category D species are those which make up less than 5% of landings and are not subject to a species-specific

<b>D1</b>	<b>Species Name</b>	<b>Pacific chub mackerel (<i>Scomber japonicus</i>)</b>	
	<b>Productivity Attribute</b>	<b>Value</b>	<b>Score</b>
	Average age at maturity (years)	2 years	1
	Average maximum age (years)	7.9 years	1
	Fecundity (eggs/spawning)	135,962	1
	Average maximum size (cm)	64cm	1
	Average size at maturity (cm)	22cm	1
	Reproductive strategy	Broadcast spawner	1
	Mean trophic level	3.4	3
	<b>Average Productivity Score</b>		<b>1.29</b>
	<b>Susceptibility Attribute</b>	<b>Value</b>	<b>Score</b>
	Availability (area overlap)	<10% overlap	1
	Encounterability (the position of the stock/species within the water column relative to the fishing gear)	High encounterability – similar depth range to target	3
	Selectivity of gear type	High rate of retention – similar size to target	3
	Post-capture mortality	Retained	3
	<b>Average Susceptibility Score</b>		<b>2.5</b>
	<b>PSA Risk Rating (From Table D3)</b>		<b>PASS</b>
	<b>Compliance rating</b>		<b>PASS</b>
	<b>Further justification for susceptibility scoring (where relevant)</b>		
	<i>For susceptibility attributes, please provide a brief rationale for scoring of parameters where there may be uncertainty affecting your decision</i>		
	Computer-generated distribution map for Pacific chub mackerel. <a href="https://www.fishbase.se/summary/Scomber-japonicus.html">https://www.fishbase.se/summary/Scomber-japonicus.html</a>		
	<b>References</b>		
Fishbase, Pacific chub mackerel. <a href="https://www.fishbase.se/summary/Scomber-japonicus.html">https://www.fishbase.se/summary/Scomber-japonicus.html</a>			
<i>Standard clauses 1.3.2.2</i>			

management regime. In the case of mixed trawl fisheries, Category D species may make up the majority of landings.

The comparative lack of scientific information on the status of the population of the species means that a risk-assessment style approach must be taken.

Table D2 - Productivity / Susceptibility attributes and scores.

Productivity attributes	High productivity (Low risk, score = 1)	Medium productivity (medium risk, score = 2)	Low productivity (high risk, score = 3)
Average age at maturity	<5 years	5-15 years	>15 years
Average maximum age	<10 years	10-25 years	>25 years
Fecundity	>20,000 eggs per year	100-20,000 eggs per year	<100 eggs per year
Average maximum size	<100 cm	100-300 cm	>300 cm
Average size at maturity	<40 cm	40-200 cm	>200 cm
Reproductive strategy	Broadcast spawner	Demersal egg layer	Live bearer
Mean Trophic Level	<2.75	2.75-3.25	>3.25

Susceptibility attributes	Low susceptibility (Low risk, score = 1)	Medium susceptibility (medium risk, score = 2)	High susceptibility (high risk, score = 3)
Areal overlap (availability) Overlap of the fishing effort with the species range	<10% overlap	10-30% overlap	>30% overlap
Encounterability The position of the stock/species within the water column relative to the fishing gear, and the position of the stock/species within the habitat relative to the position of the gear	Low overlap with fishing gear (low encounterability).	Medium overlap with fishing gear.	High overlap with fishing gear (high encounterability). Default score for target species
Selectivity of gear type Potential of the gear to retain species	a Individuals < size at maturity are rarely caught	a Individuals < size at maturity are regularly caught.	a Individuals < size at maturity are frequently caught
	b Individuals < size at maturity can escape or avoid gear.	b Individuals < half the size at maturity can escape or avoid gear.	b Individuals < half the size at maturity are retained by gear.
Post-capture mortality (PCM) The chance that, if captured, a species would be released and that it would be in a	Evidence of majority released post-capture and survival.	Evidence of some released post-capture and survival.	Retained species or majority dead when released.



condition	permitting			
subsequent survival				

D3		Average Susceptibility Score		
		1 - 1.75	1.76 - 2.24	2.25 - 3
Average Productivity Score	1 - 1.75	PASS	PASS	PASS
	1.76 - 2.24	PASS	PASS	TABLE D4
	2.25 - 3	PASS	TABLE D4	TABLE D4

D4		Species Name	n/a
<b>Impacts On Species Categorised as Vulnerable by D1-D3 - Minimum Requirements</b>			
D4.1	The potential impacts of the fishery on this species are considered during the management process, and reasonable measures are taken to minimise these impacts.		
D4.2	There is no substantial evidence that the fishery has a significant negative impact on the species.		
			<b>Outcome:</b>
<p><b>Evidence</b></p> <p>D4.1: The potential impacts of the fishery on this species are considered during the management process, and reasonable measures are taken to minimise these impacts.</p> <p>D4.2 There is no substantial evidence that the fishery has a significant negative impact on the species.</p>			
<b>References</b>			
<b>Links</b>			
MarinTrust Standard clause		1.3.2.2, 4.1.4	
FAO CCRF		7.5.1	
GSSI		D.5.01	

## FURTHER IMPACTS

The three clauses in this section relate to impacts the fishery may have in other areas. A fishery must meet the minimum requirements of all three clauses before it can be recommended for approval.

<b>F1</b>	<b>Impacts on ETP Species - Minimum Requirements</b>		
	<b>F1.1</b>	Interactions with ETP species are recorded.	PASS
	<b>F1.2</b>	There is no substantial evidence that the fishery has a significant negative effect on ETP species.	PASS
	<b>F1.3</b>	If the fishery is known to interact with ETP species, measures are in place to minimise mortality.	PASS
<b>Clause outcome:</b>			PASS
<b>F1.1 Interactions with ETP species are recorded.</b>			
<p>In the Chilean fleet, interactions with ETP species have been recorded by an observer programme which has been in place since 2015. Catches of marine mammals and sea birds are reported in the Chilean Annual Report to the SPRFMO (SPRFMO 2021). 14 species were identified, with mortality rates varying from 0% to 100% depending on species. Of the species identified in the catch, all were classified by the IUCN as Least Concern except:</p> <ul style="list-style-type: none"> <li>• Peruvian pelican, <i>Pelecanus thagus</i>, Near Threatened, average of 0.001 mortality per observed fishing set (Average Incidental Morality, AIM).</li> <li>• Sooty shearwater, <i>Ardenna grisea</i>, Near Threatened, AIM = 0.0009</li> <li>• Grey-headed albatross, <i>Thalassarche chrysostoma</i>, Endangered, no mortalities recorded</li> <li>• Pink-footed shearwater, <i>Ardenna creatopus</i>, Vulnerable, AIM = 0.007</li> <li>• Humboldt penguin, <i>Spheniscus humboldti</i>, Vulnerable, AIM = 0.0005</li> <li>• White-chinned petrel, <i>Procellaria aequinoctialis</i>, Vulnerable, AIM = 0.0005</li> <li>• Wandering albatross, <i>Diomedea exulans</i>, Vulnerable, no mortalities recorded</li> <li>• Leatherback sea turtle, <i>Dermochelys coriacea</i>, Vulnerable worldwide but Critically Endangered in the East Pacific, no mortalities recorded.</li> </ul> <p>According to the MT fishery assessment guidance, ETP species are those which are categorised by the IUCN as Endangered or critically endangered, and therefore of this list only the grey-headed albatross and leatherback sea turtle are ETP for the purposes of this assessment. Over the five years of the observer programme, 36 interactions were recorded with grey-headed albatross, all of which resulted in the individual being released alive. In the same period, one interaction with a leatherback turtle was recorded, similarly resulting in live release (SPRFMO 2021).</p> <p>Interactions with ETP species are recorded, and F1.1 is met.</p>			
<b>F1.2 There is no substantial evidence that the fishery has a significant negative effect on ETP species.</b>			
<p>No evidence was encountered during the assessment to indicate that the fishery has a significant negative impact on any ETP species. As noted above, very few interactions with species which meet the MT definition of ETP occur, and of those which do occur the mortality rate is extremely low. The fishery holds an MSC certificate with no indication that the fishery is likely to have a negative impact on ETP species (Mateo &amp; Saa 2022). The available evidence suggests that the fishery does not have a significant negative impact on ETP species, and no evidence was encountered to the contrary. F1.2 is met.</p>			
<b>F1.3 If the fishery is known to interact with ETP species, measures are in place to minimise mortality.</b>			
<p>As noted above, interactions with ETP species are rare and direct ETP mortalities are extremely rare. In part, this is a result of the measures in place to minimise interactions and mortality. In 2014 SUBPESCA implemented a Nationwide Research Program on discards and incidental catch in small pelagic fisheries, to establish bycatch reduction plans. This research program was primarily driven by data collected by the observer program, such as the seabird and marine mammal interaction data</p>			

described above. Since 2019 a mandatory bycatch reduction plan has been in place for the entire jack mackerel industrial fleet. The reduction plan includes a ban on discarding of jack mackerel; the mandatory release of all incidental catch; a training program for fishers including a code of good fishing practices; incentives for innovations in systems designed to reduce discarding and incidental catch; and monitoring programs to evaluate the effectiveness of the other measures (SPRFMO 2022).  
 Measures are in place to minimise ETP mortality, and F1.3 is met.

**References**

IUCN ratings taken from the IUCN Red List. <https://www.iucnredlist.org/>

Mateo, I., & Saa, E., (2022). MSC Certification surveillance report: Chilean jack mackerel industrial purse seine, Surveillance 2. <https://fisheries.msc.org/en/fisheries/chilean-jack-mackerel-industrial-purse-seine-fishery/@assessments>

SPRFMO (2021). SPRFMO SC9-Doc24. Chile Annual Report – Jack Mackerel. <https://www.sprfmo.int/assets/2021-SC9/SC9-Doc24-Chile-Annual-Report-Jack-Mackerel.pdf>

SPRFMO (2022). SPRFMO SC10-Doc23. Chile Annual Report – Jack Mackerel. <https://www.sprfmo.int/assets/02-SC10/Meeting-Papers/SC10-Doc23-Chile-Annual-Report-Jack-mackerel.pdf>

Links	
MarinTrust Standard clause	1.3.3.1
FAO CCRF	7.2.2 (d)
GSSI	D4.04, D.3.08

F2 Impacts on Habitats - Minimum Requirements		
F2.1	Potential habitat interactions are considered in the management decision-making process.	PASS
F2.2	There is no substantial evidence that the fishery has a significant negative impact on physical habitats.	PASS
F2.3	If the fishery is known to interact with physical habitats, there are measures in place to minimise and mitigate negative impacts.	PASS

**Clause outcome:** PASS

**F2.1 Potential habitat interactions are considered in the management decision-making process.**  
 The purse seine gears used in the jack mackerel fishery are widely considered to make little or no contact with seabed habitats (e.g., FAO 2022; MSC 2022; Sustain 2022). As the gear is not designed to interact with the seabed, fishers will generally attempt to avoid interaction wherever possible to avoid damage. The low risk of habitat damage posed by purse seine gears is reflected in many fishery assessment methodologies (e.g., Caveen & Lart 2020; SFW 2020).  
 The Marin Trust fishery assessment guidance states that “good practice requires there to be a strategy in place that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to habitat types”. Such a strategy is not required for the specific fishery under assessment here, as due to the gear type used it fundamentally does not pose such a risk.

**F2.2 There is no substantial evidence that the fishery has a significant negative impact on physical habitats.**  
 No evidence was discovered during the assessment process to indicate that this fishery has a negative impact on physical habitats. Given the purse seine gears used in the fishery it is reasonable to assume there are no significant negative impacts.

**F2.3 If the fishery is known to interact with physical habitats, there are measures in place to minimise and mitigate negative impacts.**

The gear used in this fishery does not interact with physical habitats, and therefore no such measures are required to be in place. The nature of the fishery means that in the absence of any evidence of habitat interactions, the requirements of clause F2.3 are met.

**References**

Caveen, A. & Lart, B. (2020). Seafish RASS scoring guidance. <https://www.seafish.org/document/?id=4351A6BB-D3E4-4D26-BE93-EE19695C5FA9>

FAO (2022). Fishing gear types, purse seines. Technology fact sheets, Fisheries and Aquaculture Division [online]. <https://www.fao.org/fishery/en/geartype/249>

MSC (2022). Fishing methods and gear types: purse seine. <https://www.msc.org/what-we-are-doing/our-approach/fishing-methods-and-gear-types/purse-seine>

SFW (2020). Seafood Watch Fisheries Standard V F4. <https://www.seafoodwatch.org/globalassets/sfw/pdf/standards/fisheries/seafood-watch-fisheries-standard-version-f4.pdf>

Sustain (2022). Purse seines. [https://www.sustainweb.org/goodcatch/purse\\_seines/](https://www.sustainweb.org/goodcatch/purse_seines/)

Links	
MarinTrust Standard clause	1.3.3.2
FAO CCRF	6.8
GSSI	D.2.07, D.6.07, D3.09

F3 Ecosystem Impacts - Minimum Requirements		
F3.1	The broader ecosystem within which the fishery occurs is considered during the management decision-making process.	PASS
F3.2	There is no substantial evidence that the fishery has a significant negative impact on the marine ecosystem.	PASS
F3.3	If one or more of the species identified during species categorisation plays a key role in the marine ecosystem, additional precaution is included in recommendations relating to the total permissible fishery removals.	PASS
<b>Clause outcome:</b>		PASS
<p><b>F3.1 The broader ecosystem within which the fishery occurs is considered during the management decision-making process.</b></p> <p>The broader ecosystem is considered at the national and international levels. SUBPESCA submits an annual summary document to the SPRFMO, setting out the status of the jack mackerel fishery in Chile. An extended section of this report is devoted to the “Ecosystem approach considerations” in the fishery (SPRFMO 2022), which reflects the information provided by the other nations involved in the fishery and feeds into discussions at the main SPRFMO SC meeting. Additionally, the SPRFMO Habitat Monitoring Workgroup holds an annual meeting to discuss many ecosystem aspects of the fisheries under SPRFMO jurisdiction, including jack mackerel (SPRFMO 2021). Finally, the Deepwater Working Group also holds an annual meeting, with discussions covering Vulnerable Marine Ecosystems (VME) and the potential impacts of SPRFMO fisheries upon them (SPRFMO 2021a).</p> <p><b>F3.2 There is no substantial evidence that the fishery has a significant negative impact on the marine ecosystem.</b></p> <p>No evidence was encountered to indicate that the fishery currently has a significant negative impact on marine ecosystems. Bycatch is minimal and the current estimates of SSB indicate that the population is considerably larger than the MSY level. The fishery holds an MSC certificate with no conditions related to ecosystems (Mateo &amp; Saa 2022). There is no evidence to</p>		

suggest the fishery has a negative impact on ecosystems and the available evidence suggests it does not, therefore F3.2 is met.

**F3.3 If one or more of the species identified during species categorisation plays a key role in the marine ecosystem, additional precaution is included in recommendations relating to the total permissible fishery removals.**

There is some evidence that jack mackerel belongs to a larger group of miscellaneous piscivores which, together, form an important part of the eastern Pacific pelagic ecosystem (FishSource 2022). However, there is no clear evidence that jack mackerel alone is considered to play a key role in the marine ecosystem, and the species is not categorised as a Low Trophic Level species in its MSC certification report (Mateo & Saa 2022). Even so, the current exploitation rates are relatively conservative, with the most recent stock assessment concluding that biomass is likely to remain well above the MSY level even under the most pessimistic recruitment scenarios (SPRFMO 2021b). As there is no clear evidence that jack mackerel plays a key role in the ecosystem, and catch levels are relatively conservative in any case, F3.3 is met.

**References**

Mateo, I., & Saa, E., (2022). MSC Certification surveillance report: Chilean jack mackerel industrial purse seine, Surveillance 2. <https://fisheries.msc.org/en/fisheries/chilean-jack-mackerel-industrial-purse-seine-fishery/@assessments>

SPRFMO (2021). Report of the habitat monitoring workshop SCW12, 20/21 September 2021. <https://www.sprfmo.int/assets/2021-SC9/2021-workshops/SCW-12-SPRFMO-Habitat-Monitoring-Workshop-Report.pdf>

SPRFMO (2021a). Report of the SPRFMO SC Deepwater Workshop SCW13, 21-23/22-24 September 2021. <https://www.sprfmo.int/assets/2021-SC9/2021-workshops/SCW-13-SPRFMO-Deepwater-Workshop-Report-Final.pdf>

SPRFMO (2021b). SPRFMO SC9-Report, Annex 10. Jack mackerel technical annex. <https://www.sprfmo.int/assets/2021-SC9/Report/SC9-Report-Annex-10-Jack-mackerel-Technical-advice-RS.pdf>

SPRFMO (2022). SPRFMO SC10-Doc23. Chile Annual Report – Jack Mackerel. <https://www.sprfmo.int/assets/02-SC10/Meeting-Papers/SC10-Doc23-Chile-Annual-Report-Jack-mackerel.pdf>

**Links**

<b>MarinTrust Standard clause</b>	1.3.3.3
<b>FAO CCRF</b>	7.2.2 (d)
<b>GSSI</b>	D.2.09, D3.10, D.6.09

## SOCIAL CRITERION

In addition to the scored criteria listed above, applicants must commit to ensuring that vessels operating in the fishery adhere to internationally recognised guidance on human rights. They must also commit to ensuring there is no use of enforced or unpaid labour in the fleet(s) operating upon the resource.

## Appendix A - Determining Resilience Ratings

The assessment of Category B species described in this assessment report template utilises a resilience rating system suggested by the American Fisheries Society. This approach was chosen because it is also used by FishBase, and so the resilience ratings for many thousands of species are freely available online. As described by FishBase, the following is the process used to arrive at the resilience ratings:

*“The American Fisheries Society (AFS) has suggested values for several biological parameters that allow classification of a fish population or species into categories of high, medium, low and very low resilience or productivity (Musick 1999). If no reliable estimate of  $r_m$  (see below) is available, the assignment is to the lowest category for which any of the available parameters fits. For each of these categories, AFS has suggested thresholds for decline over the longer of 10 years or three generations. If an observed decline measured in biomass or numbers of mature individuals exceeds the indicated threshold value, the population or species is considered vulnerable to extinction unless explicitly shown otherwise. If one sex strongly limits the reproductive capacity of the species or population, then only the decline in the limiting sex should be considered. We decided to restrict the automatic assignment of resilience categories in the Key Facts page to values of  $K$ ,  $t_m$  and  $t_{max}$  and those records of fecundity estimates that referred to minimum number of eggs or pups per female per year, assuming that these were equivalent to average fecundity at first maturity (Musick 1999). Note that many small fishes may spawn several times per year (we exclude these for the time being) and large live bearers such as the coelacanth may have gestation periods of more than one year (we corrected fecundity estimates for those cases reported in the literature). Also, we excluded resilience estimates based on  $r_m$  (see below) as we are not yet confident with the reliability of the current method for estimating  $r_m$ . If users have independent  $r_m$  or fecundity estimates, they can refer to Table 1 for using this information.”*

Parameter	High	Medium	Low	Very low
Threshold	0.99	0.95	0.85	0.70
$r_{max}$ (1/year)	> 0.5	0.16 - 0.50	0.05 - 0.15	< 0.05
$K$ (1/year)	> 0.3	0.16 - 0.30	0.05 - 0.15	< 0.05
Fecundity (1/year)	> 10,000	100 - 1000	10 - 100	< 10
$t_m$ (years)	< 1	2 - 4	5 - 10	> 10
$t_{max}$ (years)	1 - 3	4 - 10	11 - 30	> 30

[Taken from the FishBase manual, “Estimation of Life-History Key Facts”, <http://www.fishbase.us/manual/English/key%20facts.htm#resilience>]

## Glossary

**Non-target:** Species for which the gear is not specifically set, although they may have immediate commercial value and be a desirable component of the catch. OECD (1996), Synthesis report for the study on the economic aspects of the management of marine living resources. AGR/FI(96)12

**Target:** In the context of fishery certification, the target catch is the catch of stock under consideration by the unit of certification – i.e. the fish that are being assessed for certification and ecolabelling. (GSSI)



## MarinTrust Fishery Assessment Peer Review Template

This section comprises a summary of the fishery being assessed against version 2 of the MarinTrust Standard.

<b>Fishery under assessment</b>	WF08 Jack Mackerel Regions X-XV_ Chile_ MT Whole Fish Re-assessment September 2022
<b>Management authority (Country/State)</b>	Chile Undersecretary for Fisheries and Aquaculture (SUBPESCA) & South Pacific Regional Fisheries Management Organisation (SPRFMO)
<b>Main species</b>	Chilean jack mackerel ( <i>Trachurus murphyi</i> )
<b>Fishery location</b>	FAO 87 Pacific Southeast Chilean EEZ, Regions XV-X
<b>Gear type(s)</b>	Purse seine

**Summary: in this section, provide any additional information about the fishery that the reviewers feel is significant to their decision.**

-

## Summary of Peer Review Outcomes

Peer reviewers should review the fishery assessment report with the primary objective of answering the key questions listed in the table below. Where the situation is more complicated, reviewers may instead answer “See Notes”.

	YES	NO	See Notes
<b>A – Fishery Assessment</b>			
1. Has the fishery assessment been fully completed, using the recognised MarinTrust fishery assessment methodology and associated guidance?	X		
2. Does the Species Categorisation section of the report reflect the best current understanding of the catch composition of the fishery?	X		
3. Are the scores in the following sections accurate (i.e. do the scores reflect the evidence provided)?			
Section M - Management	X		
Category A Species	X		
Category B Species			NA
Category C Species			NA
Category D Species	X		
Section F – Further Impacts	X		

## Detailed Peer Review Justification

Peer reviewers should provide support for their answers in the boxes provided, by referring to specific scoring issues and any relevant documentation as appropriate.

Detailed justifications are only required where answers given are one of the ‘No’ options. In other (Yes) cases, either confirm ‘scoring agreed’ or identify any places where weak rationales could be strengthened (without any implications for the scores).

Boxes may be extended if more space is required.

1. Is the scoring of the fishery consistent with the MarinTrust standard, and clearly based on the evidence presented in the assessment report?

The assessment report seems to be adequate and in general, it provides the information necessary to justify the scores assigned to the different categories. Very few comments included in this review.

2. Has the fishery assessment been fully completed, using the recognised MARINTRUST fishery assessment methodology and associated guidance?

Yes, the Marin Trust methodology has been adequately and clearly applied to this assessment.

3. Does the Species Categorisation section of the report reflect the best current understanding of the catch composition of the fishery?

Yes, the catch composition given in the assessment is based on observer reports and although jibia has also been caught in the fishery in the most recent year, it is clearly explained why the species is not included in the species categorisation table. The fishery of jack mackerel is described as mono-specific.

3M. Are the scores in “Section M – Management” clearly justified?

Yes, I consider that the information provided is adequate to support the score. The management of the jack mackerel stock(s) is coordinated by the South Pacific Regional Fisheries Management Organisation (SPRFMO).

In Chilean waters, the fishery is managed by the Undersecretary of Fisheries and Aquaculture (SUBPESCA). The National Fisheries and Aquaculture Service (SERNAPESCA) is responsible for the enforcement of fisheries rules and regulations in Chilean waters. Only one minor comments.  
 M1.5. Any of these 16 Fishery Management Committees created by SUBPESCA refers to the jack mackerel fishery?

**3A. Are the “Category A Species” scores clearly justified?**

Yes, the information provided is very clear and adequate to support the scores given. A TAC is used to control catches of the species. Since 2019 the TAC has been exceeded every year, but the excess is below the 10% limit indicated by the MS standard when the target stock is above the limit reference point. In this case, the SSB of jack mackerel is considered to be over  $SSB_{MSY}$  for the two model hypothesis (single and double stock) considered during the last stock assessment conducted for the species. A HCR is also in place. No further comments necessary.

**3B. Are the “Category B Species” scores clearly justified?**

No Category B species identified

**3C. Are the “Category C Species” scores clearly justified?**

No category C species identified by the assessor

**3D. Are the “Category D Species” scores clearly justified?**

Pacific chub mackerel (*Scomber japonicus*) is correctly identified by the assessor as category D species. A PSA has been conducted and the species passes it. Scores have been reviewed and they seem to be correct. No further comments necessary.

**3F. Are the scores in “Section F – Further Impacts” clearly justified?**

Section F is adequately covered. The fishery seems to have a limited impact on ETP species (F1 clauses) and a very low impact on habitats (F2). The impact on the ecosystem is considered by the authorities and the target species, although important in the Pacific ecosystem, is not considered a key species (LTL species or similar).

**Optional: General comments on the Peer Review Draft Report**

The assessment determination section seems to be very concise, but it provides a good overview of the fishery and the assessment process.

The references used are adequate to support the scores given.

The following sentence used by the technical reviewer seems to be strange: “*Chub mackerel is also recorded as by-catch, although to a much lower degree (<6% of total catch)*”. Not sure why 6% and no 5% is used there if the catch of chub mackerel seems to be around 4.5%.

In the scope details’ table, for the area of the assessment, the assessor indicates: “*Chilean EEZ, Regions X-XV*”. From north to south the Chilean regions are numbered as XV, I, II.....X, XI, XII. So, I understand it does make more sense to say XV – X than the other way around.

