MarinTrust Standard V2

Whole fish Fishery Assessment

WF08: Trachurus murphyi - Jack Mackerel / Jurel – FAO 87, Chilean EEZ Regions XV-X

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Table 1 Application details and summary of the assessment outcome

Application details and summary of the assessment outcome			
Name(s): Alimar Industrias Isla Quihua: Alimentos Pesqueros: Blumar S.A. San Vicente/Corral: Camanchaca Pesca Sur S.A. Coronel: Compañia Pesquera Camanchaca S.A. Iquique: Corpesca, Iquique Oriente : Corpesca, Mejillones/Arica Sur/Arica Norte/Iquique Sur; Fiordo Austral, Salmonoil/Glaciares/Pesquera Fiordo Austral/ Graneros S. A.:FoodCorp Chile S.A:Lota Protein S.A.:Orizon S.A.: Coquimbo/Coronel Sur, Sociedad Pesquera Landes SA			
Country: Chile			
Email address:		**Applicant Code**	
Certification Body Details			
Name of Certification Body:		LRQA	
Assessor Name	**CB Peer Reviewer**	**Assessment Days**	**Initial/Surveillance/ Re-approval**
Blanca Idalia Gonzalez Garza	Sam Peacock	10	Surveillance 1
Assessment Period	June 2023 – June 2024		
Scope Details			
Management Authority (Country/State)		South Pacific Regional Fisheries Management Organisation (SPRFMO) and Chilean Undersecretary of Fisheries and Aquaculture (SUBPESCA)	
Main Species		*Trachurus murphyi* – Jack mackerel / Jurel	
Fishery Location		FAO 87, Chilean EEZ Regions XV-X	
Gear Type(s)		Purse seine	
Outcome of Assessment			
Overall Outcome		APPROVED	
Clauses Failed		None	
CB Peer Review Evaluation		Agree with conclusions	
Fishery Assessment Peer Review Group Evaluation			
Recommendation			

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Table 2. Assessment Determination

Assessment Determination
The purse seine jack mackerel (*Trachurus murphyi*) fishery in Chile is considered a monospecific fishery since its catch represents more than 95% jack mackerel. It is not an ETP species, and there is a Total Allowance Catch (TAC) stablish by the Chilean Undersecretary of Fisheries and Aquaculture (SUBPESCA), who as a Commission Member of the South Pacific Regional Fisheries Management Organisation (SPRFMO) adheres to the established regulations supported by the Jack Mackerel Science Working Group of the Commission. Therefore, jack mackerel was assessed as the only Category A species. The pacific chub mackerel (*Scomber japonicus*) was assessed as a Category D species, since it is the most common by-catch species of the jack mackerel fishery, it is not an ETP species, and its catch is not regulated. Blue fathead (*Cubiceps caeruleus*) and snoek (*Thyrsites atun*) were not considered for the assessment given that in the last three years they haven't been caught by this fishery. There is a robust management framework for the jack mackerel fishery, supported by science committees at national and international level. Compliance with this framework is monitored and when irregularities are identified sanctions are established; hence there is an effective management of the fishery. Dependent and independent fishery data are collected frequently to update and improve the stock assessment each year, as well as the Harvest Control Rule to establish the Total Allowance Catch (TAC) each year, or if necessary, the prohibition of jack mackerel removals. The last assessment was carried out in 2022 and showed that estimated stock biomass is well above BMSY, and fishing mortality is well below FMSY. Chub mackerel was awarded an average productivity score of 1.29 and an average susceptibility score of 2, and it passed against Table D3, indicating that the species is not vulnerable to this fishery. According to available information, the negative effect of the fishery on ETP species is practically null, since measures are in place to minimise mortality. The jack mackerel fishery does not affect the habitat either, since purse seines do not interact with any physical habitat. Fishery management framework, national and international, consider an ecosystem approach to ensure the long-term conservation and sustainable use of the resources while safeguarding the marine ecosystems. The jack mackerel fishery in the FAO 87, Chilean EEZ Regions XV-X, passed all the Marin Trust requirements in this assessment, therefore its approval is recommended to be used as a raw material in Marine Trust certified products.
Fishery Assessment Peer Review Comments
The assessment is a surveillance of the Chilean jack mackerel fishery which was previously re-approved in 2022. There is no new catch composition data since the previous assessment, and so the species categorisation remains the same. The peer reviewer agrees that the only two species prevalent in the catch in sufficient proportions to be subject to assessment are jack mackerel (Category A) and chub mackerel (Category D). The assessor has provided extensive evidence to support their conclusions in relation to every section of the assessment. The fishery continues to be managed under an organisational framework which meets the MT requirements. There is evidence that the fishery has minimal impact on ETP species or the broader ecosystem, and the nature of the gears used mean it is unlikely to cause damage to seabed habitats. Stock assessments continue to indicate that the jack mackerel stock(s) are in good shape, and the assessor has provided updated information from the most recent stock assessment activities. Catches do continue to exceed the scientific advice, but this is by less than 10%, which is acceptable according to the MT requirements. Overall, the peer reviewer agrees with the conclusions of this assessment report, and recommends that whole fish from this fishery should remain approved for use as a raw material in MT-certified marine ingredients.
Notes for On-site Auditor

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In July 2022 the Chilean jack mackerel industrial purse seine fishery continues to meet applicable MSC requirements and the certification status of the fishery as certified remains unchanged. The 2023 surveillance announcement was published on March 15 2023.

https://fisheries.msc.org/en/fisheries/chilean-jack-mackerel-industrial-purse-seine-fishery/@@assessments

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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 / Jurel (*Trachurus murphyi*)	>95%	A1	PASS
			A2	PASS
			A3	PASS
			A4	PASS
Category B	No Category B species	N/A	N/A	
Category C	No Category C species	N/A	N/A	
Category D	Pacific chub mackerel / Caballa (*Scomber japonicus*)	≤4%	PASS	

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Table 5 Species Categorisation Table

Common name	Latin name	Stock	IUCN Redlist Category[1]	% of landings	Management	Category
Jack mackerel / Jurel	*Trachurus murphyi*	FAO 87, Chilean EEZ Regions XV-X	Data Deficient [2] (Unknown)	≥95%	Yes [5]	A
Pacific chub mackerel / Caballa	*Scomber japonicus*	FAO 87, Chilean EEZ Regions XV-X	Least Concern [4] (Stable)	≤4.5%	No	D

Species categorisation rationale

Jack mackerel: Type 1 species

According to data from the Chilean on-board observer program included in the July 2022 MSC surveillance assessment for this same stock[6], the estimated proportion of species in total catch from 2016 to 2021 indicates 95% - 99% correspond to the jack mackerel, which is the target species. Jack mackerel fishery is considered monospecific[7], thus this is the only type 1 species in this assessment.

Species has been assessed under Category A considering the following:

- The South Pacific Regional Fisheries Management Organization (SPRFMO) is committed to rebuilding the stock of the species and ensuring its long-term conservation and sustainable management. One of the main commercial resources fished in the SPRFMO Area are jack mackerel; thus, this entity monitors the state of the resource at an international level[8].
- Since December 2017 there is a management plan for jack mackerel from XV – X regions [5], elaborated for the Chilean Undersecretary of Fisheries and Aquaculture (SUBPESCA), which adopts a precautionary management approach.
- Each year the stock is assessed to determine the total allowable catch (TAC).

Pacific chub mackerel: Type 2 species

Chub mackerel has been the main bycatch species for the jack mackerel target fishery[9]. The average percentage catch of this species from 2016 to 2021 is 1.81%, representing percentages > 0.1% but <5% of the catch. This species is not under any management regimen; thus, it has been assessed under Category D.

Blue fathead and Snoek: Not consider for assessment
Given the specificity of the jack mackerel fishery, when other species are caught as bycatch, they represent negligible amounts[9]. No catches of these two species have been registered since 2019, therefore they were not considered for the assessment.

[1] https://www.iucnredlist.org/
[2] https://www.iucnredlist.org/species/183965/8207652
[3] https://www.iucnredlist.org/species/190384/42691679
[4] https://www.iucnredlist.org/species/170306/6737373
[5] SUBPESCA. (2017). https://www.subpesca.cl/portal/616/articles-99235_documento.pdf
[6] https://fisheries.msc.org/en/fisheries/chilean-jack-mackerel-industrial-purse-seine-fishery/@@assessments
[7] https://chile.oceana.org/wp-content/uploads/sites/19/Bycatch_en_chile.pdf
[8] www.sprfmo.int/assets/Fisheries/Conservation-and-Management-Measures/2023-CMMs/CMM-01-2023-Trachurus-murphyi_29Mar23.pdf
[9] https://www.sprfmo.int/assets/Meetings/SC/10th-SC-2022/SC10-Doc23-Chile-Annual-Report-Jack-mackerel.pdf

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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		
	M1.1	There is an organisation responsible for managing the fishery.	PASS
	M1.2	There is an organisation responsible for collecting data and assessing the fishery.	PASS
	M1.3	Fishery management organisations are publicly committed to sustainability.	PASS
	M1.4	Fishery management organisations are legally empowered to take management actions.	PASS
	M1.5	There is a consultation process through which fishery stakeholders are engaged in decision-making.	PASS
	M1.6	The decision-making process is transparent, with processes and results publicly available.	PASS
		Clause outcome:	PASS

M1.1 There is an organisation responsible for managing the fishery.

Clause is met, considering that:

Chilean jack mackerel is widespread throughout the South Pacific, and scientific studies supports the existence of a single panmictic population in the region (SUBPESCA 2022a). The South Pacific Regional Fisheries Management Organisation (SPRFMO) was established and entered into force on 24 August 2012, and since then they lead the stock management to promote long-term conservation and sustainable use of this fishery (SPRFMO 2023a). The SPRFMO Conservation and Management Measures (CMMs) define the regulatory framework for the SPRFMO fisheries in the high seas areas of the South Pacific Ocean, where the jack mackerel is one of the main commercial resources; each year the Commission may revise existing, or adopt new, CMMs (SPRFMO 2023b).

The Undersecretary of Fisheries and Aquaculture (SUBPESCA) is the responsible for the design and implementation of fisheries and aquaculture policies, regulations and management measures. It contemplates the national reference framework, which contains the main strategic lines and implementation instruments, the national aquaculture commission, zonal fishing councils, scientific and management committees, as well as public-private work groups, to promote sustainable development (SUBPESCA 2023b).

The National Fisheries and Aquaculture Service (SERNAPESCA), is an entity under the Ministry of Economy, Development and Tourism, who supervises and manages the protection of the hydrobiological resources and their environment by promoting compliance with regulations (SERNAPESCA 2023a).

The National Fisheries Society (SONAPESCA) is an organization aimed to promote, through the joint effort of all the fishing regions, a responsible fishing with rigorous and strict compliance with the regulations established to achieve the sustainability of the resource and comprehensive care of the sea; in collaboration with the authority to eradicate non-compliance with the fishing quotas within the Chilean coasts (SONAPESCA 2023).

M1.2 There is an organisation responsible for collecting data and assessing the fishery.

Clause is met, considering that:

The SPRFMO has standards for the collection, verification, reporting, storing and dissemination of data; this information is the base for the conservation and management of fishery resources, non-target and associated or dependent species and the protection of the marine ecosystems in which those resources occur. Data should be registered using standardize templates for: collection, reporting, verification and exchange of data, record of vessels authorised to fish, inspection in port, transhipment and other transfer activities, observer programme, and fishing gear and marine plastic Pollution (SPFRMO 2023c). They have a specific database for Jack mackerel since 2013, which have information about authorised vessels, vessels active in the fishery, and vessels conducting transhipment activities within the SPRFMO Area (SPFRMO 2023d).

There is a specific SPRFMO Scientific Committee Jack mackerel working group, responsible for planning, conducting and reviewing scientific assessments of the status of the fishery. Also, the Conservation and Management Measures for the species

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have specific requirements that need input from the Scientific Committee, which helps to establish Harvest Control Rules, identify management objectives, and design species rebuilding plan (SPRFMO 2023e).

By Law, SUBPESCA have a Technical Scientific Committee, who are advisory and/or consultation bodies of the Undersecretariat in relevant scientific matters for the administration of fisheries and aquaculture. They define the biological conservation status of jack mackerel, the biologically acceptable catch range for the next year and estimation of Biological Reference Points, all this taking in consideration the results provided by the SPFRMO Scientific Committee (SUBPESCA 2023a, 2023c).

The Fisheries Development Institute (IFOP) is a non-profit Private Law Corporation who has been supporting the sustainable development of the country's fishing and aquaculture sector by creating alliances with Chilean universities and institutions of the national and international sector for managing fishing biological data (IFOP 2023).

SERNAPESCA compile the required information for creating the Fisheries and Aquaculture Statistical Yearbooks, where jack mackerel landing information can be found since 2018 (SERNAPESCA 2023b).

The Fisheries Research Institute (INPESCA) is a private institution that works as an intermediary body between the regional fishing industry and state and university institutions dedicated to research on fishing resources since 1989. INPESCA is mainly dedicated to the diagnosis of regional fisheries and their relationship with the environment (INPESCA 2023).

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

Clause is met, considering that:

The organisations responsible for managing the fishery states their commitment to sustainability in their respective websites.

- SPRFMO: “The South Pacific Regional Fisheries Management Organisation is an inter-governmental organisation that is committed to the long-term conservation and sustainable use of the fishery resources of the South Pacific Ocean and, in so doing, safeguarding the marine ecosystems in which the resources occur” (SPRFMO 2023a).

- SUBPESCA: The Institutional mission is to “regulate and manage fishing and aquaculture activity, through policies, regulations 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 2023b).

- SERNAPESCA: Their mission is to “contribute to the sustainability of the sector and the protection of hydrobiological resources and their environment, through comprehensive inspection and health management that influences sectoral behaviour promoting compliance with regulations” (SERNAPESCA 2023a).

- SONAPESCA: “we are especially committed to a sustainable exploitation of all the resources of the sea; with rigorous and strict compliance with the regulations established to achieve the sustainability of the resource and comprehensive care of the sea; in collaborating with the authority to eradicate non-compliance with the fishing quotas of the Chilean coasts; and with any other conduct that does not strictly conform to the law and ethical principles that should govern our conduct.” (SONAPESCA 2023).

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

Clause is met, considering that:

The SPRFMO is ruled by the Convention on the Conservation and Management of High Seas Fishery Resources in the South Pacific Ocean, which have 45 Articles that state how fisheries should be assessed and managed through the application of the precautionary and ecosystem approach in all waters of the Pacific Ocean beyond areas of national jurisdiction in accordance with international law (SPRFMO 2022). Meaning that they are completely empowered to take management action in the SPRFMO area.

Republic of Chile, as a Commission Member of the SPRFMO, agrees that conservation and management of fishery resources shall be conducted taking in consideration best international practices. In compliance to Article 4.2, which states that “Conservation and management measures established for the high seas and those adopted for areas under national jurisdiction shall be compatible in order to ensure conservation and management of straddling fishery resources in their

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entirety." (SPRFMO 2022), SUBPESCA is legally empowered to take management actions through the General Law on Fisheries and Aquaculture No. 18.892 of 1989, and its amendments (LGPA 2023), in order to align Chilean fisheries regulation with those from the SPRFMO.

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

Clause is met, considering that:

The SPRFMO holds annual meetings of the Commission (COMM) where representatives stakeholders from different sectors involved in fisheries of each member country participate. The Compliance and Technical Committee meets immediately prior to the Commission Meeting each year; the Finance and Administration Committee meets concurrently with the Commission Meeting each year; and the Scientific Committee meets over the months of September and October each year. The Jack mackerel Working Group meet during the annual Scientific Committee meeting, in inter-sessional virtual meetings and in Scientific Committee Workshops. (SPRFMO 2023f). The SPRFMO has meeting workshops reports available for consultation in their website; particularly, jack mackerel assessments reports are available since 2014 (SPRFMO 2023g).

By law the SUBPESCA established Fishery Management Committees, which are consultative and advisory bodies of the fishing authority conformed by stakeholders from the main sectoral representatives of each fishery, as well as officials of SUBPESCA and SERNAPESCA; and Technical Scientific Committees who are advisory and/or consultation bodies of the SUBPESCA in relevant scientific matters for the administration of fisheries and aquaculture, where member are nominated by public competition. In both cases there is a specific Jack mackerel Committee (SUBPESCA 2023d, 2023e) that meet regularly. Management Committees meetings acts, reports and resolutions are available since 2015 (SUBPESCA 2023d) and those from the Scientific Committee are available since 2013 (SUBPESCA 2023e).

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

Clause is met, considering that:

Both, The SPRFMO and SUBPESCA, publish and give free access to all Committee held meetings reports without the need to be requested in their respective websites. It is also possible to find jack mackerel information and data used for decision-making processes.

- https://www.sprfmo.int/meetings/meeting-reports-2/
- https://www.subpesca.cl/portal/616/w3-propertyname-539.html

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SUBPESCA. (2023e). Comité Científico de Pesquería Pelágica de Jurel. https://www.subpesca.cl/portal/616/w3-propertyvalue-51143.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.

Clause is met, considering that:

In Chile, The National Fisheries and Aquaculture Service (SERNAPESCA) is the entity responsible to supervise and manage the fisheries behaviour to promote compliance with regulations. They have presence in the 16 regions of the country, thanks to a staff of 900 people and 46 provincial offices that include 2 insular offices (SERNAPESCA 2023a).

M2.2 There is a framework of sanctions which are applied when laws and regulations are discovered to have been broken.

Clause is met, considering that:

The General Law on Fisheries and Aquaculture No. 18.892 of 1989, and its amendments (LGPA 2023), includes under Title 9 the framework for infringements and sanctions. Particularly, Article 108 from Title 9 states that violations of this Law, its regulations or the fishing administration measures, will be penalized with all or some of the following measures:

a) Fines taking in consideration the damage caused to hydrobiological resources and the environment

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b) Suspension or expiration of the captain or skipper title
c) Closure of commercial or industrial establishments
d) Confiscation of the fishing gear and gear with which the offense was committed and transported
e) Confiscation of hydrobiological species or products derived from the infringement

According to the SERNAPESCA´s 2022 Report on Oversight Activities in Fishing and Aquaculture (SERNAPESCA 2022), approximately 60 tons of jack mackerel were seized due to non-compliance with regulations, representing around 2% of the total seizures made in 2022. This proves that sanctions are applied.

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

Clause is met, considering that:

According to the SERNAPESCA´s 2022 Report on Oversight Activities in Fishing and Aquaculture (SERNAPESCA 2022), low level violations in the jack mackerel fishery occurs, such as: approximately 60 tons of jack mackerel seized due to non-compliance with regulations, representing around 2% of the total seizures made in 2022; and a 22% exceedance of the jack mackerel annual quota allowed in the fishing unit V-IX. No further information related to serious non-compliance in the jack mackerel fishery, nor evidence of IUU, was found; suggesting that fishers comply with relevant regulations and jack mackerel is not being overexploited in the country. In consequence, the Chilean jack mackerel catch quota in the South Pacific increased a 23.4 % for 2023 regarding 2022 (SUBPESCA 2022).

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.

Clause is met, considering that:

Chile has a National Supervision Plan (NSP) which has the objective of ensuring the application of the rules and requirements that must be respected by those who carry out exploitation activities of fishing resources. SERNAPESCA designs the NSP each year based on a strategic framework with guidelines on compliance priorities for each technical area (fisheries, aquaculture and foreign trade) (SERNAPESCA 2023c).

The NSP establish several inspection programs:
1- **Satellite monitoring program** for industrial and artisanal vessels, which are carried out in partnership with the NGO Global Fishing Watch.
2- **Landing certification program** makes it possible to verify that the vessels reliably declare the captured resources (volume and species) at the landing points.
3- **Weighing system program** is used for the certification of the catches, in which the verification of the metrological parameters is carried out and its correct functioning and use is inspected.
4- **Joint operations programs** are carried out by SERNAPESCA with other oversight institutions, such as the Chilean Navy, the Chilean Police and the Chilean Investigative Police. Together they develop work programs to strengthen oversight procedures.
5- S**pecial control programs** that include landing control and the fight against illegal fishing in the value chain.

According to the SERNAPESCA´s 2022 Report on Oversight Activities in Fishing and Aquaculture (SERNAPESCA 2022), 92,851 inspection activities were carried out, representing an increase of 21.8% compared to 2021. The satellite tracking system allowed monitoring 97 industrial vessels and 400 artisan vessels, achieving a total of 124,382 remote inspections (figure 1). This satellite tracking system represented 56.7% of the total inspection activities carried out. The landing certification program carried out around 41,000 inspections at landing points, which made it possible to certify 165,962 landings throughout the year. Also, 1,896 joint operations were carried out in commercial and recreational fishing.

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The inspection coverage of fishing regulations indicators states that 11.34 inspection activities are carried out for every 10 artisanal landings, while 54.9 activities are carried out for every 10 industrial landings. Inspection activities coverage increased more than 10% for the artisanal and industrial fisheries in contrast to 2021. (SERNAPESCA 2022).

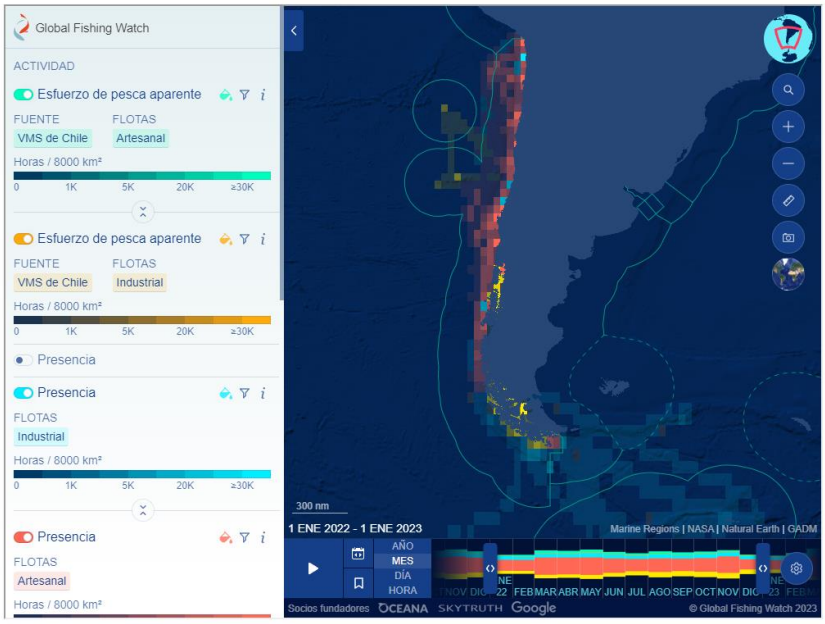

Figure 1. Satellite monitoring of ships and fishing vessels in collaboration with Global Fishing Watch (SERNAPESCA 2023d).

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

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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.**

Species Name	**Jack Mackerel (*Trachurus murphyi*)**	
A1	**Data Collection - Minimum Requirements**	
A1.1	Landings data are collected such that the fishery-wide removals of this species are known.	PASS
A1.2	Sufficient additional information is collected to enable an indication of stock status to be estimated.	PASS
	Clause outcome:	PASS

A1.1 Landings data are collected such that the fishery-wide removals of this species are known.

Clause is met, considering that:

The SPRFMO Secretariat have jack mackerel catch data since 1970. According to the Conservation and Management Measures (CMM) of the SPRFMO Commission, all Members (Australia, Belize, Republic of Chile, People's Republic of China, Cook Islands, Republic of Cuba ,Republic of Ecuador, European Union, Kingdom of Denmark in respect of the Faroe Islands, Republic of Korea, New Zealand, Republic of Panama, Republic of Peru, Russian Federation, Chinese Taipei, The United States of America, and Republic of Vanuatu) participating in the jack mackerel fishery must report monthly catches within 20 days of the end of the calendar month, when total catches have reached 70% of their catch limit, reports are made every 15 days (SPRFMO 2023).

Database of historical catch data was published as Annex 1 of the Secretariat SC10-JM01 *Trachurus murphyi* catch history report, where the 2022 data are an estimate from part year results (Figure 1) (SPRFMO 2022a). The excel file is available for download: https://www.sprfmo.int/meetings/scientific-committee/10th-sc-2022/. Data are grouped in four distinct fleets: 1) coastal purse seine fishery in northern Chile (Chilean administrative regions XV-II), 2) purse seine fishery in central-south Chile that extends into the high seas (Chilean administrative regions III-X), 3) far-north coastal purse seine fisheries occurring in the EEZs and Territorial waters of Ecuador and Peru, and 4) offshore trawl fleet operating solely in the SPRFMO Area (Figure 2). (SPRFMO 2022a).

This demonstrate that removals are monitored frequently, providing robust data for supporting the harvest control rule.

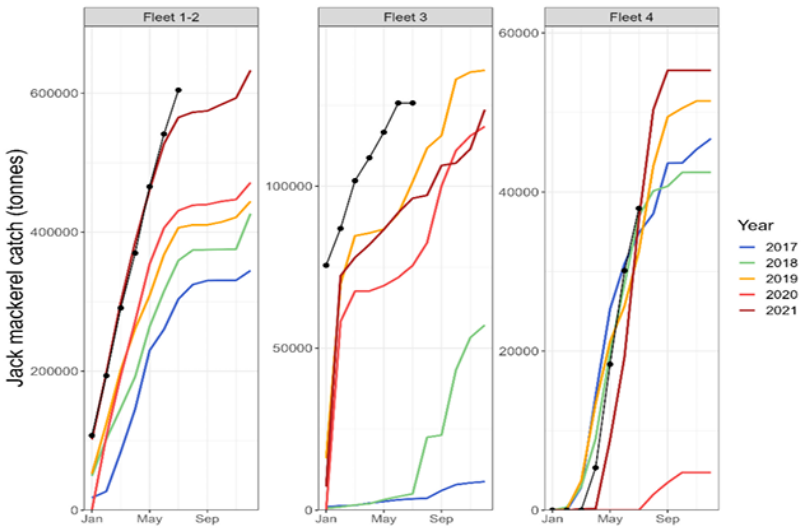

Figure 1. Cumulative catches of jack mackerel by year and fleet (fleets 1 and 2 are combined). The black line with points represents the cumulative catches through July of 2022 (SPRFMO 2022b).

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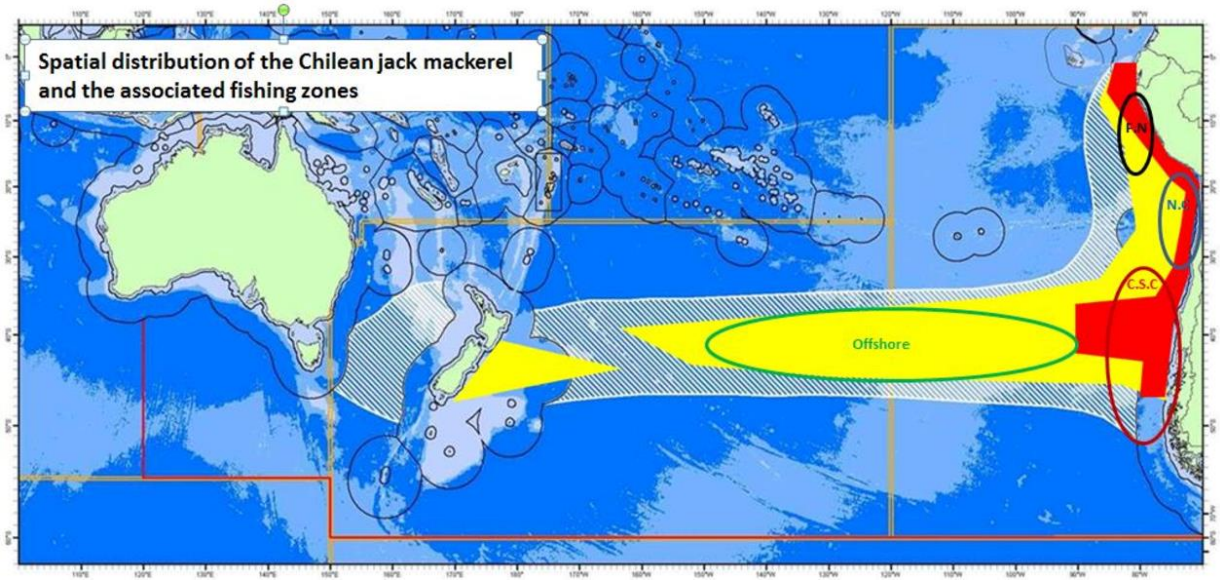

Figure 2. Description of the spatial distribution of the jack mackerel based on catches data (yellow) and survey index (red), with the corresponding four fishing zones: 1) coastal purse seine fishery in northern Chile (blue circle), 2) purse seine fishery in central-south Chile that extends into the high seas (red circle), 3) far-north coastal purse seine fisheries occurring in the EEZs and Territorial waters of Ecuador and Peru (black circle), and 4) offshore trawl fleet operating solely in the SPRFMO Area (green circle) (Guele et. al 2014)

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

Clause is met, considering that:

Jack mackerel stock status is based on stock assessments conducted using the Joint Jack Mackerel (JJM) statistical catch-at-age model, as developed collaboratively by participants in 2010 (SPRFMO 2022c). The JJM assessment models use the following information: fleet, catch-at-age, catch-at-length, landings, CPUE, acoustic and daily egg production method (DEPM) survey data (SPRFMO 2022b) (Figure 3). In figure 3, column SC9 shows the historical data available, where the shortest time series is 8 years. During the 2022 benchmark workshop (SPRFMO 2022b) some changes to the jack mackerel assessment were made given new available criterion and data to improve models results. As result time series were shortened in some cases (bold numbers in column SCW14), being 5 years the shortest time series.

This demonstrates that relevant information related to the stock structure, stock productivity and fleet composition is available to support the harvest strategy.

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Fleet nr	Fleet	Variable	variable type	SC9	SCW14	Comments
1	North Chile purse seine	Catch-at-age	age compositions	1975-2021	**1980-2020**	
1	North Chile purse seine	Landings	biomass	1970-2021	1970-2021	
1	North Chile purse seine	Acoustic survey North	age compositions	2006-2021	2006-2021	
1	North Chile purse seine	Acoustic survey North	index	1984-1988; 1991; 2006-2021	1984-1988; 1991; 2006-2021	
1	North Chile purse seine	DEPM	age compositions	2001-2008	2001-2008	Downweighted in SCW14
1	North Chile purse seine	DEPM	index	1999-2008	1999-2008	
2	Chile South-Central	Catch-at-age	age compositions	1975-2021	**1980-2020**	
2	Chile South-Central	Landings	biomass	1970-2021	1970-2021	
2	Chile South-Central	CPUE	index	1983-2021	1983-2021	
2	Chile South-Central	Acoustic survey CS	age compositions	1997-2009	**2001-2009**	
2	Chile South-Central	Acoustic survey CS	index	1997-2009	**2001-2009**	
3	FarNorth (Peru)	Catch-at-length	length compositions	1980-2020	1980-2020	length in TL
3	FarNorth (Peru)	Landings	biomass	1970-2021	1970-2021	
3	FarNorth (Peru)	CPUE	index	2002-2021	2002-2021	
3	FarNorth (Peru)	Acoustic survey	index	1985-2013	1985-2013	
4	Offshore fleet	Catch-at-age	age compositions	1979-1991; 2000-2004; 2006-2020	**2015-2020**	
4	Offshore fleet	Catch-at-length	length compositions	2007-2019	**2015-2020**	
4	Offshore fleet	Landings	biomass	1970-2021	1970-2021	
4	Offshore fleet	CPUE	index	2008-2020	2008-2020	

Figure 3. Data used to update the jack mackerel stock assessment in the 2022 SPRFMO Benchmark Workshop. (SPRFMO 2022)

References

Guele, M. E. (2014). How to Manage the Fishery on Chilean Jack Mackerel a South Pacific Pelagic Fish with Large Variation in Recruitment Regime? (Doctoral dissertation).

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Links

MarinTrust Standard clause	1.3.2.1.1, 1.3.2.1.2, 1.3.2.1.4, 1.3.1.2
FAO CCRF	7.3.1, 12.3
GSSI	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

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	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
		Clause outcome:	PASS

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.

Clause is met, considering that:

In 2008 the Science Working Group of the SPRFMO held a workshop to review all available information for use in jack mackerel stock assessments, to agree on data inputs, biological parameters and assumptions to use in joint stock. Trials were made in 2009, but it wasn't until 2010 when the Task Team on Chilean jack mackerel stock assessment agree to use the Joint Mackerel model approach (JJM). This model requires the following input data (SPRFMO 2010):

- **Removals:** catch biomass, catch at age, and catch at length, by fleet.
- **Abundance:** CPUE, acoustic survey, egg survey, trawl survey.
- **Biology:** natural mortality, growth function, maturity at age, maturity at size, aging, age-length key, weight at age, weight at age, weight at age, L-w relationship, and maps of catch distribution.

The JJM had been used since then to assess the jack mackerel stock annually, where each year data is reviewed, discussed and updated. The last stock assessment available report is that from 2022, where they integrate into the assessment new data based on the updated aging criteria developed by Chile, including age compositions and weight-at-age in the catches of Chile and the offshore fleets, and in the acoustic surveys of Central and North of Chile. (SPRFMO 2022)

A2.2 The assessment provides an estimate of the status of the biological stock relative to a reference point or proxy.

Clause is met, considering that:

The SPRFMO jack mackerel stock assessment uses spawning stock biomass (SSB) and fishing mortality (F) data to set reference points considering two stock composition hypotheses (one-stock and two-stocks). Reference points are updated each year.

In the 2022 assessment, the working group mentioned that the one-stock model should preferably be used for management advice (SPRFMO 2022), therefore, a new reference point has been derived for a limit biomass (Blim) in the single-stock hypothesis, which was estimated at 8% of unfished spawning biomass (Figure 1). Compared to previous assessments the perception of stock is relatively unchanged and is estimated to be well above BMSY and fishing mortality is well below FMSY. Also, the jack mackerel working group recommended that the Scientific Committee use BMSY (also expressed as spawning biomass) as estimated and conditioned on variable growth which has changed slightly over time, while FMSY is also conditioned on changes over time (including selectivity estimates).

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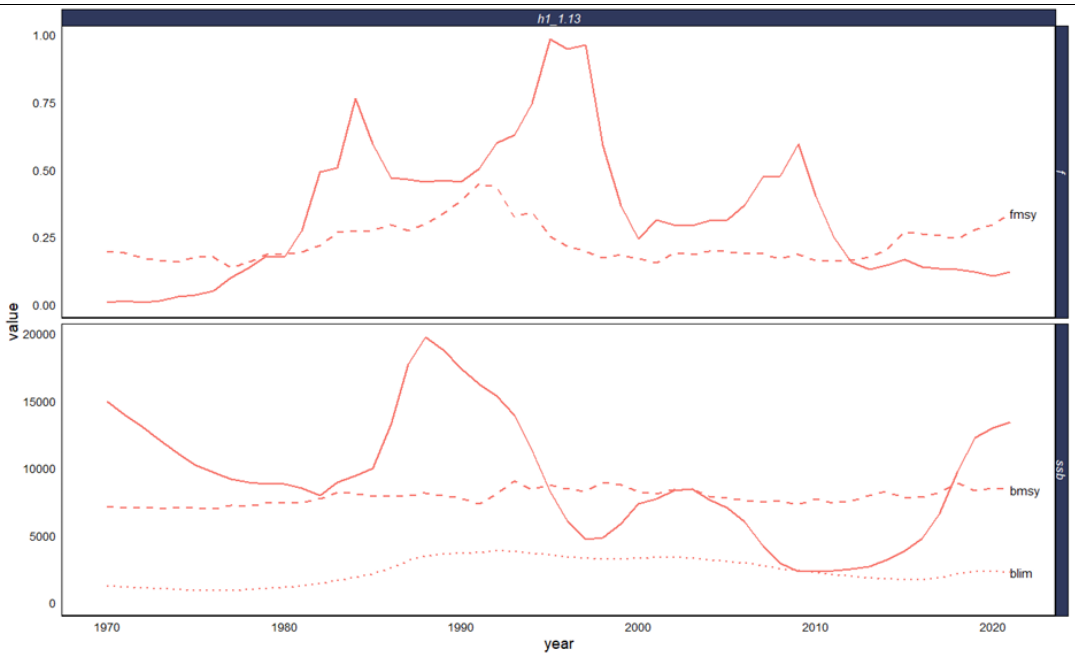

Figure 1. Model results showing the reference points for F and for SSB (B_{MSY}) under the one-stock hypothesis model. (SPRFMO 2022).

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

Clause is met, considering that:

During the stock assessment the Harvest Control Rule (HCR) is used to set the total allowable catch (TAC). In 2022 new reference points were stablish, so now sBlim should be set as a function of the ratio ylim which is based on unfished biomass estimates. Changes to HCR are shown in Figure 2.

As a result of the SPRFMO annual stock assessment an Acceptable Biological Catch (ABC) for jack mackerel throughout the South Pacific is recommended to the Commission. Then, the Chilean Mackerel Scientific and Technical Committee (CCT-J) review and analyse the information to recommend the minimum and maximum range of CBA for the country. Finally, the Minister of Economy, Development and Tourism, taking in consideration the recommendation of the CCT-J, defines the following year global annual catch quota for jack mackerel. (SUBPESCA 2017).

In 2023 the total catch of *Trachurus murphyi* in the area to which the SPRFMO Conservation and Management Measures applies shall be limited to 981,833 tonnes (Figure 3) (SPRFMO 2023). According to this information, the suggested total catch for Chile is 716,758 tonnes, however the 2023 jack mackerel quota authorized by SUBPESCA is 703,800 tonnes (SUBPESCA 2022).

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Harvest Control Rule

Stock status	TAC calculation method
$B_{t+1} < B_{lim}$	Set TAC to zero; directed jack mackerel fishing prohibited
$B_{t+1} \leq$ 80% of B_{MSY} (or proxy)	1) Compute trial catch (C_{trial}) at estimated F_t or F_{MSY} (whichever is smaller) If $C_{trial} < C_{replacement}$ Set catch at or below C_{trial} (the stock will increase) Else if $C_{trial} > C_{replacement}$ Set catch at or below $C_{replacement}$ (the stock remains stable)
$B_{t+1} >$ 80% of B_{MSY} (or proxy) and $B_{t+1} \leq B_{MSY}$ (or proxy)	2) Compute trial catch (C_{trial}) at estimated F_{MSY} (or proxy) If $C_{trial} < C_{replacement}$ Set catch at or below C_{trial} Else if $C_{trial} > C_{replacement}$ Use method 1). The TAC will not be allowed to vary by more than 15% between years
$B_{t+1} > B_{MSY}$ (or proxy)	3) Set catch at or below value based on F_{MSY} The TAC will not be allowed to vary by more than 15% between years

Figure 2. Proposed harvest control rule for jack mackerel, as adjusted during the 2022 benchmark workshop (SPFRMO 2022)

Member / CNCP	Tonnage
Belize	1,100
Chile	716,758
China	63,136
Cook Islands	1,100
Cuba	2,219
Ecuador	12,570
European Union	60,758
Faroe Islands	11,027
Korea	12,753
Panama	1,100
Peru (HS)	20,175
Russian Federation	32,649
Vanuatu	46,487
Total	981,833

Figure 3. 2023 suggested total catch for *Trachurus murphyi* in the SPRMFO area. (SPRFMO 2023)

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

Clause is met, considering that:

Before the assessment each Commission Member should perform an internal review of the data to ensure compliance with SPRFMO data submission templates and agreements made in the jack mackerel working group.

The stock assessment data and modeling results are reviewed internally by the jack mackerel working group, who are always looking for the best way to improve the assessment. They also invite experts to participate in workshops, review the work involved in the assessment and to provide advice. Then the assessment, including advice on fishery management, is submitted to the SPRFMO Scientific Committee for review at their annual meetings.

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A2.5 The assessment is made publicly available.

Clause is met, considering that:

The SPRFMO have the jack mackerel workshop reports, datasets, modeling description, discussion and conclusions available for consultation on the SPRFMO webpage. Specifically Jack mackerel stock assessments reports since 2014 can be found here: https://www.sprfmo.int/meetings/scientific-committee/sc-workshops/ , and Working Group papers and other relevant annexes can be found within the SPRFMO annual Commission Meeting reports at https://www.sprfmo.int/meetings/comm/ .

References

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SUBPESCA. (2022). Dec. Ex. N° 69-2022 Establece Cuota Anual de Captura Para el Recurso Jurel, Año 2023. (Publicado en Página Web 27-12-2022) (F.D.O. 25-01-2023). https://www.subpesca.cl/portal/615/articles-116759_documento.pdf

Links

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

A3	**Harvest Strategy - Minimum Requirements**		
	A3.1	There is a mechanism in place by which total fishing mortality of this species is restricted.	PASS
	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.	PASS
	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).	PASS
		Clause outcome:	PASS

A3.1 There is a mechanism in place by which total fishing mortality of this species is restricted.

Article 20 of the Convention on the Conservation and Management of High Seas Fishery Resources in the South Pacific Ocean states that conservation and management measures adopted by the Commission shall include the determination of the total allowable catch or total allowable fishing effort (SPRFMO 2022a). Therefore, the Commission establishes a total allowable catch (annual catch quota) applicable to the entire scope of the fishing resource, meaning that total fishing mortality of the jack mackerel is restricted.

In Chile, from 2001 to 2010, jack mackerel fishing quotas were formally establish based on scientific information provided by the Fisheries Development Institute. Since 2011, management of the jack mackerel fishery at the national level is based

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entirely on the recommendations issued by the SPRFMO. During 2011 and 2012 the global catch quota was established based on landing history, without a country allocation; from 2013 to the present the SPRFMO quotas were established and divided for each of the member countries of the Commission (SUBPESCA 2017).

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.

Clause is met, considering that:

Since 2013 the jack mackerel catch limits (TAC) has been set at or below the level recommended by the SPRFMO Scientific Committee. In Figure 1 advice catch, catch limits (TAC), and reported catch of jack mackerel since 2013 are shown (values are in tons). From 2013 to 2018, the percentage of the quota usage was between 81.2 % to 94.4%, hence fishery removals do not exceed the TAC. From 2019 up to 2022 the quota was exceeded; however, the surplus does not exceed 10% of the recommended TAC and the stock status is above the limit reference point (SPRFMO 2022c). Surplus trends seem to be declining over time.

Year	Recommended Maximum Catch	Catch limits (TAC)	Reported Catch	% Catch quota used
2013	441,000	438,000	355,539	81.2
2014	440,000	440,000	415,366	94.4
2015	460,000	460,000	395,210	85.9
2016	460,000	460,000	389,101	84.6
2017	493,000	493,000	406,126	82.4
2018	576,000	576,000	527,539	91.6
2019	591,000	591,000	635,569	107.5
2020	680,000	680,000	725,945	106.8
2021	782,000	782,000	807,566	103.3
2022	900,000	900,000	928,852*	103.2

Figure 1. Summary table regarding catch limits, reported catch, and percentage of quota used in the Southeast Pacific. Data were extracted from the SC9 final report (SPRFMO 2021); and 2022 preliminary value (*) was extracted from the jack mackerel history and predicted data annex 1 (SPRFMO 2022d). % Quota used was estimated using excel.

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).

Clause is met, considering that:

Since 1991, the General Law of Fisheries and Aquaculture of Chile (LGPA), determines in its Article 3 that it is possible to establish extractive bans (prohibition of capture or extraction in a specific area for conservation reasons) to favor the administration of the hydrobiological resources. Also, Article 110 mentions that those who capture hydrobiological species in the closed period will be penalized. (LGPA 2023).

After 1995 catch record in Chile, jack mackerel landings started to be composed by a greater presence of juvenile, which is a sign of overexploitation. Chilean Authorities, with a precautionary approach, adopted national and absolute bans that stopped industrial activity for considerable periods of time in order to avoid further overexploitation that could lead to a collapse of the fishery (SUBPESCA 2017).

This shows that when the stock is below its reference limits, the extraction of fishing resources will be subject to extractive bans.

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Standard clause 1.3.2.1.3

Links	
MarinTrust Standard clause	1.3.2.1.3, 1.3.2.1.4
FAO CCRF	7.2.1, 7.22 (e), 7.5.3
GSSI	D3.04, D6.01

A4	**Stock Status - Minimum Requirements**		
	A4.1	The stock is at or above the target reference point, OR IF NOT: 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: The stock is estimated to be below the limit reference point or proxy, but fishery removals are prohibited.	PASS
		Clause outcome:	PASS

A4.1 The stock is at or above the target reference point, OR IF NOT:

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:

The stock is estimated to be below the limit reference point or proxy, but fishery removals are prohibited.

Clause is met in their first condition, considering that:

The estimated biomass of jack mackerel increased from 2021 to 2022 and is estimated to be well above the BMSY. Given the stock assessment results, the Science Committee indicates that the stock is in the third tier of the harvest control rule. This means that catches should be limited to a fishing mortality of FMSY but the TAC should not vary more than 15% between years. In line with the accepted rebuilding plan (Adjusted Annex K) and because the jack mackerel biomass is estimated to be above

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BMSY (Figure 1), the Scientific Committee recommended a precautionary 15% increase in 2023 catches throughout the range of jack mackerel (at or below 1,035,000 t). This advice for catch limits in 2023 does not depend on the stock structure hypothesis that is used. (SPRFMO 2022).

Stock status

		2021	2022
Fishing mortality in relation to:	F_{MSY}	Below	Below
Spawning stock biomass in relation to:	B_{MSY}	Above 100%	Above 100%

Figure 1. Stock status summary (SPRFMO 2022).

References

SPRFMO. (2022). 10th Scientific Committee Meeting report. https://www.sprfmo.int/assets/Meetings/SC/10th-SC-2022/SC10-Report-Final-19Jan2023-v2.pdf

Links	
MarinTrust Standard clause	**1.3.2.1.4**
FAO CCRF	**7.2.1, 7.2.2 (e)**
GSSI	**D6 01**

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CATEGORY D SPECIES

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

D1	**Species Name**	**Pacific chub mackerel / Caballa (*Scomber japonicus*)**	
	Productivity Attribute	**Value**	**Score**
	Average age at maturity (years)	2 years [1]	1
	Average maximum age (years)	9 years [2]	1
	Fecundity (eggs/spawning)	100,000 – 400,000 eggs [1]	1
	Average maximum size (cm)	64 cm[1]	1
	Average size at maturity (cm)	22 [3]	1
	Reproductive strategy	Broadcast spawner [1]	1
	Mean trophic level	3.4 [1]	3
		Average Productivity Score	**1.29**
	Susceptibility Attribute	**Value**	**Score**
	Availability (area overlap)	< 10%	1
	Encounterability (the position of the stock/species within the water column relative to the fishing gear)	High overlap with fishing gear	3
	Selectivity of gear type	Individuals < size at maturity are rarely caught	1
	Post-capture mortality	Retain	3
		Average Susceptibility Score	**2**
		PSA Risk Rating (From Table D3)	**PASS**
		Compliance rating	**PASS**
	Further justification for susceptibility scoring (where relevant) *For susceptibility attributes, please provide a brief rationale for scoring of parameters where there may be uncertainty affecting your decision*		

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[1]Fishbase. (2023). *Scomber japonicus*, Chub mackerel. https://www.fishbase.se/summary/Scomber-japonicus.html

[2]IFOP. (2007). Informe final, Estudio biológico-pesquero de la caballa entre la I -X regiones. https://www.subpesca.cl/fipa/613/articles-89101_informe_final.pdf

[3]SUBPESCA. (2021). Plan de reducción del descarte y captura de pesca incidental para la pesquería artesanal de anchoveta (*Engraulis ringens*), jurel (*Trachurus murphyi*) y su fauna acompañante en las Regiones de Atacama y Coquimbo. https://www.subpesca.cl/portal/615/articles-111941_documento.pdf

Standard clauses 1.3.2.2

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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 b Individuals < size at maturity can escape or avoid gear.	a Individuals < size at maturity are regularly caught. b Individuals < half the size at maturity can escape or avoid gear.	a Individuals < size at maturity are frequently caught 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 condition permitting subsequent survival	Evidence of majority released post-capture and survival.	Evidence of some released post-capture and survival.	Retained species or majority dead when released.

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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	
	Impacts On Species Categorised as Vulnerable by D1-D3 - Minimum Requirements		
	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.	
		Outcome:	

Evidence

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.

References

Links	
MarinTrust Standard clause	1.3.2.2, 4.1.4
FAO CCRF	7.5.1
GSSI	D.5.01

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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.

F1	Impacts on ETP Species - Minimum Requirements		
	F1.1	Interactions with ETP species are recorded.	PASS
	F1.2	There is no substantial evidence that the fishery has a significant negative effect on ETP species.	PASS
	F1.3	If the fishery is known to interact with ETP species, measures are in place to minimise mortality.	PASS
		Clause outcome:	PASS

F1.1 Interactions with ETP species are recorded.

Clause is met considering that:

In 2015, the monitoring of discards and bycatch of the industrial jack mackerel fishery in Chile began. The objective of the monitoring program was to compile the necessary technical background for the preparation of a discard reduction plan. In 2019 The Discard Reduction Plan and Bycatch Catch for the industrial jack mackerel and its accompanying fauna was published (SUBPESCA 2019). The Discard Reduction Plan mentions that having a monitoring program is essential; therefore, interaction of the fishery with other species continues to be recorded up to today. These records allow us to identify any ETP species that may be interacting with the fishery.

The last jack mackerel fishery annual report of Chile was submitted to the Scientific Committee of the SPRFMO in August 2022 (SPRFMO 2022). This report includes the cumulative bycatch species records in this fishery from 2015 to 2021. Records were obtained from 2,657 monitored fishing sets. Of the 17 species recorded only 3 were ETP according to the Marin Trust criteria fishery assessment guidance (to be listed as Endangered or Critically endangered by the IUCN or appear in the CITES appendices):

- Grey-headed albatross (*Thalassarche chrysostoma*): Endangered (IUCN 2023)
- Humboldt penguin (*Spheniscus humboldti*): CITES Appendix I (CITES 2023)
- Leatherback sea turtle (*Dermochelys coriacea*): CITES Appendix I (CITES 2023)

F1.2 There is no substantial evidence that the fishery has a significant negative effect on ETP species.

Clause is met considering that:

Figure 1 shows the incidental catch and resulting mortality by species in the jack mackerel purse seine industrial fishery operating between Valparaíso and Los Lagos Chilean administrative regions, and in the international waters of the SPRFMO from January 2015 to December 2021 (SPRFMO 2022). The effect of fishery on ETP species is:

- Grey-headed albatross (*Thalassarche chrysostoma*): 0% mortality
- Humboldt penguin (*Spheniscus humboldti*): 7.7% mortality, average incidental mortality=0.0004
- Leatherback sea turtle (*Dermochelys coriacea*): 0% mortality

The negative effect of the fishery on ETP species is practically null, since from 50 individuals only 1 (a Humboldt penguin) dead as a result of incidental catch.

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Common name	Scientific name	N° of individuals incidentally caught	N° individuals dead as a result of incidental catch	Mort (%)	AIC	CV_{AIC}	AIM	CV_{AIM}
South american sea lion	*Otaria byronia*	1,870	13	0.7	0.8	542	0.005	1,639
Dominican gull	*Larus dominicanus*	244	1	0.4	0.1	1,426	0.0004	4,897
Black-browed albatross	*Thalassarche melanophris*	215	1	0.5	0.09	1,214	0.0004	4,897
Peruvian pelican	*Pelecanus thagus*	109	3	2.8	0.05	1,911	0.001	4,897
Unidentified albatross	*Thalassarche* spp.	61	0	0	0.03	2,049	0	-
Sooty shearwater	*Ardenna grisea*	47	2	4.3	0.02	2,531	0.0008	3,462
Grey-headed albatross	*Thalassarche chrysostoma*	36	0	0	0.02	2,105	0	-
Wilson´s storm petrel	*Oceanites oceanicus*	18	1	5.6	0.008	2,175	0.0004	4,897
Pink-footed shearwater	*Ardenna creatopus*	16	16	100	0.007	2,329	0.0067	2,329
Humboldt penguin	*Spheniscus humboldti*	13	1	7.7	0.005	4,536	0.0004	4,897
Cape petrel	*Daption capense*	8	0	0	0.003	3,569	0	-
White-chinned petrel	*Procellaria aequinoctialis*	8	1	12.5	0.003	4,328	0.0004	4,897
Southern giant-petrel	*Macronectes giganteus*	8	0	0	0.003	3,569	0	-
Unidentified storm-petrel	Hydrobatidae	1	1	100	0.0004	4,897	0.0004	4,897
Unidentified penguin	*Spheniscus* spp.	1	1	100	0.0004	4,897	0.0004	4,897
Wandering albatross	*Diomedea exulans*	1	0	0	0.0004	4,897	0	-
Leatherback sea turtle	*Dermochelys coriacea*	1	0	0	0.0004	4,897	0	-

Mort (%) = Mortality: Number of dead animals / Number of animals of the same species captured
AIC = Average Incidental Catch: Number of animals caught / Number of sets observed
CV_{AIC} = AIC Coefficient of variation
AIM = Average Incidental Mortality: Number of dead animals / Number of sets observed
CV_{AIM} = AIM Coefficient of variation

Figure 1. Incidental catch and resulting mortality by species in the jack mackerel purse-seine industrial fishery. Red squares identify ETP species (SPRFMO 2022).

F1.3 If the fishery is known to interact with ETP species, measures are in place to minimise mortality.

Clause is met considering that:

Since 2017, the jack mackerel Management Plan included among its objectives the reduction of the percentage of catches of associated species and bycatch, including endangered, threatened and protected species (ETP) (SUBPESCA 2017). As a result of this objective, in 2019 the Discard Reduction and Bycatch Reduction Plan for the industrial jack mackerel fishery was published (SUBPESCA 2019).

This Plan was developed considering the following Articles of the General Law on Fisheries and Aquaculture (LGPA 2023):

- Article 7° C, the return to the sea of all bycatch shall be mandatory, under handling protocols approved by the National Fisheries and Aquaculture Service.
- Article 4 letter c), is mandatory to carry on boats and ships devices or utensils to avoid or minimize by-catch.
- Article 4 letter d), is mandatory to carry on boats to release specimens caught incidentally by fishing gear.

The plan also establishes the requirements that must be met regarding to: administrative and conservation measures, monitoring program of the plan and measures evaluation, training program and measures dissemination, code of good

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practices to reduce the catch of incidental fishing, and innovation and technological improvements in fishing gear that reduce bycatch.

The compliance of this regulations minimize mortality of ETP species that may interact with the jack mackerel fishery, and this may be the reason why ETP species mortality had been scarce.

References

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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.

Clause is met considering that:

Jack mackerel fishery uses purse seine gear, which is a surface gear used from coastal marine waters to ocean waters; thus, a purse seine does not come into contact with the seabed and it is consider a fishing gear that do not generate any impact in the habitat. Very occasionally in shallow water the bottom of the net may lay on the seabed but as the gear is not dragged across the seabed there should very little effect. (MSC 2023, FAO 2023, Sustain 2023, SUBPESCA 2003)

Taking into account the lack of interaction of the purse seine with any kind of habitat, fishery using this gear does not pose a risk of serious or irreversible harm to any habitat types.

F2.2 There is no substantial evidence that the fishery has a significant negative impact on physical habitats.

Clause is met considering that:

Purse seine do not interact with any physical habitats; therefore, no evidence was found during the assessment about any kind of negative impact on physical habitats by the jack mackerel fishery activity.

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F2.3 If the fishery is known to interact with physical habitats, there are measures in place to minimise and mitigate negative impacts. Clause is met considering that: Purse seine do not interact with any physical habitats; hence there is no need for measures to be in place to minimise and mitigate negative impacts related to interaction of the fishery with physical habitats.
References FAO. (2023). Fishing gear type. Purse seines. https://www.fao.org/fishery/en/geartype/249/en MSC. (2023). Purse seine. https://www.msc.org/what-we-are-doing/our-approach/fishing-methods-and-gear-types/purse-seine SUBPESCA. (2003). Cerco con jareta. https://www.subpesca.cl/portal/616/articles-9188_documento.pdf Sustain. (2023). 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

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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
		Clause outcome:	PASS

F3.1 The broader ecosystem within which the fishery occurs is considered during the management decision-making process.

Clause is met considering that:

The Convention on the Conservation and Management of High Seas Fishery Resources in the South Pacific Ocean states in the Article 3, section 2b, that "An ecosystem approach shall be applied widely to the conservation and management of fishery resources through an integrated approach under which decisions in relation to the management of fishery resources are considered in the context of the functioning of the wider marine ecosystems in which they occur to ensure the long term conservation and sustainable use of those resources and in so doing, safeguard those marine ecosystems" (SPRFMO 2022a).

In this context, The SPRFMO aligns to the he FAO Ecosystem Approach to Fisheries framework, which has been developed to implement the principles of sustainable development, the Convention for Biological Diversity and the Code of Conduct for Responsible Fisheries in a practical, operational manner (SPRFMO 2023). Also, SPRFMO Science Committee has a Habitat Monitoring and a Deepwater working sub group, which holds annual meetings to discuss ecosystem aspects in relation to the fisheries.

The last jack mackerel fishery annual report of Chile submitted to the Scientific Committee of the SPRFMO in August 2022, includes an "Ecosystem approach considerations in the jack mackerel fishery" section (SPRFMO 2022b). Here, the main management measures to avoid affecting the ecosystem are the application of the reduction of discard and incidental catch plan, which seems to be effective in maintaining a low mortality of accompanying fauna and ETP species related to jack mackerel fishing, and the monitoring of garbage management on the fishing fleet according to the International Convention MARPOL, whose main rule prohibits the dumping of plastics into the sea.

F3.2 There is no substantial evidence that the fishery has a significant negative impact on the marine ecosystem.

Clause is met considering that:

No evidence was found that the jack mackerel fishery is negatively impacting the marine ecosystem. The approval of the previous sections in this assessment demonstrates that the jack mackerel fishery is regulated in different aspects, which allows minimizing the negative impacts that jack mackerel extraction could have on the ecosystem. In addition, the fishery already holds a valid MSC certification, and the assessment do not have any conditions related to Principle 2 (ecosystem). (Mateo & Saa 2022).

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.

Clause is met considering that:

Jack mackerel is an opportunistic consumer of several crustaceans, copepods and other micronekton, while their predators are tunas, billfish, sharks and marine mammals. This suggests that this species may be acting as an energy flow channeler from primary producers to top predators (Konchina 1979, Yan et al. 2012, SPRFMO 2014). However, no evidence was found about the jack mackerel playing a key role in the marine ecosystem.

According to the jack mackerel stock assessment, the SPRFMO suggested a total catch of 716,758 tonnes for Chile in 2023, but national authorities approved a 2% lower quota (703,800 tonnes) (SUBPESCA 2022). Considering this information, in

addition to a positive stock assessment with biomass levels well above BMSY and fishing mortality well below FMSY, and definition of TAC under a precautionary approach (SPRFMO 2022c), it can be recognized that if jack mackerel do play a key role in the ecosystem, fishery removals are regulated in order to avoid overexploitation and guarantee the balance of the ecosystem.

References

Konchina, Y. V. (1979). The feeding of the Peruvian jack mackerel, *Trachurus symmetricus murphyi*. Journal of Ichthyology, 19, 52-61.

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

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Yan et al. (2012) Yan Y, Zhang CL, Lu H, Wang X, Lai J. Using stable isotopes to analyze feeding habits and trophic position of hairtail (*Trichiurus Lepturus*) from the Beibu Gulf, South China Sea. Oceanologia Et Limnologia Sinica. 2012;43(01):192–200.

Links	
MarinTrust Standard clause	1.3.3.3
FAO CCRF	7.2.2 (d)
GSSI	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.

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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 rm. 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]

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Appendix B

MarinTrust Fishery Assessment Peer Review Template

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

Fishery under assessment	Whole fish Fishery Assessment WF08: *Trachurus murphyi* - Jack Mackerel / Jurel – FAO 87, Chilean EEZ Regions XV-X
Management authority (Country/State)	Chile- South Pacific Regional Fisheries Management Organisation (SPRFMO) and Chilean Undersecretary of Fisheries and Aquaculture (SUBPESCA)
Main species	*Trachurus murphyi* - Jack Mackerel / Jurel
Fishery location	FAO 87, Chilean EEZ Regions XV-X
Gear type(s)	Purse seine
Overall recommendation. (Approve/ Fail)	Approve

Summary: in this section, provide any additional information about the fishery that the reviewers feel is significant to their decision.
The assessors have provided a detailed examination of the fishery with appropriate levels of evidence, and which follows the standards required for a surveillance 1 assessment. The fishery was re-approved in 2022 and no new catch data existed at the time of the surveillance. Whilst, overall, the evidence provided substantiates the determination, the following items are noted: F1.1 Regarding the 2,657 monitored fishing sets, indication of the percentage coverage and clarification of the monitoring methodology. Noting evidence from the MSC 2nd surveillance audit () and quoting % scientific observer cover from Vega et al. 2022 SC9-Doc 24 Chile Annual Report- Jack Mackerel. M2.3/F1.2 The minimisation of mortality in ETP's: The Discard Reduction and Bycatch Reduction Plan notes the use of image recording devices on board industrial vessels since 2020 and clarification as to the extent of implementation may be useful to support substantiation of evidence of low-level violations, the status of discarding (previously noted as unquantified) and the reported low levels of mortality of ETP and bycatch interactions.
General Comments on the Draft Report provided to the peer reviewer
Overall, a well-presented review with good level of evidence and references provided. Comments made are considerations for inclusion in future assessments

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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
A – Fishery Assessment			
1. Has the fishery assessment been fully completed, using the recognised MarinTrust fishery assessment methodology and associated guidance?	✓		
2. Does the Species Categorisation section of the report reflect the best current understanding of the catch composition of the fishery?	✓		
3. Are the scores in the following sections accurate (i.e. do the scores reflect the evidence provided)?		✓	
Section M - Management	✓		
Category A Species	✓		
Category B Species	✓N/A		
Category C Species	✓N/A		
Category D Species	✓		
Section F – Further Impacts	✓		

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 scoring is consistent with the MT standard and the appropriate evidence is provided within the assessment report.
Certification body response

2. Has the fishery assessment been fully completed, using the recognised MARINTRUST fishery assessment methodology and associated guidance?
The fishery assessment has been fully completed following the MarinTrust methodology. An internal review of the assessment has been conducted with a statement of affirmation of agreement with the assessor's conclusion.
Certification body response

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3. Does the Species Categorisation section of the report reflect the best current understanding of the catch composition of the fishery?
The species categorisation section (see Table 5) indicates the catch composition is made up of> 95% jack mackerel (reaching 99% in 2021) and chub mackerel/Caballa (*Scomber japonicus*) as the only recent other retained species. The latter is not a managed species, and the assessor has correctly evaluated it as Category D. The outcome of the attributes score determines the species as not vulnerable under D4 which is therefore, consistent with MT requirements, not applicable for scoring under this section.
Certification body response

3M. Are the scores in "Section M – Management" clearly justified?	
The scores in this section are clearly justified by the assessor with a good level of detail. Additional Comment for Consideration: M1.5/M1.6 SPRFMO reports are publicly available and there is evidence of external participation (e.g. Universities, WWF, Pew Foundation) and from invited scientific reviewers in the Working Group meetings. A note could be added to substantiate stakeholders from different sectors with examples of inputs, perhaps noting interactions e.g. scientific reviewer comments in https://www.sprfmo.int/assets/Meetings/SC_WS/SCW14-Jack-Mackerel/SPRFMO-SC-JM-Benchmark-Workshop-2022-Report-SCW14.pdf. (page 26).	
Certification body response	
The auditor has reviewed the above recommendations and will take them into account for future audits, but no change to the current report is required.	

3A. Are the "Category A Species" scores clearly justified?
The scores in this section are clearly justified by the assessor with good evidence and reasoning provided.
Certification body response

3B. Are the "Category B Species" scores clearly justified?
The assessor correctly determines there are no category B species.

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Certification body response

3C. Are the "Category C Species" scores clearly justified?
The assessor correctly determines there are no category C species.
Certification body response

3D. Are the "Category D Species" scores clearly justified?
The assessor correctly determines that Pacific chub mackerel is assessed under Category D. The scores are clearly justified with source references for attribute scores applied.
Certification body response

3F. Are the scores in "Section F – Further Impacts" clearly justified?
The scores in this section are justified by the assessor. Comment: The monitored fishing sets (2,657) could be presented by % of total coverage and a short summary of monitoring activity, noting there is both at sea and at port coverage, also to what extent cameras were installed and used (referring to MSC Surveillance audit 2) .(https://fisheries.msc.org/en/fisheries/chilean-jack-mackerel-industrial-purse-seine-fishery/@@assessments).
Certification body response
The auditor has reviewed the above recommendations and will take them into account for future audits, but no change to the current report is required.

Optional: General comments on the Peer Review Draft Report
A detailed and well justified assessment with good evidence provided.
Certification body response

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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)

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