



Marine Stewardship Council  
fisheries assessment

# Chilean jack mackerel industrial purse seine

## Announcement Comment Draft Report

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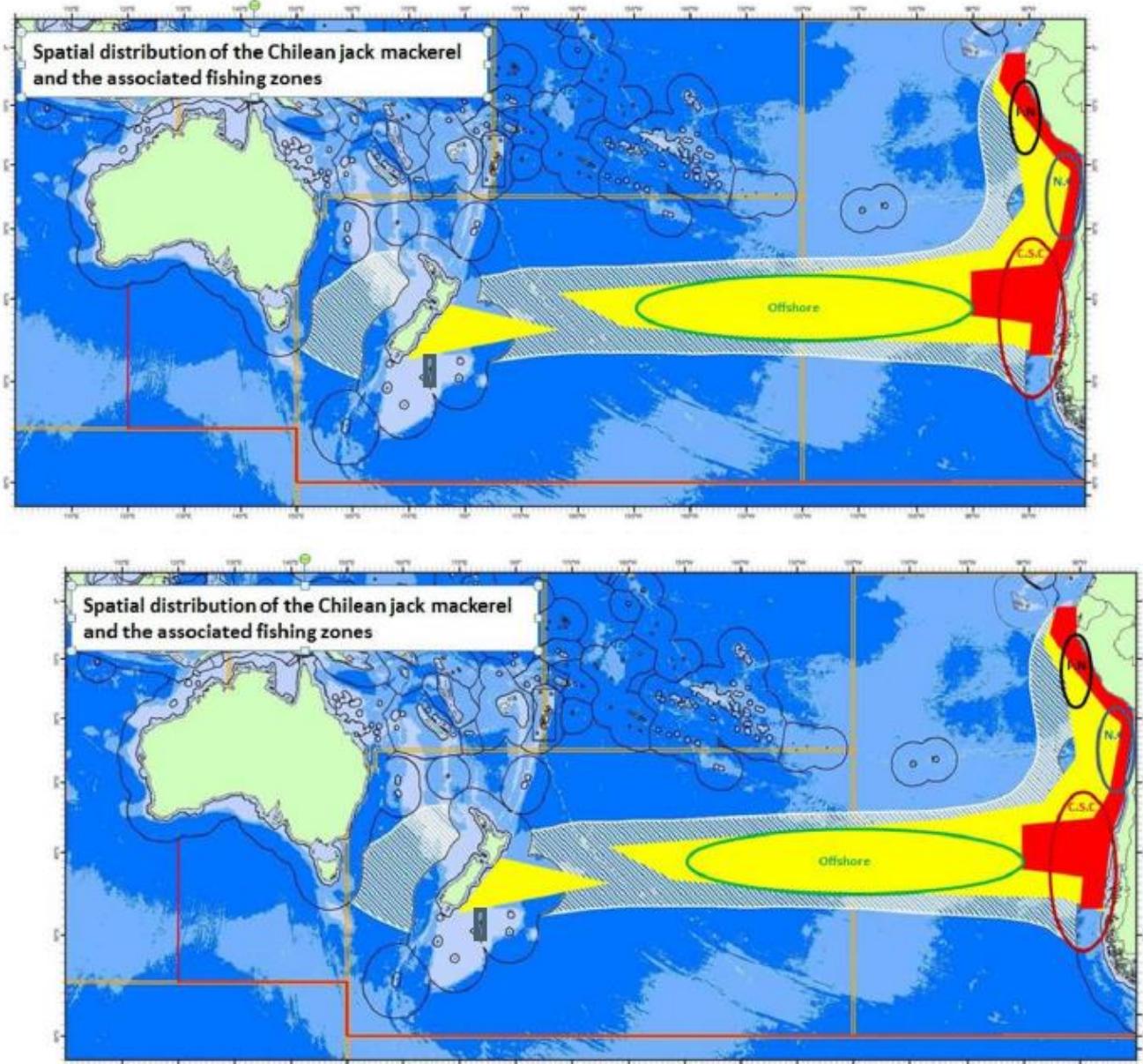


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## 2 Glossary

Term	Definition
ABC	Acceptable Biological Catch
ALC	automatic location and communication
Blim	Limit Reference Point for Biomass
$B_0$	Virgin biomass or initial biomass when there is no fishing
Bpa	Precautionary reference point for spawning stock biomass
BRP	Biological Reference Point
CFA	Commercial Fisheries Area
CIAMT	Captura incidental de aves, mamíferos y tortugas-logbook information
CITES	Convention on International Trade in Endangered Species of Wild Flora
CMM	Commission
COMM	Conservation and Management Measures
CCT-J	Comité Científico Técnico Jurel
DLA	Discriminating Lineal Analysis
DRI	Dispositivo de Registro de Imágenes
EBH	Environment-Bounded Habitat
EEZ	Exclusive Economic Zone
EMS	Electronic Monitoring Systems
ENGO	Environmental Non-Governmental Organization
F	Fishing Mortality
FAD	Fish Aggregating Device
FAO	FAO Food and Agriculture Organization of the United Nations
FL	Fork Length
ftm	Fathoms
grt	Gross Register Tons
HCR	Harvest Control Rules
hp	horse power
IFOP	Instituto Fomento Pesquero
INPESCA	Instituto de Investigación Pesquera
ITQ	Individual Transferable Quota
IQ	Individual Quota
IOE	Interacciones con otras especies-logbook information
JJM	Joint Jack Mackerel Model
JMSG	jack Mackerel Sub-group
LGPA	Ley General Pesca y Acuacultura (General Law on Fisheries and Aquaculture)
LODs	Limits of Detection
LPs	Local Populations
LRP	Limit Reference Point
LTL	Low trophic level
Ministerio de Economía	MINECON
MPs	Management procedures
MPA	Marine Protected Area
MSC	Marine Stewardship Council
MSE	Management Strategy Evaluation
MSY	Maximum Sustainable Yield
NMFS	National Marine Fisheries Service
OM	Operating Model
OMZ	Oxygen Minimum Zone
P1, P2, P3	MSC's Guiding Principles

Term	Definition
PA	Precautionary Approach
PCR	Polymerase Chain Reaction
PI	Performance indicator
PRI	Point of Recruitment Impairment
SC8	SPRFMO 8 <sup>th</sup> Scientific committee meeting
SC10	SPRFMO 10 <sup>th</sup> Scientific committee meeting
SC11	SPRFMO 11 <sup>th</sup> Scientific committee meeting
SE	Scoring element
SERNAPESCA	Servicio Nacional de Pesca y Acuicultura
SDMs	Species Distribution Models
SG	Scoring guidepost
SIBE	Sistema de Bitácora Electrónica
SONAPESCA	Sociedad Nacional de Pesca
SPRFMO	South Pacific Regional Fisheries Management Organization
SSB	Spawning Stock Biomass
STC	Scientific Technical Committee
SUBPESCA	Subsecretaría de Pesca y Acuicultura
SWG	Science Working Group
TAC	Total Allowable Catch
TL	Total Length
TP	Trophic Position
UoA	Unit of Assessment
UoC	Unit of Certification
VBGF	Von Bertalanffy growth function
VME	Vulnerable Marine Ecosystem
VMS	Vessel Monitoring System
WWF	World Wildlife Fund

## 3 Executive summary

Draft determination to be completed at Public Comment Draft Report stage

### 3.1 Assessment process and summary of assessment activities

Versions of MSC requirements, templates and processes relevant to this assessment are outlined in the table below.

**Table 1.** Fisheries program documents versions.

Document / Assessment Tree	Version
MSC Fisheries Certification Process (FCP) and Guidance	2.3
MSC Fisheries Standard and Guidance	2.01
Assessment Tree	<i>Default</i>
MSC General Certification Requirements (GCR)	2.6
MSC Reporting Template	1.3

Global Trust would like to thank all management and scientific agencies, industry bodies and stakeholders for their collaboration and for providing the information and data necessary to carry out this assessment.

### 3.2 Recommendation for further assessment at the ACDR stage

**Following the ACDR stage, the fishery was recommended for full assessment.**

The Announcement Comment Draft Report (ACDR) provides indicative scoring and rationales and identifies where more information is needed. The objective of the ACDR is to facilitate stakeholder input into the assessment and to ensure the fishery client, assessment team and stakeholders are better informed and prepared for the site visit. Stakeholders are encouraged to review the ACDR and to provide information to the assessment team and raise any concerns with the indicative scoring. The draft scoring ranges in the ACDR are based on a review of information and documents submitted by the fishery client. Based on the information provided by stakeholder, the site visit and further information gathering, the draft scoring ranges will become scores. These scores may be higher or lower than the draft scoring ranges. The scores will be published in the next assessment report (the Public Comment Draft Report).

#### Summary of Information gaps

P1: there were no information gaps on Principle 1.

P2: there were no information gaps on Principle 2.

P3: there were no information gaps on Principle 3.

Stakeholders are requested to provide information related to these gaps if able to do so.

### 3.3 Date and Location of Site Visit

To be drafted at Client and Peer Review Draft Report.

### 3.4 Main strengths and weaknesses of the Client's operation

**Table 2.** Main strengths and weaknesses of the Client's operation.

Strengths	Weaknesses
P1: <ul style="list-style-type: none"> <li>• Well-defined reference points and harvest control rules are in place.</li> <li>• Current Fishing Mortality is below FMSY.</li> <li>• Chilean Jack mackerel SSB has been increasing steadily since 2010 and is currently well above the SSBMSY target.</li> </ul>	P1: <ul style="list-style-type: none"> <li>• Although many studies have continued to understand the Population stock structure, conclusive evidence is not available and further research is undergoing.</li> <li>• Performance of the newly revised harvest control rules (Adjusted Annex K) that incorporate a B limit</li> </ul>

<ul style="list-style-type: none"> <li>The stock is considered, therefore, underexploited (SPRFMO, 2023b; Payá, 2024).</li> </ul> <p>P2:</p> <ul style="list-style-type: none"> <li>There was information available to score all PIs</li> <li>Some of the previous gaps related to lack of information for seabirds have been covered in this reassessment</li> <li>The discard program has been very useful over the years for P2</li> </ul> <p>P3:</p> <ul style="list-style-type: none"> <li>The fishery operates under a management system within an adequate and effective regulatory framework, capable of generating sustainable fisheries in accordance with Principles 1 and 2. This is ensured by both the South Pacific Regional Fisheries Management Organization (SPRFMO) and Chile, while respecting established rights.</li> <li>There is a conflict resolution system in place, which has been tested and proven effective in both the SPRFMO and Chile.</li> <li>Long-term objectives are explicitly outlined within the management policies of both the SPRFMO and Chile's regulatory system</li> </ul>	<p>have not been tested. Therefore, it cannot be said that the current harvest control rules adopted in the SPRFMO science committee meeting are robust.</p> <p>P2:</p> <ul style="list-style-type: none"> <li>Some conditions are carried over from the last assessment and will be evaluated later in the process</li> <li>Some update information will be needed for habitats</li> <li>Some Out scope species such as seabirds are considered secondary species and even though the impacts are nil no confident BBL were showed at the ACDR.</li> </ul> <p>P3:</p> <ul style="list-style-type: none"> <li>From the perspective of discard monitoring through onboard video recording cameras, the Chilean Authority lacks the professional or technological capacities needed for timely review, although the presence of cameras acts as a deterrent.</li> <li>There is no established mechanism to evaluate the monitoring and enforcement system within Chile's regulatory framework as part of the overall management system</li> </ul>
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### 3.5 Conditions

#### To be drafted at Client and Peer Review Draft Report

Conditions have been drafted for each individual Performance Indicator (PI) that failed to score at least 80 as described in the table below.

**Table 3.** Summary of conditions.

Condition number	Condition	PI	UoA impacted	Related to previously raised condition?

### 3.6 Recommendations

#### To be drafted at Client and Peer Review Draft Report

In addition to Conditions, assessment team may make Recommendations. While Recommendations are not binding, and as such do not require obligatory actions on the part of the fishery, fishery clients are encouraged to act upon them within the spirit of MSC certification.

<insert Recommendations>

### 3.7 Draft determination/determination and supporting justification <From PCDR stage only>

#### To be drafted at Client and Peer Review Draft Report

## 4 Report details

### 4.1 Authorship and peer review details

#### 4.1.1 Authorship and Assessment Team details

This assessment was conducted by an assessment team comprising members with experience and expertise in relevant areas of fishery science and fishery management as set out in the table below:

**Table 4.** Authorship and assessment team

Role	Name	Area of Expertise
Team leader	Dr. Virginia Polonio	Team leader, traceability and Principle 2 (habitats and Ecosystems)
Team members	Dr. Ivan Mateo	Principle 2
	Ms. Edith Saa	Principle 3
	Ms. Ana Ayres	Principle 2 (Primary, secondary and ETPs)

A brief bio for each team member is presented below.

#### **Dr. Virginia Polonio (Assessor, primary responsibility for Principle 2 - Habitat and Ecosystems, and RBF)**

Dr. Virginia Polonio has a B.Sc. in Environmental Sciences, and a M.Sc. in Fisheries Management and Aquaculture, both from the University of Cádiz. She also obtained her PhD in Biodiversity and Natural resources from the University of Oviedo during which she gained experience in the field of research of fisheries and protection of Vulnerable Marine Ecosystems such as coral reefs. During her thesis she wrote several articles describing new species of corals and developed skills in the fields of benthic ecology and ecosystem management. Before her PhD, Dr. Polonio was contracted as technician in the Spanish Oceanographic Institute where she realized work at sea and gained field experience to assess fisheries stocks. She participated in the Spanish National Basic Plan of Data to collect and evaluate the fishing in the ICES and CECAF areas. During this period, she carried out feeding habit and age/size studies of *Pagellus bogaraveo* and others commercial species (Chilean hake, anchovy, sharks, mackerel, squid, etc.) to implement an ecosystem approach in relation to commercial fisheries in the Gulf of Cadiz and the strait of Gibraltar. Dr. Polonio has extensive experience working on MSC assessments as lead assessor and Principle 2 expert for multiple CABs. She was involved in MSC assessments for several Chilean fisheries.

#### **Dr. Ivan Mateo (Assessor primary responsibility for Principle 1 Traceability, and RBF)**

Dr. Ivan Mateo has over 20 years' experience working with natural resources population dynamic modelling. His specialization is in fish and crustacean population dynamics, stock assessment, evaluation of management strategies for exploited populations, bioenergetics, ecosystem-based assessment, and ecological statistical analysis. Dr. Mateo received a Ph.D. in Environmental Sciences with Fisheries specialization from the University of Rhode Island. He has studied population dynamics of economically important species as well as candidate species for endangered species listing from many different regions of the world such as the Caribbean, the Northeast US Coast, Gulf of California, and Alaska. He has done research with NMFS Northeast Fisheries Science Center Ecosystem Based Fishery Management on bioenergetics modelling for Atlantic cod. Dr. Mateo also worked as an environmental consultant in the Caribbean doing field work and looking at the effects of industrialization on essential fish habitats and for the Environmental Defense Fund developing population dynamics models for data poor stocks in the Gulf of California. Dr. Mateo worked as National Research Council post-doctoral research associate at the NOAA National Marine Fisheries Services Ted Stevens Marine Research Institute on population dynamic modelling of Alaska sablefish and early life history/recruitment dynamics Pacific Ocean perch.

#### **Ms. Ana Ayres Almeida (Assessor, primary responsibility for Principle 2 (Species))**

Ana has a MS in Marine Environment and Resources from the Universities of Bordeaux (France) and of Southampton (UK). Ana worked as a Fisheries Consultant for National Fisheries and Aquaculture Collective in Brazil where she has responsibilities on the planning, development and improvement of fisheries public

policies. She also worked at the University of Southampton on benthic habitat mapping of Galapagos Islands with implications for the management of the marine reserve. Ana worked as a Marine Mammal Observer in Portugal monitoring cetaceans populations. Ana has participated in numerous Marin Trust fisheries assessments and is qualified as team member for MSC assessments.

**Ms. Edith Saa (Assessor primary responsible for Principle 3)**

Ms. Edith Saa is a fisheries engineer. She obtained her degree from the Catholic University of Valparaíso. She worked between 1976 and 1991 in the National Fisheries Service. After that, between 1993 and 2006, she developed her work in the Subsecretary of Fisheries. After that, Ms. Saa worked as manager of the Fisheries Development Division. She has participated in the drafting of several laws related to fishing activities that were established between 1991 and 2014. She worked as a consultant for the Ministry of Economy between 2008 and 2010 with her participation in the Salmon workshop. There she collaborated to modify the fishing law and regulations on fisheries, aquaculture and impacts on the environment. Currently, she works as an independent consultant for fishing activities.

#### 4.1.2 Peer Review details

##### Peer reviewer information to be included at the Public Comment Draft Report stage

The peer review of this fishery was conducted through the MSC's Peer Review College by the following (Note reviews are anonymised in this report):

**Table 5. Peer reviewers**

Peer reviewers	

With respect to these Peer Reviewers, a summary of their experience and qualifications is included in the Peer Reviewer shortlist announcement available on the MSC webpage for this fishery and presented in section XX.

## 4.2 Version details

The versions of the MSC fisheries program documents used for this assessment are outlined in Table 6 below.

**Table 6.** Fisheries program document versions.

Document/Assessment Tree	Version Number
MSC Fisheries Certification Process (FCP) and Guidance	2.3
MSC Fisheries Standard and Guidance	2.01
Assessment Tree	<i>Default</i>
MSC General Certification Requirements (GCR)	2.6
MSC Reporting Template	1.3

## 5 Unit(s) of Assessment and Certification

### 5.1 Unit(s) of Assessment and Unit(s) of Certification

#### 5.1.1 Unit(s) of Assessment

The proposed UoA is described in English and Spanish in the table below.

<b>Table 7. Unit of Assessment (UoA)</b>	
Species:	<i>Trachurus murphyi</i>
Common name:	Jack Mackerel Jurel
Stock(s):	Chilean EEZ (Regions III-X & XIV) and international waters. Stock presente entre las regiones III-X & XIV de Chile y aguas adyacentes internacionales.
Geographical Areas:	FAO 87, Pacific Southeast / FAO 87 Océano Pacífico Suroeste
Fishing methods:	Purse seine / Cerco
Management System:	Management Entities involved in this stock: Chilean Undersecretary of Fisheries and Aquaculture (SUBPESCA), Fisheries Development Institute (IFOP), Ministry of Production - Peru (PRODUCE), South Pacific Regional Fisheries Management Organization (SPRFMO), Vice Ministry of Aquaculture and Fisheries of Ecuador (MPCEIP)/ Instituciones involucradas en la gestión de este stock: Subsecretaría de Pesca de Chile (SUBPESCA), Instituto de Fomento Pesquero (IFOP), Ministerio de la producción de Perú (PRODUCE), Organización Regional de Ordenación Pesquera del Pacífico Sur (OROP-PS) y Ministerio de Producción de Comercio Exterior de Ecuador (MPCEIP).
Client Group and other eligible fishers*:	SONAPESCA and other eligible fishers defined as Chilean industrial purse seiners licensed to fish Chilean Jack mackerel in regions III-X and XIV and international waters. SONAPESCA y otros Pescadores elegibles que posean licencia para pescar jurel en las regiones III-X y XIV, así como en aguas internacionales adyacentes.

### 5.1.2 Unit(s) of Certification

The proposed UoC at the ACDR stage is presented in the table below, however, that will be confirmed at the following stage of this re assessment.

**Table 8. Unit of Certification (UoC).**

UoC X		Description
Species	Latin name:	<i>Trachurus murphyi</i>
	Common names:	Jack Mackerel / Jurel
Stock		Chilean EEZ (Regions III-X & XIV) and international waters. Stock presente entre las regiones III-X & XIV de Chile y aguas adyacentes internacionales.
Geographical area		FAO 87, Pacific Southeast /FAO 87 Océano Pacífico Suroeste
Fishing gear type(s) and, if relevant, vessel type(s)		Purse seine / Cerco
Client group		SONAPESCA

## 6 Confirmation of scope

In accordance with MSC FCP v2.3 §7.4, Global Trust Certification verified that the fishery is within scope of the MSC Fisheries Standard (see table below).

**Table 9.** Target species and method.

1	The target species (Jack mackerel, <i>Trachurus murphyi</i> ) is not an amphibian, reptile, bird or mammal
2	The UoA does not use poisons or explosives.
3	The UoA is not conducted under a controversial unilateral exemption to an international agreement.
4	The fishery does not include an entity that has been implicated in a conviction for forced or child labour in the last 2 years.
5	The fishery has completed the 'Certificate Holder Forced and Child Labour Policies, Practices and Measures' section within the MSC 'At Sea Labour Eligibility Requirements Reporting template and submitted it to Global Trust.
6	The client or client group does not include an entity that has been convicted for a shark finning violation in the last 2 years.
7	Is this fishery enhanced? <i>No</i>
8	Does the fishery target an introduced species? <i>No</i>

## 7 Overview of the fishery

### 7.1 Fishery distribution

The jack mackerel is distributed from the Galápagos Islands to the southern region of Chile, in both oceanic and coastal waters (Serra, 1991; Guele et al., 2014). In international waters, it is distributed in large schools up to 160°W, mainly between 33°S and 48°S along the subtropical convergence. As a population unit in the SPRFMO, the entire eastern region of the South Pacific up to 120°W is considered (

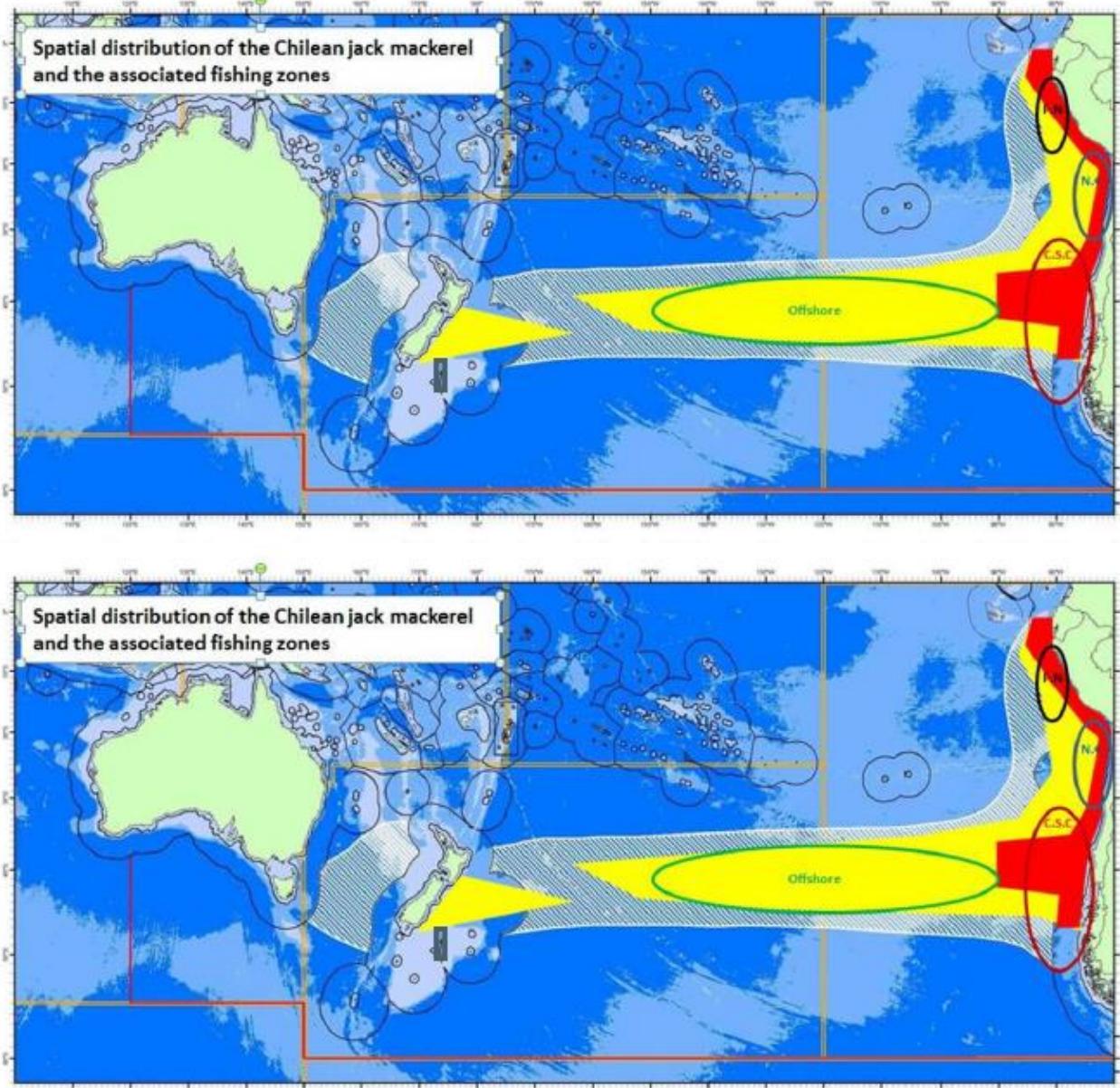
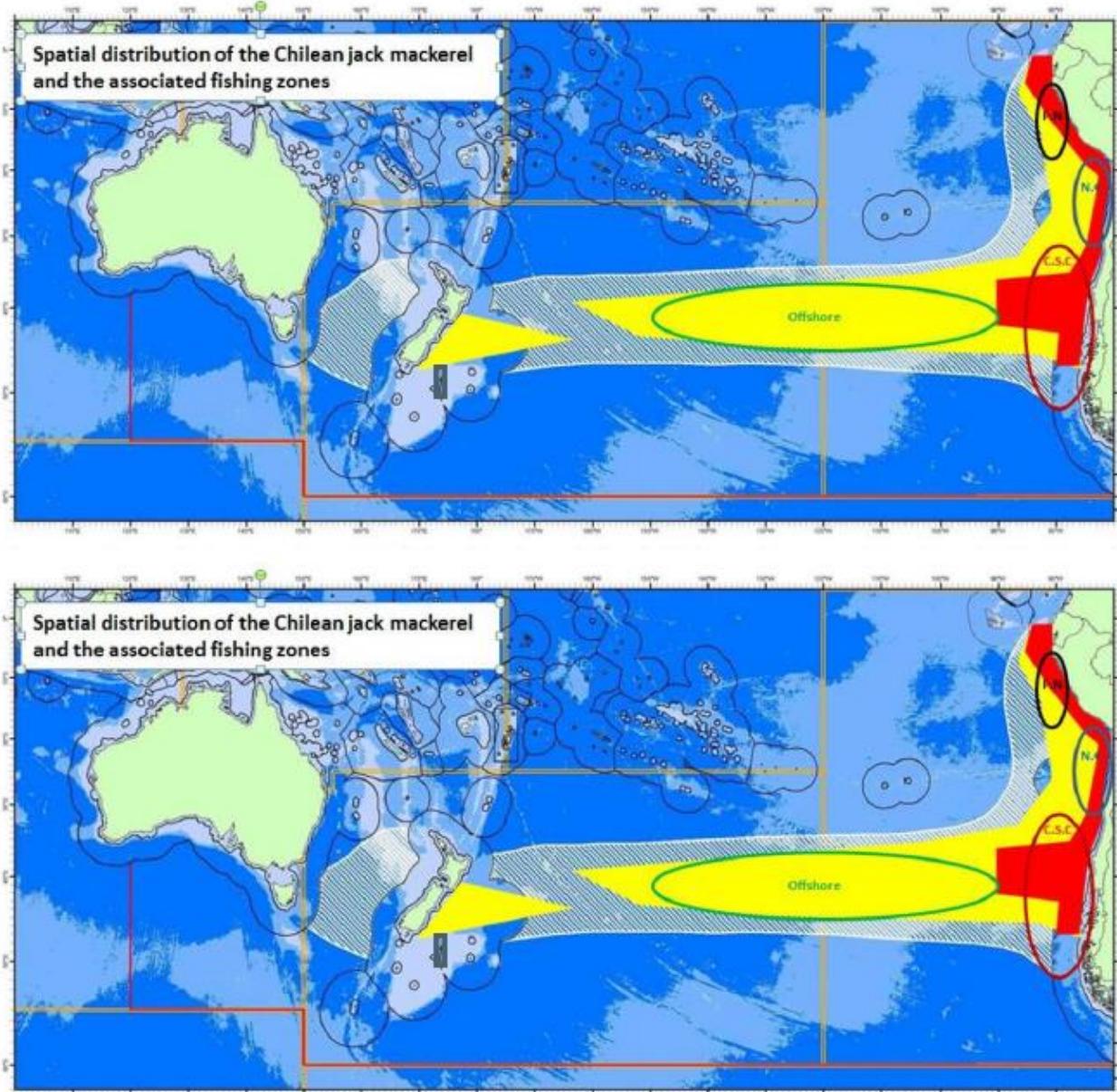


Figure 1).



**Figure 1.** Description of the spatial distribution of Chilean jack mackerel (taken from Guele et al., 2014). It is based on catch data (yellow) and survey index (red), with the corresponding four fishing zones: Northern Chile (blue line), South-Central Chile (red line), Offshore (green line), and Far North (black line). The white band represents the jack mackerel belt (Elizarov et al., 1993; Gerlotto et al., 2012). Source: IFOP 2024

The Chilean jack mackerel undergoes partial spawning primarily in open waters, from winter until late spring, with peak activity concentrated between October and November. Sexual maturity is reached at 22.7 cm LH (Leal et al., 2013). This pelagic species has a maximum age in catches that does not exceed 15 years. Recent studies have revised the age assignment, determining that the first and third annual rings are false, effectively reducing the species' longevity by two years (Cerna 2022).

Chile has a coastline of 4,337 km (measured on a straight line), while its Exclusive Economic Zone (EEZ) totals almost 2.8 million km<sup>2</sup>. The area includes the ocean surrounding its island territories.

The industrial purse seine fleet targeting jurel operates within the Chilean EEZ and in international waters (SPFRMO area). The distribution of the fishery may vary on an annual basis, according to changes in the

distribution of the biomass. Although, the fishery under assessment in this report, operates in national waters of Chile.

For the past 11 years, the assessment of the jack mackerel stock has been conducted within the framework of the Scientific Committee (SC) of the South Pacific Regional Fisheries Management Organisation (SPRFMO). The evolution of commercial jack mackerel catches is separated the data by the four fleets identified in the SPRFMO: (1) Far North: Ecuador-Peru within their EEZ, (2) N\_Chile: Northern Chile within the EEZ, (3) CS\_Chile\_PS: South-Central Chile inside and outside the EEZ, and (4) Offshore\_Trawl: International fleet off the coast of Chile, but outside the EEZ. All these fleets fish with purse seines, except for the offshore fleet, which uses midwater trawl nets. More information about biological parameters and the stock assessment are given in section 10 Principle 1 backgrounds

The history of the Chilean jack mackerel fishery is quite interesting and has seen significant changes over the decades. fishery began to gain importance in the 1970s. By the 1990s, it had become one of the world's most significant commercial fisheries, with annual catches exceeding 4 million metric tonnes.

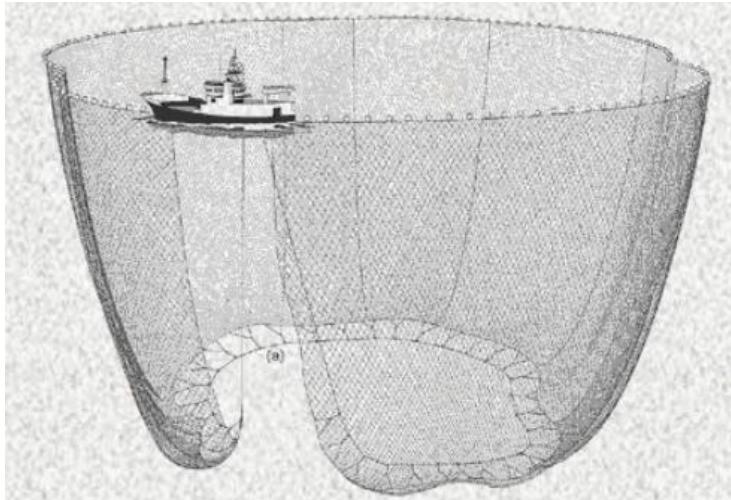
Unfortunately, overfishing led to a severe decline in jack mackerel stocks. By 2011, the fishery had collapsed, and the annual catch was reduced to just 350,000 metric tonnes. This collapse had a devastating impact on fishing communities in Chile.

In response to the crisis, international cooperation was established through the South Pacific Regional Fisheries Management Organisation (SPRFMO) in 2013. This organization implemented strict quotas and management measures to help the stock recover.

Chilean fisheries worked towards sustainable practices and, after years of effort, achieved Marine Stewardship Council (MSC) certification in 2019. This certification marked a significant milestone, indicating that the fishery was being managed sustainably and that the jack mackerel population was recovering. Now the fishery is undergoing the second cycle of the MSC certification and herein the assessment team is analysing the most up to date information for the sake of the reassessment of this fishery.

## 7.2 Fishing gear

A seine net is made up of a long wall of netting framed by an upper line of floats and a lower line of sinkers (usually of equal or longer length than the previous one), and has rings hanging at the bottom of the net. the net, through which a rope or steel cable called a purse runs, which allows the closure of the net. A sea anchor is arranged in the bow of the net, which is intended to offer resistance when setting the net. In Chile these networks can reach dimensions of 173 m high by 1,760 m long. For most situations, this is the most efficient fishing gear in catching small pelagic species that swim in schools.



### 7.3 Information about the Fishery Client

The National Fisheries Society (SONAPESCA) F.G. was born in March 2015 as an organization aimed at promoting the development of industrial fishing<sup>1</sup>. In this way, the trade union federation plays a preponderant role, due to the importance of the sector in the economic, social and cultural growth of each of the fishing regions.

#### Mission

At SONAPESCA, a trade union federation that brings together the main unions and actors of industrial fishing in the country, they are committed to contributing with skills, resources and efforts to make Chile a fishing power respected in the world for the quality of its policies and the transparency of its actions.

#### Vision

At SONAPESCA, they want to be recognized as a model industry in the country, characterized by:

- The positive relationship with its workers, the quality of the employment it generates, the attraction of talent, the development opportunities it offers to its staff, and safety at work.
- The quality of its products and services.
- Operational excellence, productivity, and efficiency of its operations and costs.
- The ability to innovate products and processes, and the incorporation of the most modern technology to seek excellence and care for the environment.
- Integration with all relevant actors in the industry and the country, and the relationship of respect and mutual convenience established with all of them.

#### Fleet

SONAPESCA has 6 client groups participating in this fishery and the South-central Jack mackerel industrial purse seine fishery fleet is composed of 23 fishing vessels<sup>2</sup>.

<sup>1</sup> <https://www.sonapesca.cl/>

<sup>2</sup> <https://cert.msc.org/FileLoader/FileLinkDownload.ashx/GetFile?encryptedKey=JtmkMty14CSqri8qslk4OHfzHVfGvSLGDpzJdBcUz9lsEZ9LpiMdgUNyWCOWozK>

Up to date as of: 06<sup>th</sup> March 2024.

**Parties currently eligible to access this certificate**

The parties (i.e. vessels, fleets and/or any other client group members, including named companies) that are currently eligible to access this fishery certificate are:

	Client group entity	Address
1	ALIMENTOS MARINOS S.A.	2111 Mar del Plata Street, Providencia, Santiago
2	BLUMAR SEAFOODS S.A.	Magdalene 181 Street, Office 1301 South, Floor 13, Las Condes, Santiago
3	CAMANCHACA PESCA SUR S.A	80 General Carlos Prats Av. Coronel, Bio Bio
4	FOODCORP CHILE S.A.	995 Pedro Aguirre Cerda Av. Coronel, Bio Bio
5	ORIZON S.A.	150 El Golf Av. Floor 8, Las Condes, Santiago
6	PESQUERA LANDES S.A.	Isla Rocuant Avenue, Talcahuano, Bio Bio.

Number	Client group entity	Name of the vessel
1	ALIMENTOS MARINOS S.A., ALIMAR	QUERELEMA
2	ALIMENTOS MARINOS S.A., ALIMAR	VICHUQUEN II
3	BLUMAR S.A.	DON EDMUNDO
4	BLUMAR S.A.	RAPANUI
5	BLUMAR S.A.	COBRA
6	BLUMAR S.A.	DON ALFONSO
7	BLUMAR S.A.	YELCHO I
8	CAMANCHACA PESCA SUR S.A.	BUCANERO I
9	CAMANCHACA PESCA SUR S.A.	CORSARIO I
10	CAMANCHACA PESCA SUR S.A.	MARIA JOSE
11	CAMANCHACA PESCA SUR S.A.	PEHUENCO
12	CAMANCHACA PESCA SUR S.A.	PELICANO
13	FOODCORP CHILE S.A.	CAZADOR
14	FOODCORP CHILE S.A.	DON MANUEL
15	FOODCORP CHILE S.A.	RUTH
16	ORIZON S.A.	DON JULIO
17	ORIZON S.A.	LONCO
18	ORIZON S.A.	SAN JOSE
19	ORIZON S.A.	VENTISQUERO
20	ORIZON S.A.	LIDER
21	ORIZON S.A.	VESTERVEG
22	SOC. PESQ. LANDES S.A.	DON TITO
23	SOC. PESQ. LANDES S.A.	DON BORIS

24) VESSEL "PANILONCO" ALIMENTOS MARINOS S.A.

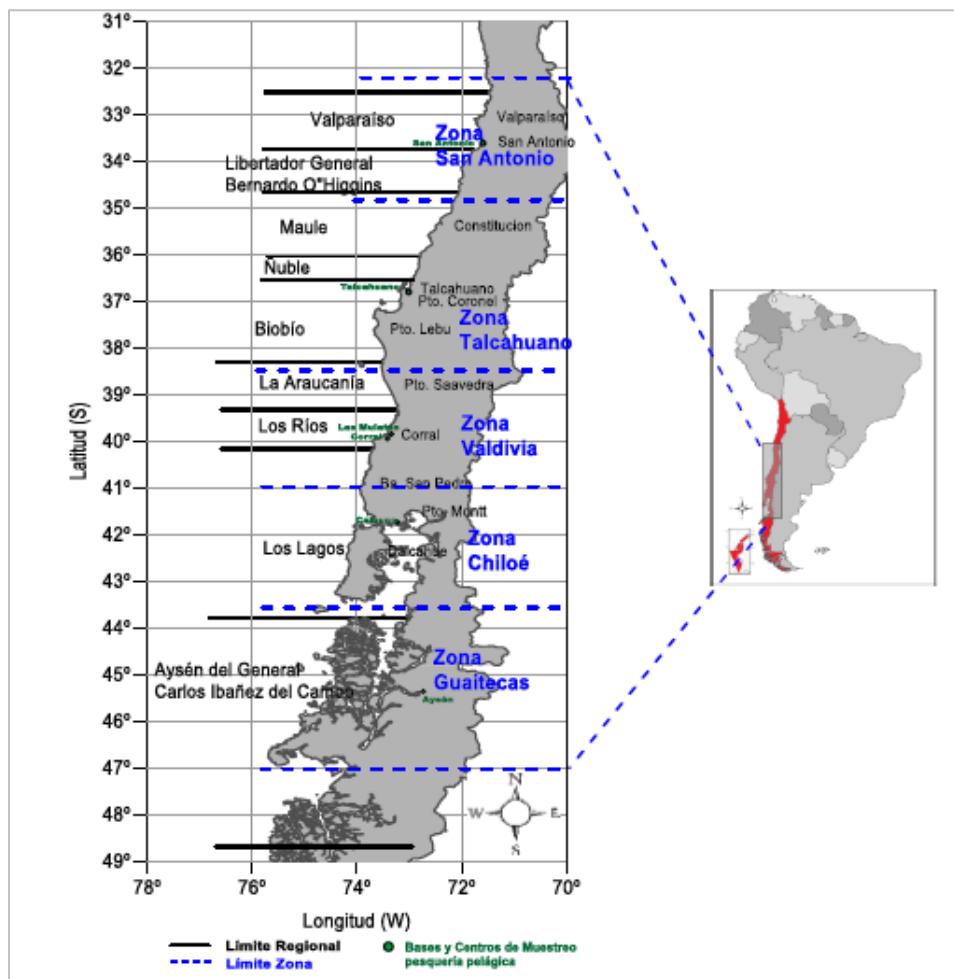
25) VESSEL "CORAL" SOC. PESQUERA LANDES

**Figure 2.** Numbers of SONAPESCA client groups and fishing vessels (Source: MSC<sup>3</sup>).

**Description of where the fishery operates, including maps, and when the fishery operates.**

The Industrial purse seine Jack mackerel of the south-central zone considers the maritime space whose north-south limits extend between 32°10'-47°00'LS and east-west from the coast to beyond the 200 nm of the exclusive economic zone of continental Chile (EEZ), including the Oceanic Islands and the high seas, and exceeding to the west in recent years the 1,200 nautical miles of the coast (Figure 3) (Walker *et al.*, 2023). Although the fishery occurs throughout the year, the largest catches of Jack mackerel for the 2018-2022 period have been recorded in the first half of each year (80% on average).

<sup>3</sup> <https://fisheries.msc.org/en/fisheries/chilean-jack-mackerel-industrial-purse-seine-fishery/@@assessments>



**Figure 3.** Area of the south-central Chilean Jack mackerel industrial purse seine fishery (Source: Walker *et al.*, 2023).

**Number of vessels, and their size; gear description and deployment (any technical measures on the gear or deployment to avoid bycatch).**

The industrial purse seine fleet that operated in the south-central area in 2022 consisted of 25 vessels (SERNAPESCA), all concentrated in the base ports of the Biobío Region (Walker *et al.*, 2023) (Figure 4).

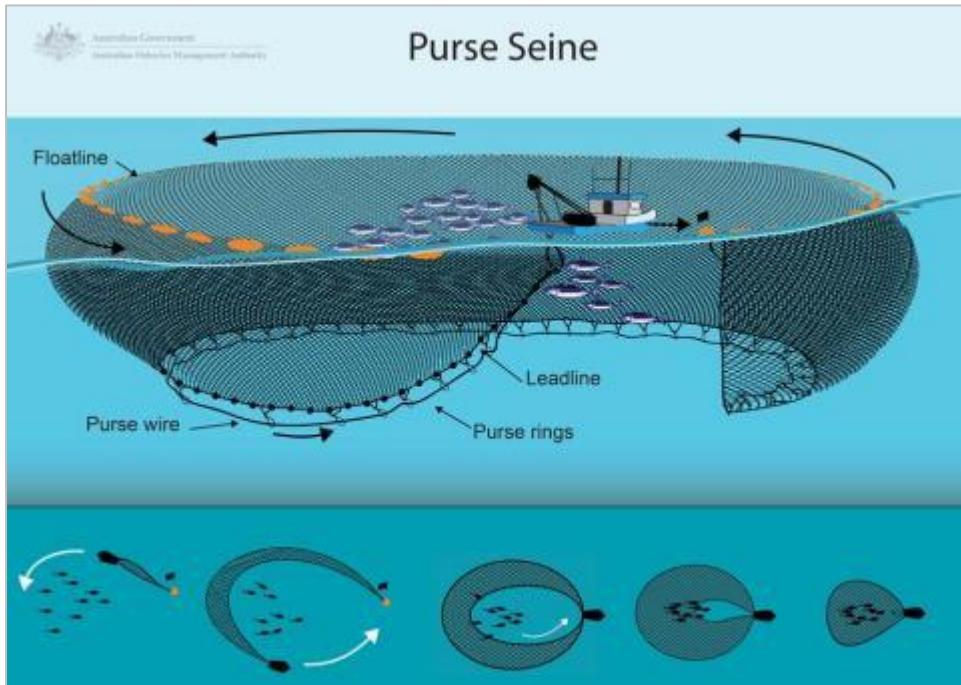
The storage capacity (CB) of the fleet that operated in 2022 was distributed between 849 m<sup>3</sup> and 984 m<sup>3</sup>, and between 800 and 2,005 GRT, with averages of 1,491 m<sup>3</sup> and 1,371 GRT, respectively, while the overall length had an amplitude between 51.8 m and 74.5 m (average of 63.4 m) and horse powers between 2,145 and 7,370 hp (average of 4,190 hp).



**Figure 4.** Types of industrial fishing vessels that operate with purse seine nets in the south-central zone, according to the most representative sizes, between the Regions of Valparaíso and Los Lagos; UoA 1 – Industrial Purse Seine Net (Source: Walker *et al.*, 2023).

The purse seine nets used by the south-central industrial fleet are designed and built in order to catch Jack mackerel, but they can also be used to catch other associated resources such as Bycatch, like chub mackerel, jumbo flying squid and hoki (Walker *et al.*, 2023). All the fishing vessels have Jack mackerel nets; however, a smaller fraction of the fleet has sardine nets as an alternative, with which common sardines and anchovy are marginally caught as target species, but also secondary resources or Bycatch, such as Pacific menhaden, starry butterfish and mote sculpin, although in very small quantities.

A purse seine is a large wall of netting deployed around an entire school of fish or a Fish Aggregating Device (FAD) (Figure 5). The seine has floats along the top line with a lead line threaded through rings along the bottom. Once a school of fish is located (either by visual cues such as congregations of seabirds or dolphins, or through using sonar), a skiff encircles the school with the net. The lead line is then pulled in, "pursing" the net closed on the bottom, preventing fish from escaping by swimming downward. The catch is harvested by hauling the net ('net rolling') and stacking it on the back deck of the vessel until all slack is removed and the fish are crowded in the 'bunt' and a brailer (small net) can be used to scoop out the fish.



**Figure 5.** Purse Seine (Source: Australian Fisheries Management Authority).

The largest fishing vessels (length greater than 60 m) use Jack mackerel nets (Figure 5), that on average, reach 700 fathoms (ftm) in upper line length and 110 ftm-115 ftm in height of stretched fabric in their central bodies (theoretical maximum) and also in some cases have sardine nets that reach an average of 524 ftm x 70/75 ftm high (Walker *et al.*, 2023).

The boats have a three-roller net turning system (Triplex) and are usually designed to cast on the starboard side. The deck equipment is completed by a netstacker to move the net or computer from it (hydraulic arm with a roller at its end) that transports the net by means of the roller that rotates towards the stowage pit at the stern. Other features of today's large purse seiners are comfortable living spaces for the crew and fish suction pumps (Walker *et al.*, 2023).

The purse seine fishing operation consists of searching for a fish school, haul, and repeat the operation to until it meets the goal of catch/process/requirement of the fishing expedition and its operation projected to the consumption of the assigned individual quota. The fishing expeditions (mareas) have an average duration of 2.1 days/trip/year (Walker *et al.*, 2023).

Among some of the technical measures on the gear or deployment to avoid bycatch are as follows:

- All net used for the industrial purse seine fishing has a minimum of 2 inches (50 mm) mesh size in the codend and square mesh panels in the extension of 75 mm mesh size in accordance with the regulation of the gear in the fishery.
- Jack mackerel legal minimum size is 26 cm FL (SUBPESCA, 2019).
- If there is a high presence of Jack mackerel individuals under the legal minimum size 26 cm FL, the fishing vessel should not repeat the set on the same area and apply a zone closure about 10 nm around the position of the set with a high percentage of specimens under legal minimum size, and search for another fishing area (move on) (SUBPESCA, 2019; MBP, 2019; INPESCA, 2023).
- In relation to the plan of reduction of discards, it is important to note that current regulations do not allow discarding for the target and secondary species caught (Law 20.625, MINECOM) (SUBPESCA, 2019; MBP, 2019).

- Discarding is only allowed for documented reasons of safety at sea, due to mechanical failure and putting the integrity of the crew of the vessel or vessel at obvious risk (Res.Ex. N° 1626 - 30.04.2019, MINECOM, SUBPESCA)(SUBPESCA, 2019; MBP, 2019).
- Within the framework of the implementation of actions that mitigate the discarding of Jack mackerel as the target species, SUBPESCA has established Exempt Resolution No. 862 (March 25, 2021) which aims to regulate the requirements and conditions of application of the maneuver of "transfer of surplus set" (TEL) of fishing, it is applicable to the industrial mackerel fishery in the maritime area of the regions of Valparaíso to Los Lagos, and in international waters, and its sole objective is to avoid the discarding of the surplus catch of a fishing haul that is kept in the net and that cannot be carried on board because the maximum hold capacity of a ship or vessel has been completed (INPESCA, 2023).

**Monitoring of the fishery – details of fisheries monitoring and surveillance, including (if relevant) methods for the independent observation of catches.**

The monitoring of the south-central industrial purse seine fishery of the Chilean Jack mackerel comprises of a comprehensive monitoring program which is carried out by the Fisheries Development Institute (IFOP)<sup>4</sup>. This program is made up of research projects for monitoring fisheries and estimation of discards, direct evaluation (by acoustic methods and by egg production method) and evaluation of the status and possibilities of exploitation (SPRFMO, 2023a). These projects are named as follows:

**Status and possibilities of biologically sustainable exploitation of the main national fishery resources, Jack mackerel XV to X Regions**

Similarly, as done by the SPRFMO SWG, this study has used the Joint Jack mackerel (JJM) model. This project is aimed to set up the status of the resource, and to assess the biologically sustainable exploitation rates. The results are used by the Fishing Authority to update and/or improve the stock assessment, simulating different exploitation scenarios and conducting additional analyses.

**Hydroacoustic Evaluation of Jack Mackerel V-X Region**

The Jack mackerel distribution and acoustic biomass estimated by IFOP has been employed for two main purposes: learning about the migration patterns and knowing the biomass level in the main fishery zone. The acoustic biomass is the most important index of abundance employed for stock assessment purposes. Its spatial and temporal variations have permitted developing different hypotheses related to its population status.

**Biological condition of Jack mackerel on the high seas**

This study objectives are to estimate indices of relative abundance of Jack mackerel eggs and larvae in the high seas characterize the reproductive condition of jack mackerel in the high seas and determine the spawning area, determine and characterize the spatial distribution of the aggregations of Jack mackerel, determine the oceanographic conditions during the spawning period of Jack mackerel and to relate it to the distribution of Jack mackerel eggs and larvae and determine the main food items of adult Jack mackerel.

**Monitoring of pelagic fisheries in south-central Chile**

This study allows obtaining information on the evolution of the main biological and fishery's indicators associated with the Jack mackerel fishery for both the industrial and the small-scale fleets. The monitoring is conducted between the northern boundary of Chile and 47°00' SL and includes information collected at sea and at landing points by scientific observers. The biological information for Jack mackerel and its associated species is obtained on a regular basis from samples collected along the Chilean coast. Sampling is conducted on a daily basis, mainly at landing sites and processing plants and is also complemented with information gathered by scientific observers onboard fishing vessels. The information collected includes fork length measurements, otolith collection, total weight, gutted weight, gonad weight, and sex and maturity stages

**Program for the investigation and monitoring of discards and bycatch in pelagic fisheries in South Central Chile**

<sup>4</sup> <https://www.ifop.cl/en/nuestro-que-hacer/la-investigacion-pesquera/planificacion-estrategica/>

Since 2015, this study monitors, through scientific observers onboard, the levels of bycatch of target species such as Jack mackerel, as well as the associated non target species caught, and the interactions of the fishery with seabirds, marine mammals and sea turtles, , and other ecosystem information used for management. The information collected by this project has been considered to establish mandatory bycatch mitigation measures. The observer programme conducted by IFOP records species composition including bycatch, total catch composition, length frequency, sex and reproductive status for the target species and collects biological samples.

In addition to that, all industrial fishing vessels must record fishing position through a mandatory Vessel Monitoring System (VMS) (SUBPESCA 2019). This GPS system monitors industrial fishing vessels when fishing in authorized areas (industrial fishing vessels cannot fish within 5 miles from shore), Catches must be recorded for each set on electronic logbooks, processors must keep mandatory data records on amounts of each species processed and Industrial vessels must have a system of video recording cameras onboard to make sure that the protocols of responsible fisheries are followed.

### At-Sea and Port Sampling Program

In order to evaluate the sampling coverage within the SPRFMO area, only fishing trips targeting Jack mackerel were considered for this report (i.e., trips with a Jack mackerel composition of more than 50% of the total catch per fishing trip). This report includes coverage data from fisheries observers onboard and/or at-port sampling (Ossa *et al.*, 2023).

During 2022 did not occur fishing activities by Chilean vessels in the SPRFMO area; therefore, sampling and monitoring were focused exclusively in the Chilean EEZ. Within this area, the sampling coverage conducted by scientific observers onboard fishing vessels was 22.3%, and at-port sampling coverage was 16.9%, with a total combined sampling coverage of 39.2% (Table 10) complying with the requirements for this specific fishery in the SPRFMO (covering at least 10% of the fleet operation with scientific observers on board).

**Table 10.** Scientific observer coverage for fishing trips with 50% or more Jack mackerel and carried out outside (SPRFMO) and within the exclusive economic zone in the north and southcentral zone of Chile, 2022. Source Ossa *et al.*, (2023)

Jurel ≥ 50% del viaje	SERNAP			IFOP						Coberturas (%)	
				Tierra			Embarque				
	Zona Norte	Zona Sur	Subtotal Sernap	Zona Norte	Zona Sur	Subtotal	Zona Norte	Zona Sur	Subtotal	Tierra	Embarque
ZEE	416	889	1.305	77	144	221	174	117	291	16,9	22,3
ALTAMAR	-	-	-	-	-	-	-	-	-	-	-
Total general	416	889	1.305	77	144	221	174	117	291	16,9	22,3

Chilean observer programs were extended with the Law N° 20.625, but with the sole objective of collecting biological and fisheries data to be used in scientific advice for management, without any jurisdiction with compliance. Therefore, the compliance with measures of reduction plan and handling protocols are being monitored remotely by electronic monitoring systems EMS (Image Recording) (SPRFMO, 2023a).

Devices (DRI) and Electronic Logbook System (SIBE) are onboard all vessels of the industrial fleet. DRI specific regulations have been enacted and the system has been fully implemented in the entire industrial fleet as of January 2020. Also as of 2020, industrial vessel owners have the obligation to report, in real time and in a set-by-set basis, all catches, discards and incidental catch through the Electronic Logbook System (SIBE) tool that has been implemented by SERNAPESCA, according to the Law. The information that must be reported in the electronic logbooks includes:

- Geographic Location of the set.
- Time (beginning and end) of the set.
- Amount (weight) or number of specimens caught by species or species groups.
- Incidental catch by species or species groups.

- Additional information (notes).

In Chile, the EMS are considered to be both; Image Recording Devices (DRI) and Electronic Logbooks Systems (SIBE). These monitoring and recording tools have been implemented to improve control of compliance with fishing regulations and fisheries sustainability. It should be noted that to this date, the EMS implementation has focused on monitoring compliance with regulations applying to catches, discards and incidental bycatch of seabirds, marine mammals, sea turtles and Chondrichthyes (SPRFMO, 2023a).

SERNAPESCA is the fisheries agency responsible for monitoring and enforcement activities. Some of the enforcement and monitoring activities consist of monitoring landings and quotas, and collecting fisheries data. SERNAPESCA monitor compliance with the regulations by examining fishing vessel logbooks records, dockside landings, transport documentation and processors' records making sure that assigned biological quotas are complied.

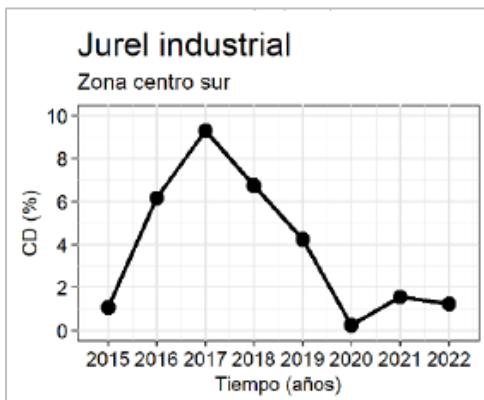
#### **Discard and bycatch for the industrial Jack mackerel fishery between the regions of Arica-Parinacota and Los Lagos, and in International Waters of the SPRFMO**

The plan to reduce discard and bycatch for the industrial Jack mackerel fishery between the regions of Arica-Parinacota and Los Lagos, and in International Waters of the SPRFMO, was made official under Exempt Resolution No. 1626 of April 30, 2019, which is composed of a technical report (R.PESQ) of SUBPESCA (SUBPESCA, 2019). This plan was structured based on the following elements (management and conservation measures, plan monitoring program and evaluation of measures, training program and dissemination of the measures, and recommendations for good practices to mitigate discarding) considering action plans for the reduction of the discarding of: a) target species, b) Bycatch with quota or regulation, c) Bycatch that do not have an annual global quota or regulation, and d) for bycatch. It also considered as a final section the innovation and technological improvements in fishing gear that reduce the catch (INPESCA, 2023).

In this context, the discard and bycatch monitoring plan for south-central Industrial Jack mackerel fishery begin to be monitored on board by observers of the research program developed by the Institute of Fisheries Development (IFOP) since 2015 (Ossa *et al.*, 2023).

These studies were mainly focused on estimating the total removals and the total discards of the target and non-target species that were quantified in purse seine fishing operations from 2015-2023. Other important aspects analyzed corresponded to the determination of the causes of discarding and the particular study of the bycatch of birds, mammals and marine reptiles (turtles). The analysis of the causes of discarding was carried out at the level of the haul, considering it as the sampling unit. It is worth mentioning that the total catch, retained and discarded and the retained and discarded species are quantified in the haul.

Ossas *et al.*, (2023), analyzed the percentage of catch discarded in the fishery showing an increase, going from 1.1% in 2015 (Vega *et al.* 2017) to 9.3% in 2017 (Vega *et al.* 2018). Over the following years, a decrease in the percentage value, falling to 0.2% in 2020 (Vega *et al.* 2021). Finally, during the last two years, this value has remained ≤1.5% of the total catch (Figure 6).



**Figure 6.** Percentage of discarded catch by fishery and area of operation, during the period 2015-2022. Data from scientific observers. CD (%): percentage of capture discarded (Source Ossa *et al.*, 2023).

On their analysis, they identified "reasons of safety in the operation (mechanical failure or risk of the crew)" as the major cause of discarding and this was evident in the highest volume of discards and, therefore, the highest percentage in discarded weight. The major reason of Jack mackerel discarding in the south-central industrial purse seine fishery (safety in the operation, mechanical failure, or risk of the crew) is in compliance with the regulations of the bycatch reduction plan (SUBPESCA, 2019), where the discarding of the target species will only be authorized, for documented reasons of safety at sea, due to mechanical failure, or risk to the crew of the ship or vessel.

### Fisheries Management

The management of the Chilean Jack mackerel fishery at the national level is based entirely on the recommendations issued by the South Pacific Regional Fisheries Organization (SPRFMO) on a single Jack mackerel stock in the South Pacific. The SPRFMO Scientific Committee carries out the joint evaluation of the fishery, establishes the fisheries management and management measures for all the countries that make it up, controls and supervises fishing operations in the South Pacific on this fishery. The procedure for adopting the Jack mackerel quota within the framework of the SPRFMO begins with the joint stock assessment process, which is carried out annually within the framework of the SPRFMO Scientific Committee in September of each year, from this process, a recommendation is obtained for the Commission of the SPRFMO of an Acceptable Biologically Catch (ABC) for Jack mackerel from the entire South Pacific. This ABC is reviewed and analyzed by the Chilean National Scientific Technical Committee of Jack mackerel (CCT-J), in November of each year, which recommends the minimum and maximum range of said ABC. Subsequently, the Minister of Economy, Development and Tourism, taking up the recommendation of the CCT-J, defines for Chile the annual global Jack mackerel catch quota for the following year, based on the allocation established at the meeting of the Commission in 2024, corresponding to 66% of the quota established for the entire South Pacific (CMM 01-2024).

There is a Chilean Jack mackerel management plan (SUBPESCA, 2017) in place that is supported by an operational framework with considerable stakeholder participation, scientific research, stock monitoring, comprehensive assessments, and peer reviews. According to the management plan, the biological goal is to maintain a spawning biomass and catch levels that allow the fishery to recover to medium-long term levels of sustainability and the biological objective is to maintain and/or bring the Jack mackerel resource to a level around MSY (within the framework of the SPRFMO management objectives).

## 8 Assessment results overview

### 8.1 Determination

#### To be drafted at Public Comment Draft Report

The report shall include a formal statement as to the certification determination recommendation reached by the assessment team on whether the fishery should be certified.

The report shall include a formal statement as to the certification action taken by the CAB's official decision-makers in response to the Determination recommendation.

Reference(s): FCP v2.3, 7.20.3.i and Section 7.21

### 8.2 Principle scores

#### To be drafted at Client and Peer Review Draft Report

The report shall include scores for each of the three MSC principles in the table below.

Reference(s): FCP v2.3 Section 7.15

Principle	UoA 1
Principle 1 – Target species	
Principle 2 – Ecosystem impacts	
Principle 3 – Management system	

### 8.3 Summary of Performance Indicator level scores

**Table 11.** Fishery Assessment Scoring at the ACDR stage.

Principle	Component	Performance Indicator (PI)		UoA 1
One	Outcome	1.1.1	Stock status	≥80
		1.1.2	Stock rebuilding	≥80
	Management	1.2.1	Harvest strategy	≥80
		1.2.2	Harvest control rules & tools	60-79
		1.2.3	Information & monitoring	≥80
		1.2.4	Assessment of stock status	≥80
	Primary species	2.1.1	Outcome	≥80
		2.1.2	Management strategy	≥80
		2.1.3	Information/Monitoring	≥80
	Secondary species	2.2.1	Outcome	≥80
		2.2.2	Management strategy	≥80
		2.2.3	Information/Monitoring	≥80
Two	ETP species	2.3.1	Outcome	≥80
		2.3.2	Management strategy	≥80
		2.3.3	Information	≥80
	Habitats	2.4.1	Outcome	≥80
		2.4.2	Management strategy	≥80
		2.4.3	Information	≥80
	Ecosystem	2.5.1	Outcome	≥80
		2.5.2	Management	≥80
		2.5.3	Information	≥80
Three	Governance and policy	3.1.1	Legal &/or customary framework	≥80
		3.1.2	Consultation, roles &	≥80
		3.1.3	Long term objectives	≥80

Principle	Component	Performance Indicator (PI)		UoA 1
	Fishery specific management system	3.2.1	Fishery specific objectives	≥80
		3.2.2	Decision making processes	≥80
		3.2.3	Compliance & enforcement	≥80
		3.2.4	Monitoring & management	≥80

The MSC Fisheries Standard Toolbox was not used for the scoring of Performance Indicators as version 2.01 of the standard was used and version 2.3 for the process.

The table shows draft scoring ranges which may change during the assessment process as they are just a range given with the information available at the ACDR stage and without concluding the 4<sup>th</sup> surveillance audit.

## 8.4 Summary of conditions

### To be drafted at Client and Peer Review Draft Report

The report shall include a table summarising conditions raised in this assessment. Details of the conditions shall be provided in the appendices. If no conditions are required, the report shall include a statement confirming this.

Reference(s): FCP v2.2 Section 7.16

**Table 12.** Summary of conditions.

Condition number	Condition	Performance Indicator (PI)	Deadline	Exceptional circumstances?	Carried over from previous certificate?	Related to previous condition?
				Yes/No	Yes/No/NA	Yes/No/NA
				Yes/No	Yes/No/NA	Yes/No/NA
				Yes/No	Yes/No/NA	Yes/No/NA

### 8.4.1 Recommendations (Optional)

### To be drafted at Client and Peer Review Draft Report stage.

If the CAB or assessment team wishes to include any recommendations to the client or notes for future assessments, these may be included in this section.

## 9 Traceability and eligibility

### 9.1 Eligibility date

#### To be drafted at Client and Peer Review Draft Report

The report shall include the eligibility date and the justification for selecting this date, including consideration of whether the traceability and segregation systems in the fishery are appropriately implemented.

Reference(s): FCP v2.3 Section 7.18

### 9.2 Traceability – initial review and planning at announcement

Please note that a comprehensive review of traceability will be conducted during the site visit for the reassessment. Most of the information in this ACDR remains consistent with what was reported in the PCR and the last surveillance audit, where no changes were detected. However, as part of the next cycle and the full reassessment, all this information will be carefully reviewed to ensure that any changes to the vessel lists are reported and included in the traceability overview.

**Table 13.** Traceability initial planning.

The proposed point of change of ownership of product to any party not covered by the fishery certificate.
Existing fisheries already certified do not need this initial review of the traceability system as it supposedly checked in each surveillance audit and if any relevant changes happen the client has the responsibility to advise the CAB. However, a brief summary of what will be reviewed at the site visit has been included in this ACDR report.
Catch data is recorded in logbooks and landing returns. On-board observers help verify and cross-check this data. Additionally, Vessel Monitoring System (VMS) data is cross-referenced with logbooks and surveillance reports to confirm accurate reporting of capture areas. Vessels must notify SERNAPESCA before discharging, and landings are monitored by independent dockside monitors and enforcement officers.
The ports included in this reassessment and the change of ownership will be revised at the site visit.
The proposed point from which subsequent Chain of Custody (CoC) is required.
Two companies already have MSC CoC – camanchaca and orizon
The plan for reviewing traceability at the site visit.
The proposed plan for reviewing traceability will be the following:
<ul style="list-style-type: none"> <li>• Review traceability in with the client to ensure there have been no changes since the last surveillance audit and the information provided when the fishery was initially certified.</li> <li>• Review traceability in processing plants</li> <li>• Review traceability with SERNAPESCA officials</li> <li>• Review change of ownership</li> </ul>

### 9.3 Traceability within the fishery

#### To be drafted at Client and Peer Review Draft Report

Reference(s): FCP v2.3 Section 7.17.1 and 7.17.6 a-d

**Table 14.** Traceability within the fishery.

Statement on fishery's ability to track and trace to each Unit of Certification.
Movement of fish and fish product between <b>harvest</b> and <b>landing</b> .
An illustration of movement of product between harvest and landing. Include when any of the following happen: Harvesting, At-Sea processing, Translocation, Transhipment, Offloading, Landing.
Fishing vessel → Landing → Transport → Plant

An illustration of movement of product between landing and start of CoC. Include when any of the following is happening: Transport, Storage, Sorting/ Grading, Packing, Auction.

Landing → Offloader → Transport → Storage → Sale by client group company

Description of any processing and sorting/ grading prior to change of ownership.

For the critical tracking events (i.e., where in the product flow this data needs to be transferred) of all fish and fish product handling and sale not covered by CoC describe:

- Process of segregating to each Unit of Certification
- Key data elements (i.e., the data or documents to identify the UoC such as species, catch area, gear)

Where there are IPI stock(s) within the scope of certification, describe the verification of traceability systems

Other relevant information on the systems to track and trace to each UoC

## 9.4 Traceability risks and mitigations

A comprehensive review of traceability will be conducted during the site visit for the reassessment. Most of the information in this ACDR remains consistent with what was reported in the PCR, checklist and the last surveillance audit, where no changes were detected. However, as part of the next cycle and the full reassessment, all this information will be carefully reviewed to ensure that any changes to the vessel lists are reported and included in the traceability overview.

**Table 15.** Traceability risks and mitigation within the fishery.

Factor	Description <i>Please state whether this occurs within the fishery and how frequently (e.g., regularly, seasonally, rarely). If so, please describe how this potential traceability risk is mitigated and any risk management.</i>
Will the fishery use gears that are not part of the Unit of Certification (UoC)?  If Yes, please describe: - If this may occur on the same trip, on the same vessels, or during the same season. - How any risks are mitigated.	<i>If this is covered by information provided elsewhere in the report (such as for segregation or in section 5 MSC Fisheries Standard – Principle 3 – Effective management for regulatory frameworks) cross-reference as needed.</i>  No, the only gear type used is the purse seine. Jack mackerel is only caught by purse seine. The at-sea tracking and tracing systems described above ensure that the potential for non-certified gears to be used within the fishery to be negligible.
Will vessels in the UoC also fish outside the UoC geographic area?  If Yes, please describe: - If this may occur on the same trip. - How any risks are mitigated.	No, because the fleet is supervised by the navy and by Sernapesca through the VMS global positioning system and the fishing area is very extensive, including the SPRFMO convention area outside the Chilean EEZ.
Do vessels from outside the UoC and/or client group ever fish on the same stock?	There is a fleet from foreign countries that fish within area 87 (SPRFMO) And there are also other vessels that have a quota of horse mackerel in the north of the country and 2 companies from the south-central area (but in both cases they are not adherents to the MSC certificate)
Do the fishery client members ever handle certified and non-certified products during any of the activities covered by the fishery certificate? This refers to both at-sea activities and on-land activities and should reflect those listed in product movement in Table 9. It includes:  - Translocation - Transhipment - Transport - Storage - Processing - Sorting/grading - Packing - Landing - Auction  If Yes, please describe how any risks are mitigated.	No, but the team will seek confirmation at the site visit.

**Table 15.** Traceability risks and mitigation within the fishery.

Does transhipment occur within the fishery?  If Yes, please describe: <ul style="list-style-type: none"> <li>- What is the type of transhipment in-port/high seas/other.</li> <li>- What are the systems used to track and trace UoC</li> </ul> For high seas transhipment please describe how the systems to track and trace to the UoC: <ul style="list-style-type: none"> <li>- Are verified independently of the fishery client.</li> <li>- Cover all fishing and receiving vessels involved in transhipment.</li> <li>- Apply to all transhipment events</li> </ul> If any of these 3 criteria above are not met for high seas transhipment, CoC certification is required for both the fishing and receiving vessels involved in this transhipment.	No Transhipment does not occur for this fishery. However, Transhipping is allowed within the SPRFMO convention area under provisions set out in CMM 12-2018 (which include prior notification and the requirement to have an observer on-board). However, Chilean national law does not permit transhipping by Chilean flagged vessels unless under strict conditions. Boats must be registered and notify their intentions in advance. This information will be checked at the site visit.
Are trading agents to be covered within the fishery certificate?  If yes, please describe: <ul style="list-style-type: none"> <li>- How information on UoC is passed through</li> </ul>	There aren't trading agents. Jack mackerel are not processed at sea. They are kept aboard vessels in refrigerated salt water (RSW) tanks and landed whole to shore based processing facilities. The team will check this information with the client.
Are there any other risks of mixing or substitution between certified and non-certified fish?  If No, refer to the section describing product movement and segregation which demonstrates this.	Transhipments are not authorised for Chilean vessels unless under strict conditions. Vessels must be registered and notify their intentions in advance so that the process can be inspected
Are there any other risks of mixing between different Units of Certification?  If Yes, please describe: <ul style="list-style-type: none"> <li>- link to any relevant variations relating to this</li> </ul> If No, refer to the section describing product movement and segregation which demonstrates this.	No, there is just one UoC in this assessment. There is another fishery which overlap with this fishery European Union (EU) South Pacific Jack Mackerel fishery but basically, they fish outside the EEZ Chilean waters

## 9.5 Eligibility to enter further chains of custody

To be drafted at Client and Peer Draft Report stage

The CAB may copy this table into the Fishery Certificate Statement as this information is relevant to the first buyer.

Reference(s): FCP v2.3 Section 7.8.2.m, 7.17.1.3 and 7.17.6.f-m

Clear information on the UoC must be available to stakeholders and particularly any party purchasing certified product from the fishery client. The change of ownership relates to the first point of sale to any party not covered by the fishery certificate. Any specific conditions related to eligibility of product from the

UoC to bear the MSC ecolabel should be clearly stated in this section (for example, if roe is not considered within the UoC).

If sales agents or non-fisher client group members are confirmed as included in the fishery certificate, Chain of Custody could be required to start from the point of sale by the sales agent or client group member, and these entities need to be assessed as per 7.17.1.1. All entities that handle or trade product between harvest and start of CoC (such as transhipment, unloaders, offloaders, storage and transport) will also be considered under 7.17.1.1.

Reference(s): FCP v2.3 Section G7.17.6

**Table 16.** Eligibility to enter Chain of Custody.

Determination on whether fish and fish products from the certified UoC(s) can go onto be sold as certified. Including:

- *Whether the ability for fish and fish products to be sold as certified is conditional upon CoC certification;*
- *If traceability systems still need to be established prior to either CoC certification OR revised fishery determination.*

- It is determined that fish and fish products from the certified Units of Certification can go onto be sold as certified.
- It is determined that fish and fish products from the certified Units of Certification cannot go on to be sold as certified or bear the MSC label.

*The latter would be selected where systems need to be established within the fishery. Please select the latter and then specify if product eligibility is conditional to the fishery to pass Chain of Custody Certification. Note that a Chain of Custody audit can only be successfully completed once systems are in place.*

The point of change of ownership of product to any party not covered by the fishery certificate and detail of any trading between client group members prior to this

The point from which subsequent Chain of Custody (CoC) is required

*The latest this can happen is the point of change of ownership of fish or fish product to any party not covered by the fishery certificate (reference section above) but it may happen sooner in which case describe as per the product flow (in table 9). Note the requirement for when CoC is required to start on High Seas Transhipment.*

The entities, or categories of entities, at the point of landing and/or sale required to have separate CoC including any auctions, selling agents, offloaders or storage facilities and so not covered in the above two tables

A list of entities, or categories of entities, eligible to access the certificate and sell product as certified including:

- Confirm if all vessels within the geographic area and gear of the UoC are eligible to sell fish and fish products as certified
- Any other limits to vessel types, ownership, client group membership
- Include any trading agents used

Points of landing, auctions or other transfer which may be used for the sale of fish from the certified fishery into further chains of custody, either:

- *The geographic region where all landing points are possible, or*
- *Named landing points, auctions or other transfer sites if there are limits*

Any specific eligibility criteria for product to be sold as certified, or where to find this information where relevant, including:

- *Product form*
- *Trip type (e.g., includes outside EEZ),*
- *Need for Chain of Custody*

- *Need for trading through client group members*

*Where there is nothing additional to the UoC, state N/A.*

How fish or fish products can be identified or can be confirmed as certified at the point it enters certified CoC, including:

- *How information on gear, species, stock, area, vessel (where relevant) client group member (where relevant) is provided*
- *Any segregation to UoC required of first buyers (e.g., sort batches by species)*
- *Where relevant how any specific eligibility criteria can be confirmed by the first buyer (as per section above)*

How IPI is identified to first buyers at the point it enters certified CoC where relevant

## 9.6 Eligibility of Inseparable or Practically Inseparable (IPI) stock(s) to enter further chains of custody

Pelagic fisheries, such as the Jack mackerel fishery, often deal with mixed stocks or bycatch from species that are hard to separate during the catch and landing processes.

For the Jack mackerel fishery in Chile, no specific IPI stocks have been identified in the available documentation. However, it's crucial to explain why this aspect has been considered by the assessment team. A brief justification for the absence of IPI stocks is given below:

1. Target Species Dominance: The Jack mackerel fishery in Chile primarily targets a single species, *Trachurus murphyi*, which dominates the catch. This reduces the likelihood of mixed catches or inseparable stocks at significant levels, compared to fisheries that target multiple species or have high bycatch rates.
2. Bycatch Minimization Measures: The fishery employs various bycatch reduction techniques, and any bycatch that does occur is typically managed separately. Hence, there are established procedures to handle non-target species, which helps to avoid inseparability concerns during processing.
3. Geographical and Seasonal Targeting: The fishery often operates in well-defined areas where Jack mackerel schools are dense, further reducing the likelihood of catching significant numbers of other pelagic species.
4. Previous Assessments: Past MSC certifications and sustainability evaluations for this fishery have typically focused on Jack mackerel alone, without identifying significant issues related to IPI stocks.

Therefore, while IPI stocks are a common issue in pelagic fisheries, the specific operational practices and ecological conditions of the Chilean Jack mackerel fishery appear to minimize or eliminate this concern. If future assessments uncover any significant inseparability issues with other species, they would be addressed in updated versions of this report after the site visit.

## 10 Principle 1

### 10.1 Principle 1 background

#### 10.1.1 Biology of Target Species

##### Name and Classification

Class: Actinopterygii

Order: Perciformes

Family: Carangidae

Latin binomial: *Trachurus murphyi* (Nichols, 1920)

Common names: English – Chilean Jack mackerel

Information taken from SPRFMO 2021 CJM *Trachurus murphyi* Species Profiles

##### Morphological description

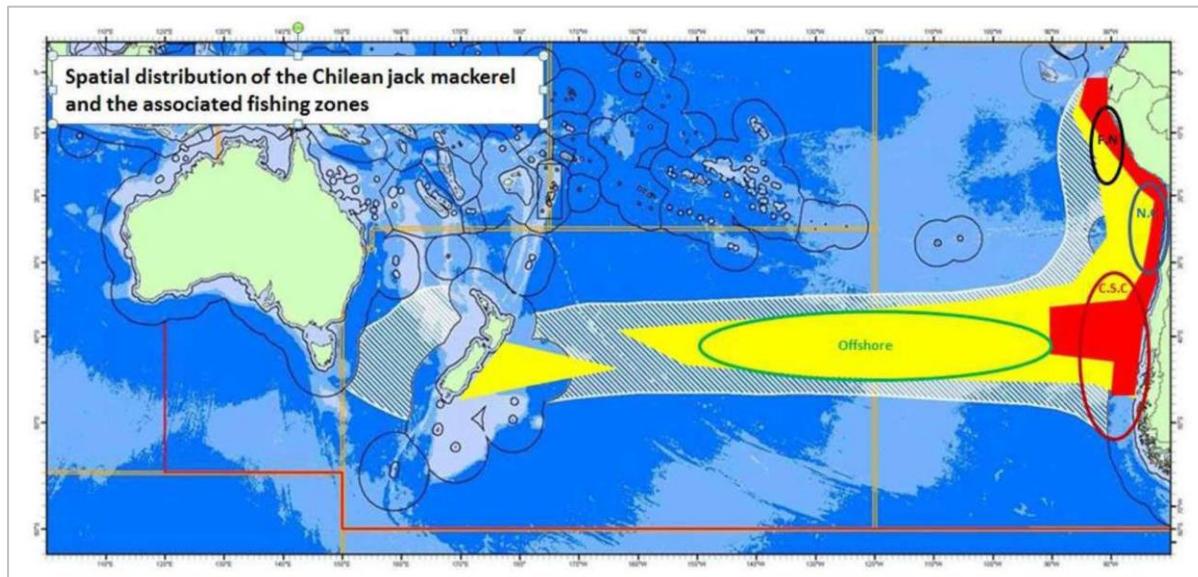
Body elongated and slightly compressed. Enlarged, scute-like scales on primary lateral line. Termination of dorsal accessory lateral line below 2<sup>nd</sup> to 5<sup>th</sup> soft ray of dorsal fin. Pectoral fin tip extending to be above the two detached spines anterior to the anal fin. Eye moderate size with well-developed adipose eyelid. Posterior margin of upper jaw below anterior margin of eye. Jaws vomer, palatine, and tongue bearing minute teeth (Kawahara *et al.*, 1988).

Color when fresh: dark blue dorsal body, silver-white ventrally; upper posterior margin of opercula bears a black spot; pale pelvic fins; caudal, pectoral, and dorsal fins dusky; anal fin pale in the front, dusky in the rear.

##### Distribution

The Chilean Jack mackerel is distributed in the sub-tropical waters, of the south eastern Pacific Ocean, both inside areas under national jurisdiction and on the high sea, ranging from the Galapagos Islands and south of Ecuador in the north to southern Chile; ranging from the South America in the east to Australia and New Zealand in the west (Evseenko, 1987; Jones, 1990; Serra, 1991a; Elizarov *et al.*, 1993; Kotenev *et al.*, 2006; Gerlotto *et al.*, 2012) (Figure 7).

Aggregations of Jack mackerel can be found at depths between 0 and 300 m (Serra, 1991a; Guzman *et al.*, 1983; Bahamonde, 1978; Anon, 1984; Anon, 1985; Dioses, 2013a). The species exhibits a diurnal migratory behavior, with fish being found deeper during the day (50-180 m) than at night (10-40 m) (Cordova *et al.*, 1998).



**Figure 7.** Description of the spatial distribution of Chilean Jack mackerel (Payá, 2024; Güele, 2014). It is based on catch data (yellow) and prospecting index (red), with the corresponding four fishing areas: Northern Chile (blue line); South Central Chile (red line); Offshore (green line), and North End (Black Line). The white stripe represents the Jack mackerel belt (Elizarov *et al.*, 1993; Gerlotto *et al.*, 2012).

### Habitat requirements

Chilean Jack mackerel is a schooling pelagic species adapted to both neritic and oceanic environments. According to the average catch pattern by fishing areas of Jack mackerel, the highest concentrations registered in Peruvian and Chilean coastal ocean are associated with the high dynamics of coastal upwellings (Ñiquen and Peña, 2008; Chernyshkov *et al.*, 2008; Vásquez *et al.*, 2020). At the interdecadal scale, variability patterns (warm and cold periods) seem to define favorable and unfavorable scenarios for Jack mackerel. Likewise, studies by Díoses (1995) and Gretchina *et al.* (1998) indicate that the oceanic fronts formed by the convergence of cold coastal waters and surface subtropical waters, would be the preferred habitat of Jack mackerel resource, which is evidenced by the catches of this resource. On the other hand, Bertrand *et al.* (2004a) report that Chilean Jack mackerel is mainly located in oxygenated waters (above oxycline). It is noted that the optimal oxygen content value for the presence of Jack mackerel would be between 1 and 3 ml/L, above oxycline (Díoses, 2013a).

The results of the data recovered by the Chilean purse-seine fleet and biological-fisheries data for this species, demonstrate the existence of three spatially separated habitats for Chilean Jack mackerel in the South Pacific Ocean (Arcos *et al.*, 2001), and seasonal migrations in these zones indicate the seasonal behavior of fishing in the Chilean central-southern region. The following has been determined: a) an oceanic reproductive habitat that includes the South Pacific eastern edge with a main spawning center extending between 33°-40°S and from 80°-82°W to beyond 92°W (Núñez *et al.*, 2004, 2006; Cubillos *et al.*, 2008), b) an oceanic adult feeding area located within the 400 nm off central south Chile, and c) a nursery habitat in the coastal and oceanic waters off southern Perú and northern Chile (within the EEZs), which shows highest concentrations of juveniles and prerecruits, which is consistent with the juvenile phase of Chilean Jack mackerel suggested by Elizarov *et al.* (1992), and recently named the Chilean Jack mackerel nursery area (Gretchina, 1998; Arcos *et al.*, 2001), which has a significant importance in the regional migratory circuit as a source of recruits to the central-south Chilean fishery specially during warmer oceanographic conditions (El Niño events).

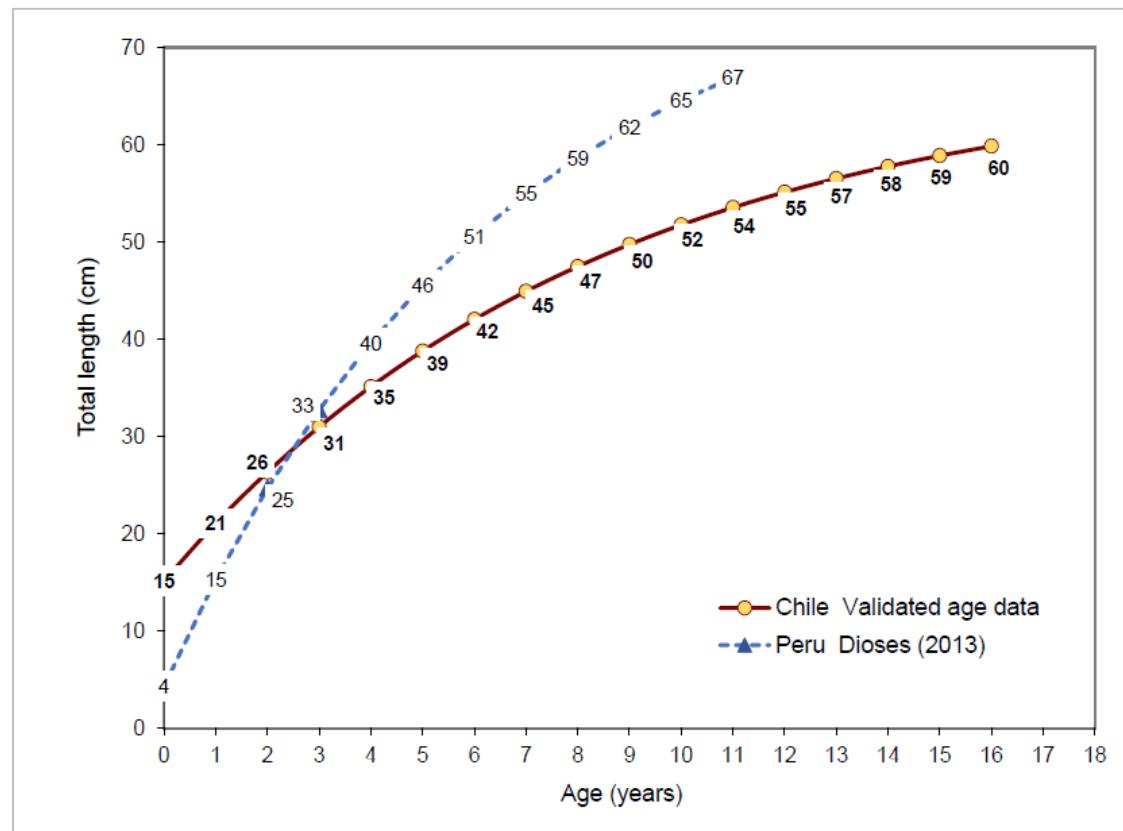
### Growth

Studies on the growth of Chilean Jack mackerel come from otoliths observation and studies of the modal distribution (Kaiser, 1973; Pavéz and Saa, 1978; Castillo and Arizaga, 1987; Nosov and Kalguchin, 1990; Arcos and Gretchina, 1994; Cubillos and Arancibia, 1995; Díoses, 2013b). Results show a rather wide variety of growth curves attributed mostly to the areas where the studies were performed.

Csirke (2013) stated that in the northern range of its distribution, off Perú, Chilean Jack mackerel grows faster and larger than in the southern part (central-south Chile), likely due to a higher metabolism linked to warmer waters in the North. Diaz (2013) and Goicochea *et al.* (2013) reached similar conclusions by comparing growth parameters for the Chilean and the Peruvian Chilean Jack mackerel calculated from different methods.

However, in recent years, IFOP produced a new age assignment, which considers that the first and third rings of the traditional allocation correspond to false annual rings, probably semi-annual rings (Cerna, 2022a). Due to the new age assignment, IFOP reprocessed the historical series of age-length keys and the age compositions of commercial catches and relative abundance estimated by hydroacoustic cruises. The new assignment also changed estimates of important biological parameters such as growth, natural mortality, and maturity at age (Cerna, 2022a; Cerna, 2022b).

In the Cerna (2022b) study, the Chile Von Bertalanffy growth parameters were found to be adequate to represent the growth of Jack mackerel, because they were supported by validation studies (Cerna, 2022c). In this sense, the Von Bertalanffy growth parameters and mean of lengths match with the historical series of age lengths keys data, their mean lengths, and weights. A comparison between the current Chilean and Peruvian Von Bertalanffy growth parameters (Dioses, 2013b) (Figure 8) showed that Peruvian curve has a slower growth rate for 1-yr-old and 2-yr-old fish, which is not consistent with validation studies conducted in Chile and Perú. In the Peruvian validation study, based on micro increments, Goicochea *et al.* (2013), validated the 1-yr-old fish total length at 19.5 cm while Dioses (2013b) estimated this total length at 15 cm.



**Figure 8.** Comparison of von Bertalanffy growth curves of Chile and Perú. The number over the lines correspond at the mean of total length estimated by each equation (Source: Cerna, 2022b).

The age assignment recently revised concluded that the first and third annual rings correspond to false annual rings, shortening longevity by 2 years (Cerna, 2022a). Sexual maturity size is reached at 22.7 cm FL (Leal *et al.*, 2013). The age of 50% maturity is reached at 1 year of age (Cerna, 2022a). Thus, Chilean Jack mackerel maximum age in commercial catches does not exceed 15 years (Payá, 2024).

In the benchmark workshop prior to SC10 (SCW14), the new Chilean ageing method was included into the assessment. This resulted in revisions to age composition data for both Chilean fleets, as well as the offshore fleet for older years. In addition, several biological variables (weight, maturity, natural mortality) were re-estimated and updated.

The new growth parameters used for the latest 2023 Jack mackerel stock assessment were the following (Table 17).

**Table 17.** Jack mackerel growth (von Bertalanffy function) and natural mortality parameters used in JJM models. SC11-Report, Annex 7 Jack mackerel technical annex.

Parameter	Far North stock	Single / South stock
$L_\infty$ (cm) (Total length)	73.56	73.56
k	0.16	0.16
$L_0$ (cm)	13.56	13.56
M (year-1)	0.33	0.28

### Mortality

In SCW14, a value of 0.28 was established for all ages and all years for the single stock model and for the southern stock of the two-stock model. The value was derived from the mode of M-values estimated with multiple methods using a natural mortality toolbox (<https://connect.fisheries.noaa.gov/natural-mortality-tool/>). The new range of natural mortality, according to the estimation model used, is 0.25-0.95.

### Early Life History and reproduction

Several authors have described Jack mackerel to be an indeterminate batch spawner, based on histological studies and on the oocyte-size-frequency-distribution (OSFD) of reproductively active females, and their “presence over a long temporal extension of seven to nine months per year” (Dioses *et al.*, 1989; George, 1995; Oyarzún *et al.*, 1998; Leal *et al.*, 2013; Perea *et al.*, 2013). This conclusion is supported by evidence from Evseenko (1987) and Bailey (1989) who state that Jack mackerel spawns wherever environmental conditions are suitable. The suitable environmental conditions seem to be water warmer than 15 °C, with highest densities having been found in waters of 16 – 19 °C, and low current (less than 15 cm/s) (Evseenko, 1987; Núñez *et al.*, 2004; Cubillos *et al.*, 2008). During the period of most intensive spawning, 10–15% of females spawn each day, meaning that the average female spawns every 7–10 days at this time (Oyarzún and Gacitua, 2002; Oliva *et al.*, 1995).

Jack mackerel spawns, throughout its whole distribution range, in austral spring and summer, with the main spawning season from October to December (Serra, 1983, 1991a; Elizarov *et al.*, 1993; Oyarzún *et al.*, 1998; Leal *et al.*, 2013; Perea *et al.*, 2013). Santander and Flores (1983) and Dioses *et al.* (1989) described Jack mackerel spawning in Perú as mainly occurring between 14°00'S and 18°30'S. However, more recent analyses by Ayon and Correa (2013) show that between 1966 and 2010 Jack mackerel larvae were present (and therefore spawning is inferred) every year along the whole Peruvian coast, with clear year to year north-south shifts in the centers of higher larvae abundance associated with shifts in environmental conditions. They describe important changes with time in the spatial larvae distribution. The centers of gravity of the larvae spatial distribution per year also showed some important differences in the distribution by latitude and distance from the coast, with three clear periods: the first one between 1966 and 1978 with main larvae concentrations between 14°S and 18°S closer to the coast; the second between 1979 and 1994 more to the north, between 4°S and 14°S, and more offshore; and, the third one between 1995 and 2010, with the centers of gravity located in an intermediate position between the other two (Ayon and Correa, 2013). Jack mackerel spawns regularly in Peruvian waters but the reproductive activity has a greater variability, lesser abundance and longer spawning period compared to the spawning occurring off Chile (Perea *et al.*, 2013).

The main Jack mackerel spawning grounds are located between 30°S and 40°S off central Chile, in coastal and oceanic waters extending beyond 200 miles of the EEZ to about 93° W (Serra, 1991; Núñez *et al.*, 2004; Arcos *et al.*, 2005). In this region, the spawning activity is associated with the Subtropical front location that reaches its maximum latitudinal extension during austral spring-summer, and on the interannual scale modulates the meridional location of the Jack mackerel spawning centroid (Gretchina *et al.*, 1998; Cubillos *et al.*, 2008; Núñez *et al.*, 2008). Larval otolith microstructure analysis has revealed a spatial age gradient with the smallest/youngest larvae specimens found primarily in the offshore area and the largest/oldest found in the

coastal area, implying offshore-inshore larval drift (Vásquez *et al.* 2013). Furthermore, an additional area of spawning has been recorded in the area between 105°E and 125°E (Kotenev *et al.*, 2006). In this region, favorable oceanographic conditions can increase larval survival and support the occurrence of juvenile Jack mackerel (Parada *et al.*, 2017). Historically, Jack mackerel spawning records also have been reported within the EEZ of northern Chile with significant interannual variability and associated with coastal upwelling centers (Braun and Valenzuela, 2008).

### Recruitment

Fluctuations in recruitment of Chilean Jack mackerel in relation to El Niño-Southern Oscillation variability during the spawning or pre-recruitment period have been studied. Cubillos and Argos (2002) analyzed the hypothesis that recruitment is affected by environmental conditions occurring in the spawning area during October-December or during the pre-recruitment period, which extends one year before recruitment. Time series of recruitment, biomass, sea surface temperature (SST) and wind were used to explore these relationships.

A significant relationship was found between recruitment at age 2 and environmental conditions during the spawning peak (October-December). However, SST in the spawning area during October-December was not related to SST variability in the Equatorial Pacific. On the contrary, the SST in the nursery habitat was directly related to the El Niño-Southern Oscillation variability. Furthermore, the nursery habitat was swept away during strong and moderate El Niño events, changing the spatial pattern of the population.

Overall, Cubillos and Argos (2002) concluded that recruitment fluctuations in the Chilean Jack mackerel population are strongly affected by two current systems: the intensity and location of the West Wind Drive current system during the spawning period, and El Niño-Southern Oscillation variability during the pre-recruitment period in the nursery habitat. In this context, a degree of non-linearity could be determined depending on the influence of each system.

### Feeding

The Jack mackerel is considered an opportunistic predator of neritic and oceanic environments with a wide range of prey type, from macrozooplankton to mesopelagic fish (Arancibia *et al.*, 2019; Bertrand *et al.*, 2004b; Alegre *et al.*, 2015, Medina and Arancibia, 2002, Espinoza *et al.*, 2017). In many studies the diet of adult Jack mackerel is composed of myctophids, euphausiids, copepods and small crustaceans.

Arancibia *et al.*, (2019) determined the trophic components of Jack mackerel in coastal (inshore) and oceanic (offshore) zones in Chile (northern macrozone, central-southern macrozone) by identifying with stomach content analysis the main feeding items of Jack mackerel by size groups available from commercial harvests (juveniles and adults) on spatial and temporal scale. The authors also determined the contribution of the main feeding items in juveniles and adults of Jack mackerel by using stable isotopes, and also tested the existence of intra-specific (ontogenetic) differences.

Arancibia *et al.*, (2019) found that in the northern macrozone, Jack mackerel individuals feed mostly on euphausiids (42%), followed by the zooplankton (27%) and squat lobster (16%). In the south-central macrozone, Jack mackerel individuals feed mostly on euphausiids (47%), followed by anchovies (43%), and very marginally cephalopods (5%). No ontogenetic trophic pattern was observed in Jack mackerel (changes in diet with predator size).

The contribution of preys in the Jack mackerel diet and the trophic position (TP) of preys were analysed using Bayesian inference. For mixing-models, the  $\delta^{13}\text{C}$  (stable isotope of Carbon 13) and  $\delta^{15}\text{N}$  (stable isotope of Nitrogen 13) were combined. To estimate the TP of Jack mackerel individuals, the specific composition of  $\delta^{15}\text{N}_{\text{Glutamic}}$  and  $\delta^{15}\text{N}_{\text{Phenilalanina}}$  were used. The stable isotopes study confirmed the same results from

the stomach analysis. No ontogenetic differences in the Jack mackerel diet were found. The TP of Jack mackerel, using amino acids, was 3.3 in the central-south macrozone, and 3.6 in the north macrozone.

### Predation

There is scarce information about its predators. Bailey (1987) tentatively identified juvenile Jack mackerel from the stomachs of albacore tuna (*Thunnus alalunga*) taken in the central South Pacific (36°S to 42°S and 148°W to 165°W) as *T. murphyi*. It has also been found in the stomach contents of swordfish off the Chilean coast (SPRFMO 2014). Generally, it can be expected that its predators will be similar to those of other carangid mackerels and will include tunas, billfish, sharks, and marine mammals.

Muñoz *et al.* (2013) analyzed the diet of the South American sea lion in 3 geographic zones of the coast of Chile using analysis of stable isotopes  $^{13}\text{C}$  and  $^{15}\text{N}$  on hair and skin tissues. It was found that in the Southern zone the analysis of skin indicated that the most important prey groups were snoek and Jack mackerel (20.8%). Similarly, Hückstädt *et al.* (2007) found that in this same zone, the South American sea lion fed mainly on Jack mackerel.

### Jack Mackerel as Key Trophic Level Species

According to MSC 2.01

#### SA2.2.9

Teams shall treat a stock under assessment against Principle 1 as a key low trophic level (LTL) stock if:

- a. It is one of the species types listed in Box SA1 and in its adult life cycle phase the stock holds a key role in the ecosystem, such that it meets at least two of the following sub-criteria i, ii and iii.
  - i. A large proportion of the trophic connections in the ecosystem involve this stock, leading to significant predator dependency.
  - ii. A large volume of energy passing between lower and higher trophic levels passes through this stock.
  - iii. There are few other species at this trophic level through which energy can be transmitted from lower to higher trophic levels, such that a high proportion of the total energy passing between lower and higher trophic levels passes through this stock (i.e., the ecosystem is ‘wasp-waisted’).
- b. It is not one of the species types listed in Box SA1, but in its adult life cycle phase it meets at least two of the sub criteria in SA2.2.9a.i–iii, and additionally meets the following criteria:
  - i. The species feeds predominantly on plankton; has a trophic level of about 3 (but potentially ranging from 2 to 4); is characterized by small body size, early maturity, high fecundity and short life span (default values: <30cm long as adults, mean age at maturity  $\leq 2$ ,  $>10,000$  eggs/spawning, maximum age <10 years respectively); and forms dense schools.
  - c. Teams shall provide evidence specifically addressing each of the sub-criteria in SA2.2.9 to justify any decision to not define the stock as a key LTL species in the ecosystem under assessment.
- i. In the case where there is no information on a sub-criterion in SA2.2.9, the stock shall be assumed to meet that sub-criterion.
- ii. In providing rationales against the key LTL sub-criteria (SA2.2.9.a.i–iii), teams shall document the choice of spatial scale and provide reasonable justification for the choice.

Jack mackerel inhabits In the South Pacific upwelling systems (Vasquez *et al.*, 2013; SPRFMO, 2021). In these ecosystem, other small pelagic species such as anchovy and sardines play an important role in transferring energy from lower to higher trophic levels transferring a very large proportion of the total primary production to higher trophic levels. In addition, Jack mackerel does not have a small body size, short life span or matures early according to MSC criteria (SPRFMO, 2021). Furthermore, Jack mackerel is an opportunistic feeder foraging on a large range of prey, from euphausiids to mesopelagic fish (Arancibia *et al.*, 2019; Bertrand *et al.*, 2004b; Alegre *et al.*, 2015; Medina and Arancibia, 2002; Espinoza *et al.*, 2017).

### Migrations

According to Serra (1991), this straddling resource exhibits a seasonal migration pattern characterized by a spring westward migration to oceanic habitat for spawning (spawning occurs between October and December), which extends across the Southeastern Pacific Ocean (SPO) but mainly occurring from 82°W and beyond 92°W (Gretchina *et al.*, 1998; Arcos *et al.*, 2001; Sepúlveda *et al.*, 2006; Cubillos *et al.*, 2008). On the contrary, Jack mackerel shows an eastward migration during the late summer related to coastal food availability, evidencing compact schools in coastal and oceanic waters off central Chile during fall and winter, and therefore, accessible to the Chilean purse-seine fleet (Arancibia *et al.*, 1995).

### **Stock Structure**

Chilean Jack mackerel *Trachurus murphyi* is a highly migratory transregional pelagic species with a wide distribution in the South Pacific along South American coastal areas and across a 35° – 45° S band in the Pacific Ocean to New Zealand (Evseenko, 1987; Serra, 1991; Elizarov *et al.*, 1993; Kotenev *et al.*, 2006)

Due to its highly migratory behavior resulting in a population structure difficult to determine, there is a growing interest in determining its population structure in order to improve management measures across the total area of the Chilean Jack mackerel fisheries. The unknown stock structure is one of the main uncertainties for the stock status assessment and management of this species.

There are currently six stock structure hypotheses proposed. These include the four described in SPRFMO (2008), according to which (i) Jack mackerel caught off the coasts of Perú and Chile each constitute separate stocks which straddle the high seas, or (ii) Jack mackerel caught off the coasts of Perú and Chile constitute a single shared stock which straddles the high seas; and, (iii) Jack mackerel caught off the Chilean area constitute a single straddling stock extending from the coast out to about 120°W, or (iv) Jack mackerel caught off the Chilean area constitute separate straddling and high seas stocks. In addition, there are two more hypotheses describing the stock as a patchy population and a metapopulation proposed by Gerlotto *et al.* (2012, 2021), and Hintzen *et al.* (2014) suggesting that the possible effects of long-term changing environmental conditions could potentially structure the Chilean Jack mackerel population and should be taken into account.

Currently, the SPRFMO scientific committee evaluates the stock status of Chilean Jack mackerel considering the working hypotheses (i) and (ii) (SPRFMO, 2023b). However, it is uncertain what population structure hypothesis should be used for fisheries management.

Several studies have been conducted to resolve the population structure, which include studies of parasites, life-history traits, morphometry and meristic traits, otolith microchemistry, oceanographic modelling, and genetics. Some of these supports the inference of more than one population, while others support the inference of just one population.

### **Parasites**

Parasites have been used successfully to identify the population structure in some marine fishes from Chile like Chilean hake *Merluccius gayi* (George -Nascimento, 1996; Oliva and Ballon, 2002), Austral hake *Merluccius australis* (Gonzalez and Carvajal, 1994), red rockfish *Sebastes capensis* (Oliva and Gonzalez, 2004), anchovy *Engraulis ringens* (Valdivia *et al.*, 2007), hoki *Macruronus magellanicus* (Oliva, 2001) and Jack mackerel *Trachurus murphyi* (George-Nascimento, 2000; Aldana *et al.*, 1995; Oliva, 1999), among others. The problem of local variability in the parasite fauna of anchoveta was clarified by Chavez *et al.* (2007). With regard to the Jack mackerel, parasitological information is a little confusing because the analytical procedures used by different authors do not follow a common pattern. The most comprehensive studies are those by Oliva (1999) and George-Nascimento (2000). Both studies analyzed metazoan parasites in the Jack mackerel along the Chilean and Peruvian coast (Oliva, 1999) and from Iquique to Valdivia (George-Nascimento, 2000). The data of Oliva (1999) strong suggest two stocks (Central - Northern Perú and a unique stock along the Chilean coast) based on univariate analyses. George-Nascimento suggests two ecological stocks in Chilean waters: a northern

and a southern stock, based on a multivariate analysis, unfortunately, George-Nascimento (2000) pooled the northern and southern localities and did not analyze a potential latitudinal gradient. Unpublished reanalyses of Oliva's data (1999), based on multivariate analyses using not only parasites as explanatory variable but also fish length, shows that the difference is a function of fish length but not parasites.

Serra *et al.*, (2014) analyzed metazoan parasites of a total 1733 Jack mackerel's specimens-*Trachurus murphyi* obtained from nine fishing areas, namely: one in New Zealand, three in Perú, and five in Chile, obtaining a total of 44,506 metazoan parasites belonging to 18 species. A qualitative analysis indicates what fish obtained from Perú's fishing areas evince a fauna of metazoan parasites poorer than occurs with fish obtained in Chile. Univariate analyses about prevalence, abundance, and mean intensity of infection, particularly for species of value as biological indicators, (specially nematodes of the Anisakidae Family as *Anisakis simplex* and *Hysterothylacium* sp.) show changes associated with a latitudinal gradient increasing the parasitic charge from northern of Chile to south, which keeps well agreement with the tendencies in the fish' size. One increasing of the parasitical charge, particularly *A. simplex* (parasite found in larvae stage and cannot leave the fish, organism that accumulated and stayed over the time developing its vital cycle in the host). As well, fish size allows strongly to infer migration's movements from northern Chile to the south. Multivariate analysis on the samples allows separating well the samples of New Zealand, oceanic Chiloe, and north central Perú. These results explained because New Zealand' samples represent a recent settlement process and a consequent loss of some parasites as well as an acquiring of parasites' fauna own of the new environment colonized. Oceanic Chiloe includes samples of larger size and at the same time is a particular environment regarding food supply. Finally, samples' discrimination of north-central Perú agrees with previous studies.

In conclusion, Serra *et al.* (2014) found that parasitic fauna metazoa of Jack mackerel suggests that Jack mackerel in Chile well correspond with a stock unit separated from the one Perú. Evidence from this comes from the absence of parasites with a high importance on discrimination such as *A. simplex*, a low prevalence for *L. trachuri* (with exception in northern of Perú in feeding period) and also an absence of nematode *H. aduncum* presents in all fishing areas, except Perú.

### Otolith Morphology

The morphometry of otoliths is a characteristic feature of a species (Hecht and Appelbaum, 1982; Gaemers, 1984) and also specific to a population in some cases (Neilson *et al.*, 1985), since variations in the shape of otoliths can reveal the presence of different stocks (Bird *et al.*, 1986; Campana and Casselman, 1993; Begg and Brown, 2000; Turan, 2000; Turan *et al.*, 2006 , Turan, 2006).

Otoliths morphometry was assessed by a set of multivariate methods on the descriptors of harmonic and lineal form (Serra *et al.*, 2014). Twelve standardized, normalized, and linear descriptors were considered regarding to fish length, which correspond to lineal measurements between landmarks of otolith. The analysis of main components (AMC) does not provide a classification of categorical variables (location or period), which make possible the conformation by groups of locations that explain the differences found in the analysis of variance.

The results of MANOVA applied on the descriptors of Fourier normalized and centered, indicate significant differences ( $F=0.28$ ;  $P<0.05$ ) between locations and suggest that in each location the otoliths contours have got its own average form.

However, by including in the MANOVA a second categorical descriptive variable of fish size, average variance power is increased ( $F=0.11$ ;  $P<0.05$ ), showing that both sampling locations as the fish sizes explain the differences in otoliths contours. Coherent with this latter analysis, the locations classification carried out by means of a discriminating lineal analysis (DLA) on descriptors or harmonics of Fourier, properly separates those locations which represent major differences in the size range of the sample, which is more evident for the second sampling period (spring – summer), while locations with a similar sizes distribution present a high level

of mixing. Conclusively, the analysis indicated that the differences in the otoliths form are explained by the differences in the Jack mackerel sizes between locations and attributed to an allometric effect in the otoliths growth rather than differences between locations.

The classification by location, realized by means of a discriminating lineal analysis (DLA) about harmonic decomposition of Fourier, confirm the results in the sense that classification success was explained due to differences in the average sizes of fish between locations and therefore to the ontogenetic differences, which reflected in the asymmetric growth and variations in the otoliths form in the different stages of life history of Chilean Jack mackerel.

### Otolith Chemistry

Otolith chemistry has become a key tool to identify and delineate fish stock units. Its successful application as a natural tag in stock discrimination studies is based on the ability to distinguish among different groups due to variation in otolith chemical composition.

Otoliths are small, calcified structures located in the inner ear of the fish. They are regularly referred to as fish 'black boxes' as they may provide a time resolved and temporally stable record of the environmental conditions experienced by individual fish throughout their life (Campana, 1999).

It is known that otolith chemical composition reflects the physicochemical conditions in the water surrounding the fish at the time of deposition (Elsdon and Gillanders, 2003; Elsdon *et al.*, 2008). Because otoliths are acellular and metabolically inert, their material is neither reabsorbed nor reworked after deposition (Panfilii *et al.*, 2002). Therefore, their chemical signatures provide fingerprints of the water masses successively inhabited by the fish, acting as natural tags (Campana *et al.*, 2000; Elsdon and Gillanders, 2003; Darnaude and Hunter, 2017) that can be used to reconstruct the environmental history of sampled individuals or identify migratory and life history patterns within populations (Walther *et al.* 2017).

Ashford *et al.*, (2011) used otolith chemistry to examine the population structure of Chilean Jack mackerel throughout its distribution in the South Pacific, as part of a holistic approach (Begg and Waldmann, 1999) that included parallel studies of genetics, morphometrics, parasites, and life history patterns. Ashford *et al.* (2011) compared the chemistry laid down just before capture at the otolith edge to examine empirically how otolith chemistry varies spatially across the southern Pacific Ocean. Since discrete, self-recruiting populations imply separate exposure to local environments during early life, Ashford *et al.* (2011) used elemental chemical fingerprints laid down in the otolith nucleus to test for population differences between samples taken off Chile, Perú and New Zealand.

Chilean Jack mackerel showed strong spatial heterogeneity corresponding to hydrographic structure across putative population boundaries between (i) the western and eastern South Pacific Ocean, and (ii) Chile and Perú. However, the chemistry of the otolith nucleus showed no evidence supporting the existence of these boundaries. Instead, Chilean Jack mackerel from New Zealand had similar nucleus chemistry to most sampling areas off South America; and those off southern Perú showed similar nucleus chemistry to most sampling areas off Chile. Strong differences were found between southern and northern Perú, and cluster analysis indicated this was caused by a group of fish off northern Perú with chemistry found nowhere else. Most other fish grouped in two clusters, which showed properties suggesting correspondence with a major spawning zone in oceanic water off central Chile, and a smaller area in coastal water off northern Chile, characterized by similar sea surface temperature, lack of westward transport, and low kinetic energy. Rather than discrete populations separated by boundaries, Ashford *et al.*, (2011) suggest complex spatial structure defined by environmentally mediated survival and connectivity: fish caught off New Zealand may be of South American origin; the spawning zone off central Chile may supply fisheries around the South Pacific; and spawning off

northern Chile may be an important source of fish caught locally and in Perú. However, northern Perú does not supply areas further south.

On a subsequent study, Sierra *et al.* (2014) analyzed i) the temporal consistency of the otolith chemistry in the Chilean Jack mackerel deposited in different environments, by measuring the outer ring of the otolith that corresponds to the known date and time of capture, and ii) the temporal consistency in the population structure by measuring the chemistry of the otolith nucleus that records the environment that the Jack mackerel experiences in its early life.

Although after the transformations the otolith core data met all statistical assumptions and the chemistry along the otolith edge conclusively demonstrated environmental heterogeneity, no differences were found indicating regional population heterogeneity between southern Chile, northern Chile and northern Perú during the spawning season when underlying groups are more likely to be more segregated.

The lack of differentiation in the otolith nucleus corresponding to population boundaries, despite the strong differences in otolith edge chemistry, was inconsistent with the hypothesis of discrete populations versus Perú and Chile. Moreover, the chemistry of the New Zealand fish otolith core shows no difference from most fishes from Chile and Perú despite the regional environmental differences recorded in the otolith edge chemistry, again suggesting a South American origin. There was also no evidence of regional stability in the differences detected that could provide consistent evidence of a "source and sink" scenario (source sink hypothesis). Likewise, no evidence of temporal stability was found in the differences detected between sampling areas.

Sierra *et al.* (2014) results do not strongly support the hypothesis of spatially and temporally stable aggregations of Jack mackerel, with heterogeneity generated by mixing between underlying groups centered in southern Chile, the Arica codo (Coquimbo to Olleros) and north-central Perú. Comparing the results of the recent study to Sierra *et al.* (2010), there was no evidence of a strongly differentiated group of northern Perú fishes and little evidence of the pattern of spatial heterogeneity between and within regions reflecting movements and mixtures predicted under this hypothesis. Nor do the results of the cluster analysis for the spawning station indicate the expected north-south trend.

The chemistry fixed in the otolith shows spatial heterogeneity, which allows to rule out the hypothesis of a single stock that is randomly mixed with fish from Perú, Chile, and New Zealand. Despite this considerable spatial heterogeneity in the chemistry fixed at the edge the otolith of Jacks sampled along the coast of Perú, Chile, and New Zealand, little evidence was found in the otolith core chemistry of population boundaries separating or identifying self-sustaining subpopulations in these regions.

However, the MANOVA for the core chemistry of otoliths from the feeding period (autumn) samples detected significant differences between the samples from south-central Chile and north-central Perú. When the data were explored with cluster analysis, the results suggested the existence of two underlying groups, with proportions changing from south to north during the feeding period, but with a lower proportion in Perú of Jacks centered in south-central Chile.

In conclusion, the results of Serra *et al.* (2014) shows a complex population structure for the South Pacific, ruling out the hypothesis of a single population; and suggest the existence of two partially discrete self-sustaining subpopulations or stocks in the Eastern South Pacific and a colonization process in the New Zealand region.

Relating Ashford *et al.* (2011) and Serra *et al.* (2014) results and potential implications for Jack mackerel population structure, and connectivity, there some considerations that should have been taken into account on the interpreting of the results.

The chemical signals of the elements in the otolith can be affected by growth rates depending on the size of the individuals collected. That is why individuals of the same size/age should be collected. Individuals collected, even if they are all adults, will have different growth rates if there is a lot of variability in sizes or ages because it means that they have had different experiences of chemical environment over the years. In other words, the chemistry of otoliths from two-year-old specimens cannot be compared with others that are 6 or 7 years old.

Ashford *et al.* (2011) shows an effect of sampled individual lengths for Ba and Sr concentrations. Given that there was an effect of individual sizes in Ba and Sr concentrations an examination of the relationship between the weight of the otolith and the chemical composition of the elements of the otolith with analysis of covariance (ANCOVA) must be carried out. If there is a significant relationship, the effect of size (otolith weight was used as an indicator of fish size) should be eliminated to ensure that differences in fish size between samples did not confuse any site-specific differences in otolith chemistry. That is why the concentrations of the chemical elements must be detrended by subtracting the product of the common linear slope within the group multiplied by the weight of the otolith from the observed elemental concentration (Campana *et al.*, 2000).

Ashford *et al.* (2011) reported that the collection of specimens was done from November 7, 2007, to June 2008. In order to prevent certain factors from affecting the chemistry of otoliths, such as temperature, samples should be collected at the same time or within a short period of time, at least between weeks or a month. The concentrations of otolith chemical elements tend to vary by temperature and if there are samples that were taken one month like January and another in June, these samples will not be informative.

In Ashford *et al.* (2011) study there is only one year of data, and it is not known whether the chemistry of otoliths varies over the years. The elemental compositions of otoliths may not be temporally stable between cohorts (year classes) since interannual variation in water chemistry can affect the chemical composition of otoliths even if fish remain in the same locations (Milton *et al.*, 1997). Some studies that have examined temporal stability in otolith chemistry indicate that population-specific signatures vary from year to year (Campana *et al.* 2000; Hamer *et al.* 2003; Sweare *et al.* 2003). Temporal variation in the multielemental marks of otoliths may have significant implications for their application to the retrospective determination of adult origins and may confound inferences from population structure (Gillanders, 2002). Since chemical tags are very unlikely to remain stable over years, it is recommended that assignments should be cohort specific (Gillanders, 2002a; Elsdon *et al.*, 2008).

Finally, Ashford *et al.* (2011) and Serra *et al.* (2014) studies considered that since discrete, self-recruiting populations imply separate exposure to local environments during early life, both studies used the elemental chemical fingerprints laid down in the otolith nucleus to test for population differences between samples taken off Chile, Perú, and New Zealand.

There are many studies that suggest that the chemistry of the otolith's nucleus is influenced by maternal and ontogenetic effects and not by the environment. This is because enrichment of Mg, Mn, Ba elements has been found in the nucleus of the otolith compared to other sections within the otolith. Brophy *et al.* (2004) reported otoliths of larval Atlantic herring, *Clupea harengus*, and sprat, *Sprattus sprattus*, had higher Mn:Ca values near the primordium than in the rest of the otolith and concluded that potential maternal, physiological, or matrix effects all may contribute to confound the environmental signal of Mn:Ca in otolith cores. Similarly, Ruttenberg *et al.* (2005) reported that concentrations of Ba:Ca and Mg:Ca, as well as Mn:Ca, were elevated in the primordium of six species of larval fishes sampled from different regions of the Pacific Ocean. Systematic differences in Ba:Ca and Mn:Ca ratios were also reported between whole and cored juvenile red snapper otoliths most likely resulted from a disproportionate representation of the primordium in cored otoliths

relative to the entire volume of whole otoliths (Patterson *et al.*, 2010). Volk *et al.* (2000) demonstrated with Pacific salmon that the Sr:Ca ratio in the otolith core of fry spawned by females that matured in seawater was roughly four times the core Sr:Ca ratio of fry spawned by females raised in freshwater. Zimmerman and Reeves (2002) also found maternal influences on the otolith primordium in their study of resident and anadromous rainbow trout (*Oncorhynchus mykiss*). These studies indicate that in the early stages of otolith formation and growth, the isotopic and elemental composition of otoliths is influenced by the nutrients provided by the mother in the egg. For the nonessential element Ba, otolith concentrations also likely reflect maternal investment rather than differences in ambient water chemistry in capelin (Loeppky *et al.*, 2018). This study found that differing maternal investment of otolith Ba concentrations from repeat spawners may explain the finding of more similar concentrations of this element between consecutive years compared to those between nonconsecutive years. Other studies that have examined the chemistry of natal otoliths and statoliths have all found significant variation at the clutch or brood level (Warner *et al.*, 2005; Zacherl, 2005; Ruttenberg and Warner, 2006) implying the chemical composition of natal otoliths does not appear to reflect the chemistry of water samples taken at the time of collection. Other recent work has found strong maternal effects on the composition of the natal portion of the otolith by transferring enriched Ba isotopes from mothers to embryonic otoliths of their offspring (Thorrold *et al.*, 2006) strongly arguing in favor of the presence of maternal effects on otolith chemistry.

All of these findings suggest that variation in maternal factors may have a strong influence on the chemical composition of the natal portion of fish otoliths (and possibly mollusk statoliths) and these maternal effects may further confound any spatial patterns in water chemistry and otolith chemistry.

As noted by Ruttenberg *et al.*, (2005) and Chittaro *et al.*, (2006), if such enrichment in the otolith nucleus is not subject to strict environmental control, but is also influenced to some extent by developmental factors (e.g., yolk sac input, variation in Ca-binding proteins in endolymph (Kalish, 1989)), and protein enrichment) or physical factors (e.g., changes in the crystal structure of the otolith), the use of otolith core chemistry to identify natal sites may be fundamentally biased, which could reduce the likelihood of detecting real environmentally-driven spatial differences between natal sites. That is why in recent otolith chemistry studies the primordium of the otolith is removed and areas of the otolith that are not affected by maternal or ontogenetic influence are sampled (Ruttenberg *et al.*, 2005; Ruttenberg and Warner, 2006; Ruttenberg *et al.*, 2008; Macdonald *et al.*, 2008.)

Finally, it is not suggested that Ashford *et al.* (2011) and Serra *et al.* (2014) studies using otolith nucleus microchemistry are biased or invalid. Rather, it is suggested that further inquiry should be done into the generalization of these findings, a reconsideration of mechanisms by which elements may transit into and out of the core or other parts of the otolith, and potential incorporation of chemical variability in different sections of the otolith into statistical analyses especially in studies attempting to assign individuals to habitats or groups to inform management or direct policy decision.

### Genetics

The knowledge of the population genetics of Chilean Jack mackerel in the South Pacific Ocean has been conducted using several methodologies: i) allozyme, ii) PCR (nuclear and mitochondrial genes, microsatellite data), and iii) Sanger sequencing. However, molecular markers based on Next-Generation Sequencing have not yet been explored.

The first genetics study comes from Galleguillos and Torres (1988) where the authors identified polymorphic enzyme loci in samples from Chile (Chiloé, Talcahuano, Juan Fernández, Iquique), Perú, and one oceanic area (39°24'S; 76°45'W), not detecting significant differences between them. Later, Arancibia *et al.* (1996), using 23 enzymatic loci for samples from Chile, also failed to observe differences. Sepúlveda *et al.* (1996), using PCR-RFLP in ITS2 (Internal Transcribed Spacer) with the Mspl enzyme and analyzing samples from Chile (Isla Mocha,

Iquique, Juan Fernández), New Zealand, and Australia, showed no significant genetic differences among the samples, and patterns of genetic homogeneity were observed in the study area for these genetic markers.

Cardenas *et al.* (2009) by analyzing mitochondrial DNA (control region 772 bp) and nuclear DNA (four heterologous microsatellite loci) for samples from the eastern South Pacific Ocean and western South Pacific Ocean (Chile, New Zealand, open Pacific Ocean), indicated low genetic variability for both types of molecular markers, with no significant genetic differences between localities. Subsequently, Serra *et al.* (2010) adopted a multidisciplinary approach, considering a set of methods: genetics, parasites, morphometry (body and otoliths), otolith microchemistry, and natural history patterns. More than 1,020 samples from the geographical distribution of Chilean Jack mackerel were analyzed, with samples from Chile (7 localities) and the collaboration of the Instituto del Mar del Perú (IMARPE; three localities) and the Ministry of Fisheries of New Zealand (1 locality). The genetic analysis used six heterologous microsatellite loci (Cárdenes *et al.*, 2009) and three species-specific loci (Canales-Aguirre *et al.*, 2010). These microsatellites showed no differences among the localities analyzed. Later, Serra *et al.* (2014), extended the work to investigate temporal and spatial variations from the previous study of Serra *et al.* (2010), again using a multidisciplinary approach. For the genetic analysis, ten microsatellite loci (three heterologous and seven species-specific) were used for 852 individuals from eight localities of the South Pacific Ocean distribution of Chilean Jack mackerel (3 localities from Perú, four localities from Chile, and one locality from New Zealand). In addition, comparisons were made by season (spring-summer). The FST index for localities and sampling seasons showed no evidence of genetic structuring (low and non-significant FST). For the temporal analysis, between samples from the FIPA N°2007-27 and FIPA N° 2010-18 projects, the FST index showed no significant genetic differences.

Finally, Ferrada *et al.* (2023) re-analyzed the estimating genetic diversity and population structure with polymorphic markers of Chilean Jack mackerel, in the South Pacific Ocean. A total of 522 samples were collected from 11 locations in 2008, to be analyzed using six loci microsatellites. The results showed a high genetic diversity across locations ( $H_o = 0.551$  to 0.980;  $H_e = 0.676$  to 0.959). Estimates for the population structure showed a low and non-significant pairwise FST in all comparisons. The study supported the nongenetic differentiation previously reported with the used microsatellite panel and conclude again the hypothesis that, in the South Pacific Ocean, Chilean Jack mackerel correspond to a large single population.

### Larval Distribution

Oceanographic structures involved in larval transport can affect larval survival and subsequent recruitment of pelagic fish. Therefore, to understand interannual variability in stock abundance it is essential to have a deeper understanding of the ways in which oceanographic processes affect eggs and larvae trajectories from spawning to nursery ground.

The spatial structure of the oceanic Jack mackerel spawning has been well described (Cubillos *et al.*, 2008). However, larval transport and the oceanographic processes affecting early Jack mackerel life history are not fully understood (Vasquez *et al.*, 2013). Due to the large distance and the spatial uncoupling between Jack mackerel spawning and nursery grounds, deeper understanding is required of the physical mechanisms that force the transport of eggs and larvae that promote connectivity between the spawning and recruitment fractions of the population (Vasquez *et al.*, 2013).

A study done by Vasquez *et al.* (2013) wanted to attain an understanding of the spatial structure of spawning and nursery grounds and to assess the likely physical factors that drive successful transport from spawning to nursery grounds. In order to do that, Vasquez *et al.*, (2013) research consisted on (i) describing Jack mackerel larval distribution based on data from bio-oceanographic cruises, (ii) exploring larval age-specific spatial patterns through microstructure analysis of daily deposition of sagittal otoliths, and (iii) characterization of the oceanographic structures involved in larval transport.

In this study, otolith microstructure analysis revealed a spatial age gradient with the smallest/youngest larvae specimens found primarily in the offshore area and the largest/oldest found in the coastal area, implying offshore-inshore larval drift. This suggested a connection between the oceanic spawning area and the historical coastal nursery ground (north of 30°S). Vasquez *et al.* (2013) showed that eddy trajectories lead to net northwestward offshore transport (the opposite direction of larval connectivity). In addition, mean circulation associated with the subtropical anticyclonic gyre and recurrent energetic meandering structures seem to be the major mechanisms driving the spatial dynamics of the early Jack mackerel life history, determining a net transport to nursery grounds.

Vasquez *et al.* (2013) concluded that the transport process of Jack mackerel in waters off Chile appears to be linked to mean surface circulation (as a product of geostrophic flow and wind-driven currents) rather than eddy self-propagation transport from the Coastal transition zone (CTZ). Mean surface velocities consistently explain the age heterogeneity in the spatial distribution of Jack mackerel larvae. On the other hand, mesoscale processes (i.e., mesoscale eddies and meander currents) may influence early Jack mackerel life stages by modifying the dispersal pattern, generating oceanic retention zones and/or providing larval food supply through the extension of the productive coastal upwelling area.

Therefore, larval distribution and advection processes support a single population hypothesis suggested by genetic analyses because of the absence of the genetic structure that can result from the long-distance dispersal of the early development stages. The latter involves the seasonal offshore migration of the adult fraction to spawn in oceanic waters (austral spring), and a recruitment process in the coastal region dependent on the advection of Jack mackerel from the oceanic area to coastal nursery grounds. Oceanic Jack mackerel spawning behavior, combined with the regional surface circulation, provides possible physical-biological mechanisms to explain offshore-inshore larval transport indicated by otolith microstructures. Thus, Vasquez *et al.* (2013) study support the hypothesis that the juvenile fraction observed in northern Chile and southern Perú originates in the oceanic zone off central Chile and is transported to the coastal nursery ground, thus modulating annual recruitment, and establishing a single population of Jack mackerel in the Southern Pacific Ocean.

## Demography

### Life history patterns approach

Differences in one or more life history parameters may distinguish one stock from other stocks of the same species. Begg *et al.* (1999) stated that, population parameters such as growth, survival, age-at-maturation, fecundity, as well as the species distribution, abundance and spawning grounds are the consequences of life history traits to which fish stocks have evolved. Different parameters and patterns have been used previously to identify separate management stocks based on phenotypic variations that could be explained by genotypic and environmental factors. Furthermore, life history parameters are considered as an evidence of discrete stock units for management purposes (Ihsen *et al.*, 1981). Also, other life history traits such as size structure, maturity and fecundity demonstrate interactions between the genetic background and environmental factors providing evidence for stock structure (Begg, 2005). Serra (1991), based on the distribution of the abundance, seasonality (abundance, catch), spawning time, spawning ground, and size structure, proposed the existence of two self-sustaining sub-population of Jack mackerel within the Southeast Pacific Ocean, one located off Perú and the second off Chile extending into the high seas.

### Growth

Studies on the growth of Jack mackerel and establishment of growth curves were achieved mostly through otoliths observation and studies of the modal distribution (Kaiser, 1973; Pavez and Saa, 1978; Castillo and Arizaga, 1987; SC9-HM01 Nosov and Kalguchin, 1990; Arcos and Gretchina, 1994; Cubillos and Arancibia, 1995; Díoses, 2013b). Results show a rather wide variety of growth curves attributed mostly to the areas where the studies were performed.

Csirke (2013) stated that in the northern range of its distribution, off Perú, Jack mackerel grows faster and larger than in the southern part (central-south Chile), likely due to a higher metabolism linked to warmer waters in the North. Diaz (2013) and Goicochea *et al.* (2013) reached a same conclusion by comparing growth parameters for the Chilean and the Peruvian CJM calculated from different methods. However, in recent years, IFOP produced a new age assignment, which considers that the first and third rings of the traditional allocation correspond to false annual rings, probably semi-annual rings (Cerna, 2022a). The new assignment also changed estimates of important biological parameters such as growth, natural mortality, and maturity at age (Cerna, 2022a; Cerna, 2022b).

A comparison between the current Chilean and Peruvian Von Bertalanffy growth parameters (Dioses, 2013) (see Figure 8), showed that the Peruvian curve has a slower growth rate for 1-yr-old and 2-yr-old fish, which is not consistent with validation studies conducted in Chile and Perú. In the Peruvian validation study, based on micro increments, Goicochea *et al.* (2013), validated the 1-yr-old fish total length at 19.5 cm while Dioses 2013b estimated this total length at 15 cm.

**Demographic structure.** Studies on demographic structures have been developed on the base of the fisheries data. Therefore, they produce results for exploited stocks more than for specific populations or sub-populations. SPRFMO calculated age structure and dynamics for four major fisheries (Guerlotto *et al.*, 2021).

- The CENTRE-SOUTH CHILE fishery (CSCF), limited by the Chilean coastline between latitudes 30°S and 45°S, and reaching 100°W. This fishing area is exploited by Chile with purse seines and the international fleet (outside Chilean EEZ) with pelagic trawls.
- The NORTHERN CHILE fishery (NCF), from 17°S to 30°S, limited by the coastline and the longitude 80°S. This area is more concentrated along the coast than the former one, and is almost exclusively exploited by Chile.
- The FAR NORTH fishery (FNF), located north of the former one, and mostly inside the jurisdictional waters of Perú. Practically the only exploitation is performed by the purse seine fishery of Perú, and marginally west of the 200 NM limit.
- The HIGH SEAS fishery (HSF), gathering all the south Pacific area, but mostly located west of 100°W, between latitudes 35°S and 45°S, and with no defined limit westward, although no fishery exists or existed west of New Zealand. Most of the vessels are equipped with pelagic trawls.

The data of these fisheries permitted in depicting demographic histories for each one of these fisheries. Gerlotto *et al.* (2012) analysed in detail the demographic dynamics of these 4 fisheries and concluded that the different fisheries/areas present different histories, split into four main periods:

- a. Before 1986, all the fisheries present approximately the same pattern, characterized by a stable age histogram with no visible cohort evolution. The mean age is different for each fishery: around 6-7 years old in CSCF and NCF, younger in FNF (5 years old) and older in HSF (7-8 years old)
- b. 1986-1993. This period is characterized by the presence of a very strong cohort, visible in all the fisheries, which represents the bulk of the catches. It can be observed that there are some delays in the occurrence of the cohort, present since 1986 in FNF and NCF, and only after 1988 in CSCF and HSF. This cohort is the clearest in NCF.
- c. 1993-2003. This period is characterized by important differences between fisheries. CSCF is mostly catching adults of age 3-7 (younger than in the first period), with no clear cohort evolution; NCF is almost exclusively catching young fish (age 2-5), centred on age 3; FNF is exploiting both young fish and adults (age 3-6). No data describe the HSF, as this period corresponds to the end of the Soviet fishery, and the international fishery in HSF began to operate in 2000. Note that the only cohort evolution that is visible occurs in CSCF and FNF, between 1999 and 2003.
- d. 2003-present. This period is characterized by the occurrence of a series of cohorts, with differences

between the fisheries. CSCF and HSF are exploiting exclusively adults, the mean age being similar to that of the first period (age 5-8) and the NCF continues exploiting only young fish (age 3-4). The FNF presents an original pattern, where several cohorts are clearly visible and where the fishery exploits successively each of them, from age 2 to age 7.

### Habitat

The spatial distribution of fish may be influenced by habitat features, which also provide an explanation for the presence of distinct groupings and the possibility of subpopulation organization. It is thought that a single population hypothesis would be supported by continuity in a favorable environment over a considerable area, but a multiple populations hypothesis would be supported by constant discontinuities in habitat range as a result of hydrological or productivity limitations. Finally, temporal discontinuities within global habitat could favor intermediate structures such as a metapopulation.

Recently Bertrand *et al.* (2016) studied how environmental conditions that drive Chilean Jack mackerel distribution can provide insights on its population structure. First, Bertrand *et al.* (2016) used temperature and productivity satellite data from 1998 to 2012 to develop a statistical model describing Chilean Jack mackerel horizontal distribution. For that purpose, Bertrand *et al.*, (2016) used Species Distribution Models (SDMs) which links species location to environmental data to access the combination of environmental conditions suitable for the survival in the absence of explicit biotic interactions, such as competition or predation. Second, Bertrand *et al.*, (2016) used available in situ temperature and oxygen data to determine the limits of Jack mackerel horizontal and vertical distribution.

Consequently, a conceptual 3D model of Chilean Jack mackerel habitat in the Southeastern Pacific was built where the combination of these parameters allowed to predict the suitable Chilean Jack mackerel habitat and to study whether the suitable habitat would show spatial or temporal discontinuities along the area studied.

Bertrand *et al.* (2016) showed two schematic cases. The first situation corresponds to a case where there is a low suitable habitat along the Chilean and Peruvian coast, figuratively presenting a closed door caused by a gap in the horizontal habitat at  $19^{\circ}\text{S}$ – $22^{\circ}\text{S}$  and a shallow oxycline off south-centre Perú. Such low oxygen conditions exclude Jack mackerel from coastal areas limiting its potential habitat to a narrow band offshore, at the edge of the gyre. This kind of situation is likely to occur on a seasonal basis, in austral summer, when the oxycline is shallower (Passuni *et al.*, 2016) and a discontinuity in Jack mackerel habitat occurs but also, at longer temporal scales for instance during the first decade of the 2000s (and before the 1970s) when the Oxygen Minimum Zone (OMZ) was very shallow.

The second situation corresponds to a case where exchanges between the Chilean and Peruvian sub-systems are facilitated by a deeper oxycline off south-centre Perú and an absence of a gap in the horizontal suitable habitat at  $19^{\circ}\text{S}$ – $22^{\circ}\text{S}$ . In this case Jack mackerel have access to the very productive Peruvian waters, where prey is concentrated in easily accessible surface physical structures (Bertrand *et al.*, 2014), and can thus grow faster (Goicochea *et al.*, 2013).

Bertrand *et al.* (2016) results showed that evidence of temporary discontinuity in Jack mackerel coastal habitat provides an alternative approach to determine South Pacific Jack mackerel population structure. Their interpretation of Jack mackerel stock structure is as follows:

A population source is located off Chile where the highest spawning occurs. If a strong cohort develops and productivity and oxygen are in favour of a continuous suitable habitat along the Chilean-Peruvian coast, Jack mackerel can replenish the population inside Peruvian waters. A lack of exchanges at some periods/seasons partially isolate Jack mackerel distributed off Perú, where it can benefit from the high productivity and therefore grow faster (Goicochea *et al.*, 2013), present a difference in parasite composition (Oliva, 1999) and spawn (Ayón and Correa, 2013). On the other hand, the continuity in the habitat during

most of the year helps to understand why strong exchanges in juveniles and to a lesser extend adults occurs (Ashford *et al.*, 2011). Bertrand *et al.* (2016) concluded that the more likely population structure for Jack mackerel is thus a pelagic metapopulation with a source population off Chile.

#### **Jack mackerel analyses of population structure hypotheses**

Information taken from the following papers.

Gerlotto, F., Hintzen, N.T., Habasque, J., Corten, A., Gutierrez, M., Bertrand, A. 2016b. The concept of “Pelagic metapopulation” as exemplified by the case of Jack mackerel *Trachurus murphyi* in the South Pacific Ocean. SPRFMO, 4<sup>th</sup> meeting of the Scientific Committee, The Hague, 10–15 October 2016, SC-04-JM-02.

Gerlotto, F., Bertrand, A., Hintzen, N., Gutiérrez, M. 2021. Adapting the concept of metapopulations to large scale pelagic habitats. Working paper presented to the 9th meeting of the SPRFMO Scientific Committee, 27 September – 2 October 2021. SPRFMO document SC9-HM01: 37p.

Hintzen, N.T., Corten, A., Gerlotto, F., Habasque, J., Bertrand, A., Lehodey, P., Brunel, T., Dragon, A. C., Senina, I. 2014a. Hydrography and Jack mackerel stock in the South Pacific – Final report Studies for carrying out the Common Fisheries Policy, Open call for tenders No MARE/2011/16 Lot 1, European Commission.

In 2008, a series of six possible scenarios describing the Chilean Jack mackerel population structure were defined during an international scientific workshop organized in 2008 by the South Pacific Regional Fisheries Management Organization (SPRFMO, 2008b; Gerlotto *et al.*, 2016).

From these hypotheses, SPRFMO listed six possible scenarios.

**Scenario 1. Single discrete populations:** All Chilean Jack mackerel populations in the South Pacific belong to one population that is homogenous in structure throughout the entire distribution area.

**Scenario 2. Two discrete populations (off Perú and Chile):** Chilean Jack mackerel populations in the South Pacific belong to two populations, separated by latitude 20°S, the southern one extending onto the high seas up to New Zealand and the northern one foremost present in Peruvian and Ecuadorian waters. The populations do not mix during their life.

**Scenario 3. Two discrete populations (coastal & high seas):** Chilean Jack mackerel populations in the South Pacific are assumed to be organized into two populations, one coastal and one in the high seas extending up to New Zealand. The populations do not mix during their life.

**Scenario 4. Network of closed populations:** Three or more discrete populations, one in Perú, one in and off Chile & one or multiple populations in the high seas. The populations do not mix during their life.

**Scenario 5. The superpopulation (= patchy population):** Chilean Jack mackerel populations are organized in different population “patches” but maintain a high degree of exchanges between the patches resulting in overall correlated population fluctuations.

**Scenario 6. The metapopulation:** Chilean Jack mackerel populations are organized in different autonomous population units that maintain a limited to moderate degree of inter-population exchange.

Following Hanski (1999), Gerlotto *et al.* (2012) extended a list of conditions required for a metapopulation to exist and applied it to the case of the Chilean Jack mackerel. After studying a series of population characteristics, namely spawning areas, growth rates, and recruitment for the different exploited populations as defined by SPRFMO (i.e., Centre-South Chile, North Chile, Far North (Perú and Ecuador), offshore (west of

100°W), Gerlotto *et al.* (2012) concluded that although not all the theoretical conditions are fulfilled, the more likely structure is that of a metapopulation. The central offshore population represents the “source area” from 30°S to 40°S and from 80°W to 98°W. The other areas (Peruvian area, coastal Centre-South Chile and NE to 30°N – 98°W) should be considered as supporting temporal autonomous sub-populations.

Hintzen *et al.* (2014a) established a list of 27 characteristics that condition the population structure. Table 18 shows a summary of the supporting and contradicting pieces of evidence for the six population structure scenarios.

**Table 18.** List of the characteristics collected in the literature and their compatibility with the six population structure scenarios. Scenarios are indicated by their number in columns 3, 4 and 5 (Source: Hintzen *et al.*, 2014a).

Characteristic	Observation / condition	Supporting	Contradicting	Incompatible
1	No genetic evidence is found to differentiate fish caught in different regions ranging from Perú to Chile and onto the high seas.	1, 5, 6		2, 3, 4
2	No clear segregation in otolith biogeochemistry was found for juveniles to distinguish between fish caught in Peruvian or Chilean waters.	1	2, 4	
3	There is a high degree of similarity in length distribution from Northern Chile and Southern Perú catches.	1, 5		
4	Strong cohorts appear all over the Pacific.	1, 5		
5	Only a continuous and permanent distribution of adult fish is shown off Chile.	1	3	
6	A certain degree of segregation in otoliths biogeochemistry was found for adults to distinguish between fish caught off Perú and Chile.	2, 6	1, 5	
7	Differences in growth and estimated growth parameters are observed between fish caught off Perú and Chile.	2, 6	5	1
8	A difference in encountered natural mortality between fish off Perú and Chile is observed.	2, 4, 6	1, 5	
9	Based on an analysis of the metazoa parasite fauna, a small difference between fish off Perú and the Chilean coast is observed.	2, 4, 6	1	
10	A difference in age distribution in the catch taken off Perú and off Chile / high seas is observed.	2, 3, 4, 6	1	
11	A difference in estimated recruitment / productivity, obtained from assessment results, is observed between stock assessments separating the Northern and Southern fisheries.	2, 6	1	
12	The existence of a 'few-fish zone' between ~19-22° South is observed in acoustic and catch geo-referenced data. In addition, the predicted separation in coastal habitat during part of the year limits extensive mixing.	2, 4, 6	3	1
13	A difference in encountered natural mortality between fish off Perú and Chile is observed.	2	3	1
14	Spawning is observed in multiple patches / areas throughout the South Pacific and is not limited to one spawning area	2, 3, 4, 6		
15	Analyses show that the 2008 cohort, first captured off Chile, may have migrated under a strong La Niña effect into Peruvian waters in the beginning of 2011.	6	3	2, 4
16	Substantial connectivity between fish in Chilean, Coastal and Peruvian areas.	1, 5, 6	2, 3, 4	
17	The spatial-temporal SEAPODYM model, parameterized for Jack mackerel, shows that the		3, 4	

Characteristic	Observation / condition	Supporting	Contradicting	Incompatible
	distribution of adult and juvenile fish is also oriented perpendicular to the coast.			
18	A recent eastward shift in distribution area of the main catches in the south-central area of the South Pacific has been observed with limited availability of Jack mackerel outside Chilean jurisdictional areas.	1	3, 4	
19	Observations of spawning activity span from the Chilean coast up to 110°W.		3, 4	
20	At least two main spawning areas are defined)	4, 6	1, 5	
21	Observations show local spawning activity inside New Zealand waters. Most catches correspond to large and old Jack mackerel.	4, 6	1, 5	
22	Analyses of the trend in population units, based on assessment results separating Peruvian and other catches, do not show a close synchrony in development.	6	1, 5	
23	No extensive connectivity between fish in Peruvian and Chilean waters or to the high seas except during strong El Niño when there is a flux from offshore to coast and south to north.	6	1, 5	
24	Jack mackerel is considered a highly migratory species with the ability to migrate between potential habitat patches.	1, 5, 6		
25	The heterogeneous habitat owing to the Humboldt current system results in patchy suitable habitats.	5		
26	No connectivity between coastal Chile and high-seas fish, no connectivity between Perú and high-seas fish.	4	1, 6	
27	Habitat is only partly fragmented throughout the year. There is no fragmentation between habitat off Chile and onto the high seas.		6	

These results indicate that scenarios 1, 2, 3, 4 are not fully compatible with the biological, ecological or habitat observations. Therefore, the two extreme scenarios, i.e., single and multiple discrete population structures, seem unlikely.

According to Hintzen *et al.* (2014a) the single discrete population hypothesis is possibly one of the most difficult one to reject given that there is no clear evidence of genetic differentiation along the entire Jack mackerel population and that under large recruitment events strong spatial synchrony of year-class strength is shown. However, the hypothesis cannot explain why there is substantial differentiation in age structure and life-cycle dynamics of local patches off Perú, in the Chilean coastal area and at the high seas, shown also in the otolith biogeochemistry. This is the main reason to reject the single discrete population hypothesis. Given that the Humboldt Current System dynamics result in a very heterogeneous habitat for Jack mackerel, with spatial segregation (~20°S) between Jack mackerel in Peruvian waters and off Chile during part of the year also contribute to the information base to reject this hypothesis.

The two discrete populations (one population off Perú and one population off Chile extending onto the high seas) hypothesis can be rejected based on the information that there are no genetic differences between Jack mackerel found in the South Pacific and New Zealand. Given that the habitats are substantially different in the

Northern distribution area from the Southern area, if two discrete populations would exist, genetic difference would be found. Hintzen *et al.* (2014a) analysis also show substantial exchange of fish between Southern Perú and Northern Chile. These arguments together reject the hypothesis of two discrete populations.

The two discrete populations (one coastal and one high seas population) hypothesis can be rejected for similar reasons as the one above. Thereby, the spatial segregation ( $\sim 20^{\circ}\text{S}$ ) of Jack mackerel during part of the year limits the likelihood of having one coastal population. Results from this project also suggest a continuous favorable habitat and distribution of Jack mackerel from the Chilean coast onto the high seas. These arguments together reject the hypothesis of a coastal and high seas population.

The arguments to reject the existence of three or more populations (one population off Perú, one off Chile and one or multiple on the high seas) are similar to rejecting the two discrete population hypotheses. In addition, Hintzen *et al.* (2014a) study show substantial exchange of fish between the high seas and coastal areas which would contradict the hypothesis

The patchy population hypothesis suggests spatially structured population units, allowing for a discontinuous distribution in space, but with high exchange rates of fish and migration between each of the patches, such that dynamics at each of the patches is similar. Given that there is substantial differentiation in age structure and life-cycle dynamics of local patches off Perú, in the Chilean coastal area and at the high seas, shown also in the otolith biogeochemistry, indicates that mixing or exchange rates are not high enough to support this hypothesis. Preliminary assessments of a potential Southern and Northern population indicate different trends in productivity as well. These arguments together reject the hypothesis of the patchy population.

The last remaining hypothesis is that of a metapopulation. This hypothesis receives support from both genetic evidence, allowing for differences in growth, maturity and otolith biogeochemistry between adults caught off Perú and Chile and the difference in population dynamics on these patches. Hintzen *et al.* (2014a) indicate that it is likely that the Chilean unit may function as a predominant source of fish to Perú and New Zealand during high times. Information is available however that spawning takes place in each of the respective areas.

According to the metapopulation hypothesis, some continuity in the Jack mackerel suitable habitat occurs in austral winter, permitting exchanges from the high seas to the Peruvian coast via the Chilean coast. However, the connectivity is reduced in austral summer with a threshold at  $\sim 19^{\circ}\text{S} - 22^{\circ}\text{S}$  (Bertrand *et al.*, 2016). The degree of separation varies at an inter-annual scale. The lack of exchanges at some periods/season explains why growth patterns (Goicochea *et al.*, 2013) and parasite composition (Oliva *et al.*, 1999; Serra *et al.*, 2014) differ between Chile and Perú which present different thermal, trophic and biodiversity conditions. The existence of the threshold between the north and south populations could explain also why “imported” cohorts (Corten, 2014) spawn in a different spawning area than the one where they are born (McQuinn, 1997; Petitgas *et al.*, 2010), which is not the normal behavior: usually homing behavior is strong and makes the fish spawning in their birthplace (Cury, 1994). In the case of Jack mackerel, due to the lack of connectivity during the spawning season between north and south, once mature, fish “trapped” in the north cannot go back to the south to spawn, and change their migration route through learning and entrainment (Petitgas *et al.*, 2010). On the contrary, the continuity in the habitat during part of the year explains why inter-habitat movements for juveniles and to a lesser extend for adults may happen (Ashford *et al.*, 2011; Serra *et al.*, 2014; Gretchnina *et al.*, 2013). The favorable habitat can be highly reduced off Perú during certain years (Gretchnina, 2008), and hence, when the suitable habitat shrinks, the main source for Chilean Jack mackerel may be limited off center-south Chile.

Therefore, there are two main patches of favorable habitat structure defining the Chilean Jack mackerel population: one centered in Peruvian waters and the other one in center-south Chile and its extension offshore up to  $80^{\circ}\text{W}$  (Bertrand *et al.*, 2016). These two areas are favorable to Chilean Jack mackerel given their

temperature and hydrographical conditions. Under normal conditions two separate groups are hypothesized to live in each of these areas and behave as a metapopulation including individual exchanges during part of their life. Under unfavorable climatic and hydrographic conditions, the suitable habitat may disappear to a large extend, resulting in reduced Jack mackerel biomass in the area (Gutierrez *et al.*, 2012). In the center-south, climatic, and hydrographic conditions are more stable; suitable habitat spans over a wider area and has an opening to the high seas, which allow fish a refuge in case of unfavorable conditions closer to shore. Given these attributes, it is likely that a suitable habitat persists in this area and is therefore host to a resident population unit.

Exchange of individuals from the southern resident population unit to the northern unit have sporadically been observed in the South Pacific in 2008 (Corten and Janusz, 2011), This shows that colonization of the northern habitat is possible from the southern population. The inverse is unlikely, as we saw that unfavorable conditions in the south coincide with even worse conditions in the north where suitable habitat may have completely disappeared (Bertrand *et al.*, 2016.).

In conclusion, Gerlotto *et al.* (2021) analysis of evidence that could explain the population structure of Jack mackerel is in agreement with Gerlotto *et al.* (2012), Hintzen *et al.* (2014a), and Bertrand *et al.* (2016) studies. The most likely population structure is best described by that of a 'metapopulation'. Furthermore, Gerlotto *et al.* (2021) states that the population characteristics of the Chilean Jack mackerel are typical to an environment-bounded habitat"(EBH) metapopulation where the Chilean Jack mackerel overall population is characterized by a huge distribution area limited by environmental factors exclusively, with independent local dynamics during long periods, synchronous changes in biology during the period of high abundance, existence of separated spawning grounds that show spatial variability related to environment, and existence of mechanisms that "close" or "open" connections between the sub-populations.

According to Gerlotto *et al.* (2021) the characterization of the population structure of Jack mackerel as a metapopulation inside an EBH could be described as this. in the case of Chilean Jack mackerel, the global habitat is split into two major "pelagic pits" (and possibly a few minor ones), i.e., center-south Chile and offshore Perú, separated enough for allowing subpopulation to develop a "Harden-Jones' migration triangle" where areas for feeding, growing and spawning can be encountered (Harden-Jones, 1968), and being autonomous; but with sporadic exchanges of cohorts thanks to climatic or oceanographic events, as evidenced when observing the Chilean Jack mackerel cohort migrations.

However, it is important to say the lack of connectivity from Perú and Chile to the high seas, as well as the existence of a rather continuous favorable habitat connecting Perú to Chile and the high seas limits in conclusively defining the population structure of Chilean Jack mackerel.

MSC requires that fishing activity on Principle 1 species be assessed at a level that is sustainable for the stock. Unit(s) of Assessment (UoA(s)) for an MSC assessment shall be defined based on the target stock(s). In the first instance, stocks normally be either different species, or different biologically distinct units within a species. However, the MSC also recognizes that the application of the "stock" concept may vary depending on the knowledge available and complexity in management and also allows for the consideration of different 'more or less isolated and self-sustaining' groups within a species as different "stocks".

Generally speaking, from a fisheries management point of view, a unit stock can be defined as a group of fish that can be treated as a stock and managed as an independent unit, as long as the results of the assessment and the impact of management measures do not differ significantly from what they would be in the case of a truly independent stock.

The assessment team assessed whether Chilean Jack mackerel stock unit is based on one or more local populations (LPs) or on a metapopulation as a whole using table G2 from MSC 2.0.

Figure 9 shows the Table G2 from MSC 2.01: Level of assessment expected and considerations when scoring the stock outcome and harvest strategy components of a unit stock for different forms of metapopulations. Based on the characteristics of the fishery mentioned above the assessment team concluded that the Chilean Jack mackerel possess the characteristics of C Local population (s) with moderate connectivity within the meta-population where the degree of connectivity between LPs is enough to maintain genetic flow and some degree of homogeneity. Source-sink dynamics with variable degree of self-recruitment. Sources of recruits act as core areas in the species range where the species occurs in all years and where the typical age composition exhibits regular recruitment patterns with multiple age classes present.

Table G2: Level of assessment expected and considerations when scoring the stock outcome and harvest strategy components of a unit stock for different forms of metapopulation

Stock structure	Description (degree of connectivity and self-recruitment)	Implications for management of the stock (assessment of Outcome and Harvest Strategy)
A. Single population	Completely isolated. Self-contained with no emigration or immigration of individuals from or to the stock. Occupies a well-defined spatial range and is independent of other stocks of the same species.	Whole population. Fishing on the population has no effect on the dynamics of neighbouring populations. Normal expectations may apply for reference points. The fishery must manage the stock above the point of recruitment impairment (PRI) to ensure recruitment is sustained.
B. Local population with partial isolation	Partially isolated and minimal connectivity. Self-sustaining. The degree of connectivity with other LPs in the metapopulation is so weak that, for management purposes, it can be considered a self-sustaining population. This may be true even if occasional larval exchanges between LPs are enough to maintain a certain degree of genetic flow and homogeneity.	Local population. Fishing on the local population appears to have no effect on the dynamics of neighbouring populations. Normal expectations may apply for reference points. The fishery must manage its own local unit stock above a point of recruitment impairment (PRI) to ensure recruitment is sustained. Requires information on the biology of the species, larval dispersal, source-sink dynamics, and oceanographic conditions supporting management at a local level. Information and uncertainties related to stock structure need to be scored in Performance Indicators (PIs) 1.2.2, 1.2.3 and 1.2.4.
C. Local population(s) with moderate connectivity within the meta-population	Moderate connectivity. The degree of connectivity between LPs is enough to maintain genetic flow and some degree of homogeneity. Source-sink dynamics with variable degree of self-recruitment. Sources of recruits act as core areas in the species range where the species occurs in all years and where the typical age composition exhibits regular recruitment patterns with multiple age classes present. There may be sinks where occasional individuals or low densities usually occur and where populations typically consist of only 1 or a few age groups, often of old individuals.	Local population(s). Fishing on local populations affects the dynamics of neighbouring populations. Fishing and the management decision affecting upstream populations will have impacts on the components downstream. Local populations are not entirely in control of their productivity. The fishery must manage its own local unit stock above a PRI to ensure recruitment is sustained, but reference points also need to take into account connections with and dependences on neighbouring local populations. Per recruit reference points (e.g. percentage spawners per recruit) may confirm the good management of the fishery to contribute to the wider surrounding populations. Separate monitoring of absolute reference points (either of incoming recruitment or of local population levels) may also be needed to confirm that the inputs of external recruitment are being sustained. Requires information on the biology of the species, larval dispersal, source-sink dynamics, and oceanographic conditions supporting management at local level. Information and uncertainties related to stock structure need to be scored in PIs 1.2.2, 1.2.3 and 1.2.4.
D. Local populations with maximum connectivity within the meta-population	Maximum connectivity. Metapopulation is panmictic (mating is random within the entire metapopulation). Subpopulations are arbitrary. Well-mixed larval pool.	Whole metapopulation. Fishing on local populations affects the dynamics of neighbouring populations. The fishery must manage the whole metapopulation (unit stock) above a PRI to ensure that recruitment is sustained. Special attention may be needed in setting reference points to ensure that the LP structure is not affected by fishing. Scored against the whole metapopulation. Information and uncertainties related to stock structure need to be scored in PIs 1.2.2, 1.2.3 and 1.2.4.

**Figure 9.** Table G2 from MSC v2.01 where different levels of assessment expected and considerations for scoring the stock outcome and harvest strategy components of a unit stock are detailed for different forms of metapopulations.

In the case of Chilean Jack mackerel, the Assessment Team determined that the stock represents local population with moderate connectivity within the metapopulation.

This determination is based on these facts:

1. There is substantial differentiation in age structure and life-cycle dynamics of local patches off Perú, in the Chilean coastal area and at the high seas and this is supported from genetic evidence, allowing for differences in growth, maturity and otolith biogeochemistry between adults caught off Perú and Chile and the difference in population dynamics on these patches.
2. Hintzen *et al.* (2014a), and Gerlotto *et al.* (2016, 2021) indicate that likely the Chilean unit may function as a predominant source of fish to Perú and New Zealand during high times. However, information is available that spawning takes place in each of the respective areas.
3. According to the metapopulation hypothesis, there is some continuity in the Jack mackerel suitable habitat which occurs in austral winter, permitting exchanges from the high seas to the Peruvian coast via the Chilean coast. However, the connectivity is reduced in austral summer with a threshold at ~19°S - 22°S (Bertrand *et al.*, 2016). The degree of separation varies at an interannual scale. The lack of exchanges at some periods/season explains why growth patterns (Goicochea *et al.*, 2013; Cerna, 2022) and parasite composition (Oliva *et al.*, 1999; Serna *et al.*, 2014) differ between Chile and Perú which present different thermal, trophic and biodiversity conditions.

Given that:

- 1) The population structure of Jack Mackerel in the South Pacific is not fully understood yet,
- 2) The SPRFMO Scientific Commission SC conducts parallel assessments of the Jack mackerel stock(s) in the Eastern South Pacific under the two main working hypotheses already identified. That is: Jack mackerel caught off the coasts of Perú and Chile constitute a single shared stock which straddles the high seas (hypothesis 1); or that Jack mackerel caught off the coasts of Perú and Chile each constitute separate stocks (the Peruvian or northern and the Chilean or southern stock) which straddle the high seas (hypothesis 2).
- 3) There is a continued evaluation of the performance of the assessment model under the single-stock and two-stock hypotheses and is expected to be explored along with an additional 3<sup>rd</sup> hypothesis (metapopulation) as part of the Management Strategy Evaluation (MSE);  
the Assessment Team is confident that defining that Chilean Jack mackerel stock within Chilean waters and outside of its EEZ as local population with moderate connectivity to other local populations (Perú, New Zealand) conforming a metapopulation. Furthermore, the assessment and managing of the “subgroup” at the level of the UoA will ensure that fishing activity on the species is assessed and managed at a level that is sustainable for the distinct presumed local populations without risking stock.

### Description of the fishery

Information taken from:

SPRFMO. 2023a. 11<sup>th</sup> Scientific Committee Annual report - Chile (Jack mackerel) SC11-Doc25.

### Composition of the Fleet

During the 2016-2019 period, it is observed that the industrial purse seine fleet that operated in the Jack mackerel fishery has been deployed both in the SPFRMO area and in the Chilean EEZ; while from 2020 until May of 2023, Jack mackerel fishing operations have been concentrated exclusively within the Chilean EEZ. Thus, the number of vessels that operated within the SPRFMO area during 2019 was reduced by 60% compared to 2016 (Table 19).

Until May 2023, 44 fishing vessels were operating, which represents a decrease of around 39% of the fleet compared to 2019 and 49% compared to 2016 (Table 20). This reconfiguration in the composition of the Chilean fishing fleet is mainly explained by a lower participation of vessels with a hold capacity of less than 600 m<sup>3</sup> as of 2019; while the number of vessels larger than 900 m<sup>3</sup> has remained stable during the same period.

**Table 19.** Number of industrial purse seine vessels catching Jack mackerel in the Chilean EEZ and the SPRFMO (combined) area between 2016 and May 2023. Data were assembled by year and hold capacity (2023\* preliminary data; Source: SPRFMO, 2023a).

Hold capacity (m <sup>3</sup> )	2016	2017	2018	2019	2020	2021	2022	2023*
0 ≤ 300	3	0	0	0	0	0	0	0
300 ≤ 600	57	57	46	42	42	27	23	18
600 ≤ 900	7	5	5	7	6	5	4	3
900 ≤ 1,200	1	2	1	1	1	1	1	1
1,200 ≤ 1,500	6	8	7	8	8	8	8	8
1,500 ≤ 1,800	9	9	9	10	10	10	10	10
1,800 ≤ 2,100	4	4	4	4	4	4	4	4
<b>TOTAL</b>	<b>87</b>	<b>85</b>	<b>72</b>	<b>72</b>	<b>71</b>	<b>55</b>	<b>50</b>	<b>44</b>

**Table 20.** Number of industrial purse seine vessels catching Jack mackerel in the SPRFMO area between 2016 and May 2023. Data were assembled by year and hold capacity (2023\* are preliminary data; Source: SPRFMO 2023a).

Hold capacity (m <sup>3</sup> )	2016	2017	2018	2019	2020	2021	2022	2023*
0 ≤ 300	0	0	0	0	0	0	0	0
300 ≤ 600	0	0	0	0	0	0	0	0
600 ≤ 900	1	0	0	0	0	0	0	0
900 ≤ 1,200	0	1	0	0	0	0	0	0
1,200 ≤ 1,500	0	0	1	0	0	0	0	0
1,500 ≤ 1,800	2	2	0	2	0	0	0	0
1,800 ≤ 2,100	2	0	1	0	0	0	0	0
<b>TOTAL</b>	<b>5</b>	<b>3</b>	<b>2</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

### Catches, Seasonality of Catches, Fishing Grounds

#### Catches

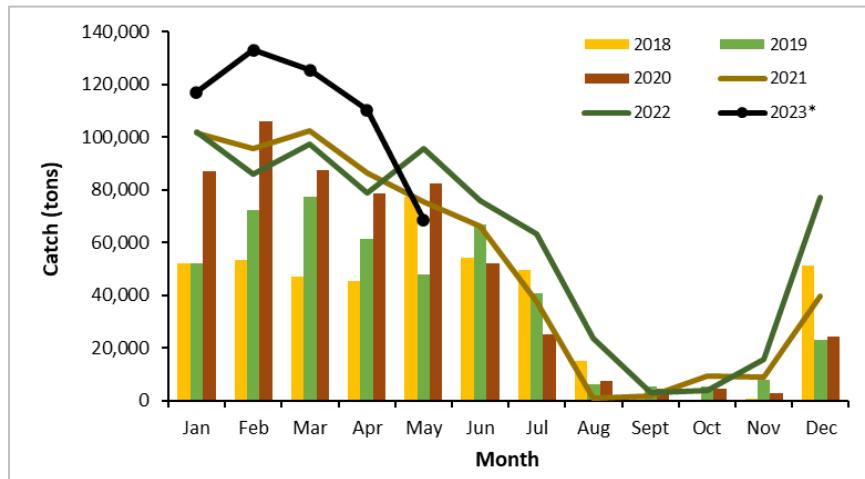
During the 2013-2022 period, an increase in Jack mackerel catches has been observed, with a maximum reached in 2022 (Figure 10). This trend is explained by the increase of the quota allocated to Chile and the completeness of its extraction, plus transferences of quota from other SPRFMO members to Chile. Thus, until May 2023, 554,236 metric tons of Jack mackerel have been caught in the Chilean EEZ, which corresponds to 77% of the national TAC. It is highlighted that as of 2020, the catches of Jack mackerel come entirely from the Chilean EEZ.



**Figure 10.** Total annual Jack mackerel catch within the Chilean EEZ and the SPRFMO area for the period 2013 – May 2023 (Source: SPRFMO, 2023a).

## Seasonality of Catches

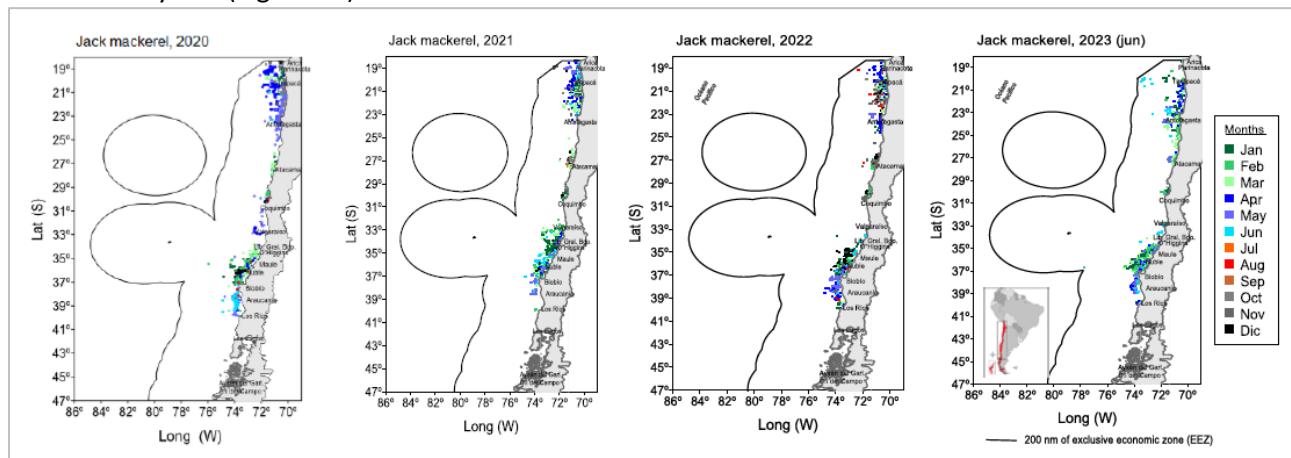
The largest catches of Jack mackerel for the 2018-2022 period have been recorded in the first half of each year (80% on average). Thus, until May 2023, catches reached 554,236 tons within the Chilean EEZ, representing 77% of the national TAC (Figure 11).



**Figure 11.** Seasonality of the Jack mackerel catches by the purse-seine fleet for the period 2018 - May 2023 (Source: Source SPRFMO, 2023a).

## Spatial Distribution of Catches

Since 2020, the spatial distribution of the Jack mackerel catches in the center-south zone of Chile have been concentrated near the coast, within 100 nm. Likewise, in the northern part of the country the captures of this resource have also been concentrated near the coast, on average within the first 50 nm, initially associated with the operation of the fleet directed to Anchovy, transiting to target fishing of Jack mackerel towards the most recent years (Figure 12).



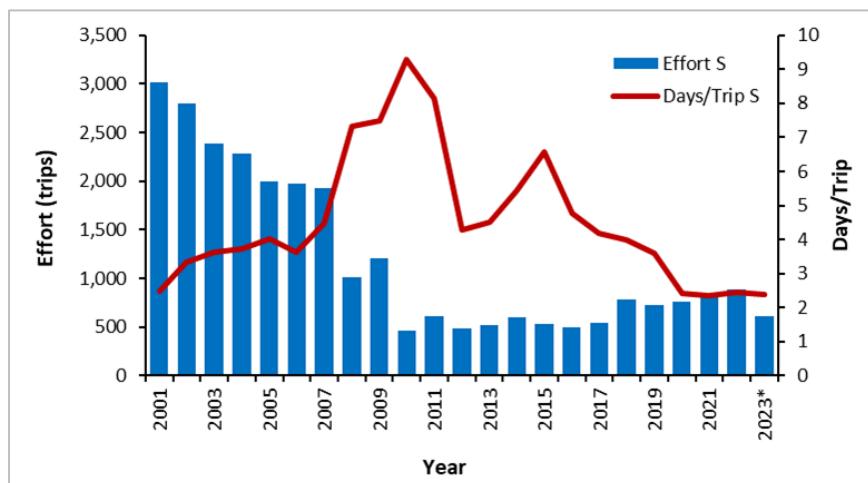
**Figure 12.** Spatial-temporal distribution of the industrial purse seine fleet targeting Jack mackerel for the 2020-2022 and Jun 2023 period (Source SPRFMO, 2023a).

## Effort and CPUE for Jack mackerel fishery

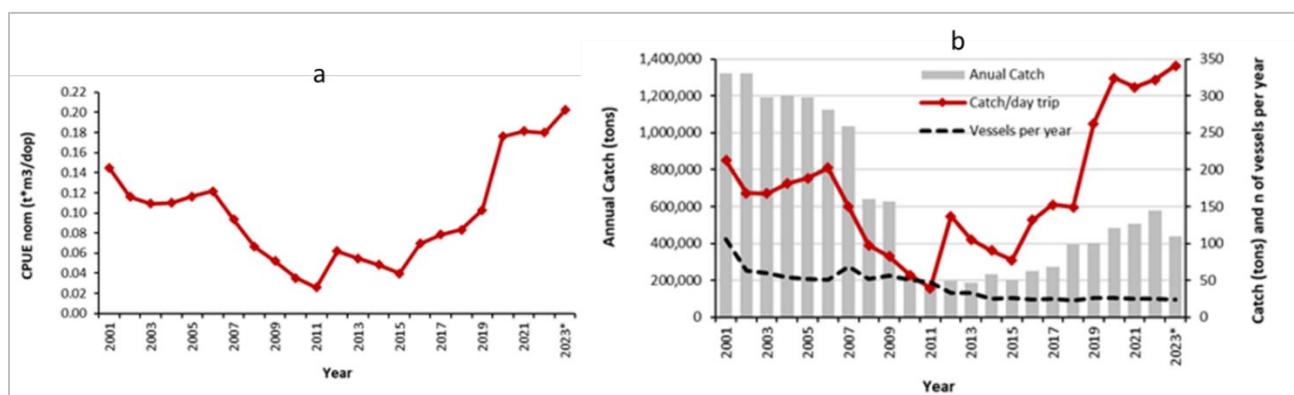
The information in this chapter is referred to the fleet targeting Jack mackerel that operates in the center south zone of the country. Catches, effort and CPUE were calculated for each trip where Jack mackerel represented over 50% of the total catch's species composition.

Until 2010, an increasing trend in the average length of the fishing trips has been observed (Figure 13), which is explained by the distances of the Jack mackerel's fishing grounds from the coast. Later, during 2012 and 2013, the catches were concentrated within the Chilean EEZ, condition that reduced considerably the average length of the fishing trips by 50%. In 2015, the catches were again obtained outside the Chilean EEZ, increasing the average length of the fishing trips to around 7 days. For the period 2016 to May 2023, the total number of fishing trips showed an upward fluctuation, while the average length of fishing trips showed a downward trend and a relative stability towards the end of the series, because catches have concentrated near the coast, within the first 150 nm.

Regarding the standardized CPUE, measured as the rate of use of the fleet's carrying capacity (catch / (hold capacity displaced x length of fishing trip)), it has shown a decreasing trend between 2001 and 2011. Subsequently, in 2012, this indicator changed this trend, increasing over time. This condition is explained by a decrease in the average length of the fishing trips, as a result of changes in the spatial distribution of the resource (Figure 14a). This trend has continued (Figure 14b), and has become more evident in recent years, when a reduction in the number of vessels operating has been associated to an increase in both fishing yields and total landings.



**Figure 13.** Effort in number of fishing trips with catch (blue), and length of fishing trips in days (red) for the purse seine fleet in the center-southern zone targeting Jack mackerel, period 2002 to May 2023 (preliminary; Source: SPRFMO 2023a).



**Figure 14.** a) Nominal CPUE for the purse seine fleet in the center-southern zone targeting Jack mackerels and, b) Total catch per year (grey bars), catch per day of fishing trips (red line) and number of vessels with catch of Jack mackerel for the purse seine fleet in the center-southern zone, period 2001 to May 2023 (preliminary; Source: SPRFMO, 2023a).

### Biological sampling, length and age composition of the catch

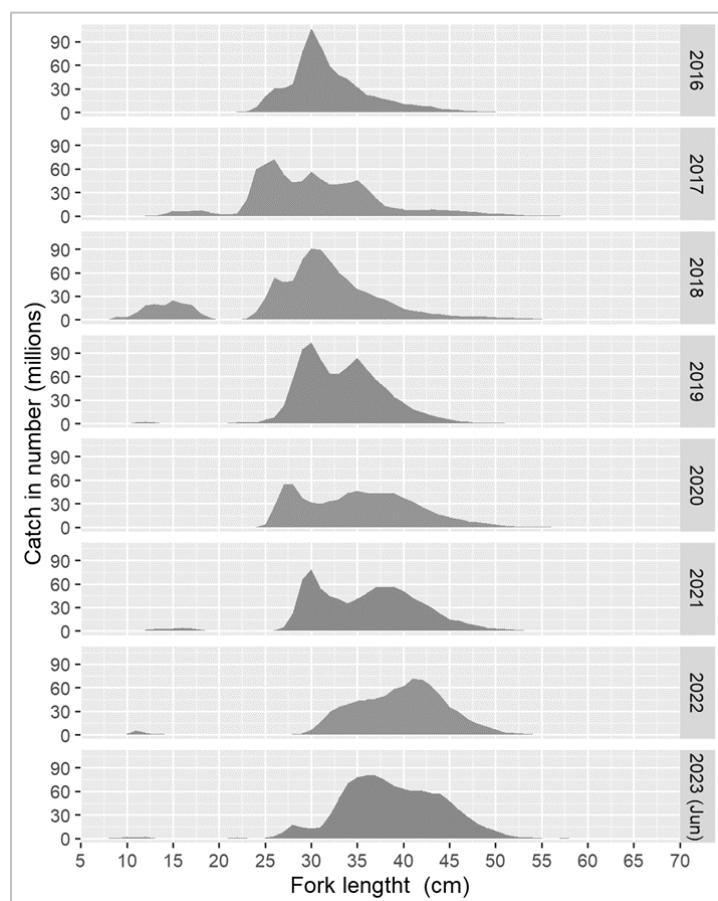
The biological information for Jack mackerel and its associated species is obtained on a regular basis from samples collected along the Chilean coast. Sampling is conducted on a daily basis, mainly at landing sites and processing plants and is also complemented with information gathered by scientific observers onboard fishing vessels. The information collected includes fork length measurements, otolith collection, total weight, gutted weight, gonad weight, and sex and maturity stages.

In 2022, a total of 64,580 specimens of Jack mackerel were sampled of which 18,559 were used to collect biological samples. For the industrial fleet, samples included at-sea sampling as well as port sampling, covering the entire range of activities reported for this fishery in Chile. The main landing ports were Antofagasta and Coquimbo in the northern area and, Talcahuano and Valdivia in the center-south area of the fishery.

### Length and age composition of the catches

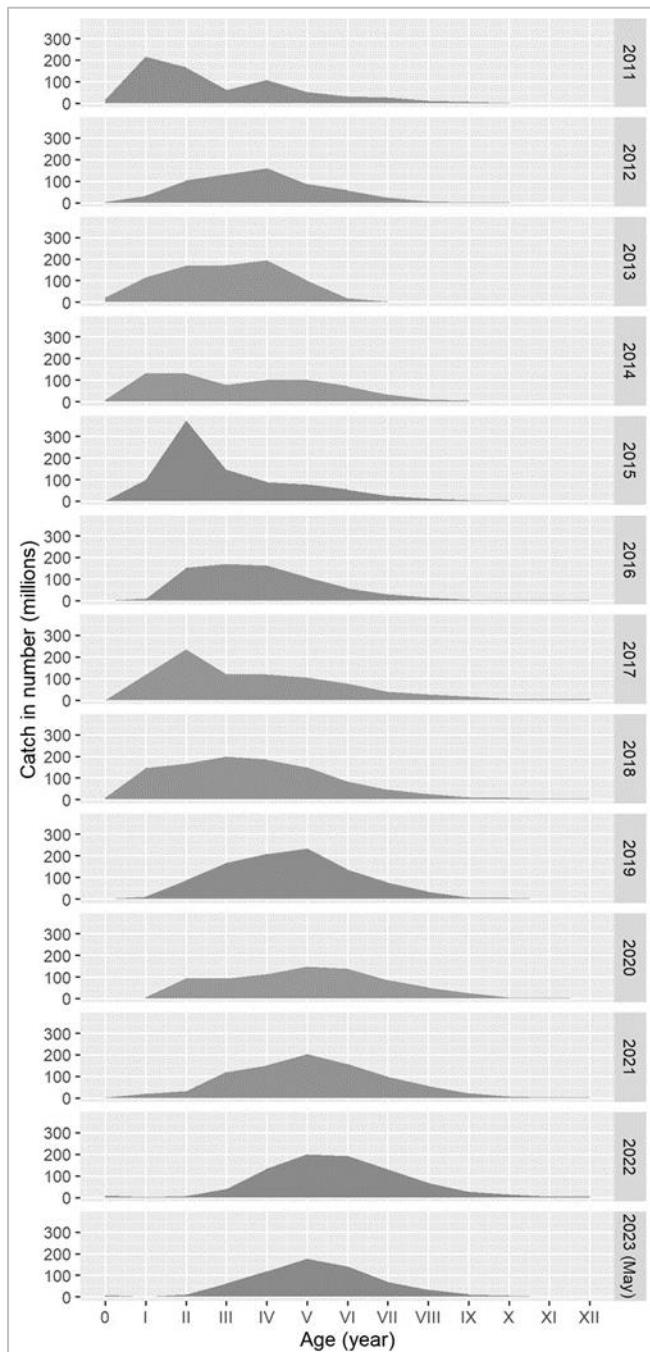
Since 2016, size-structured catches of Jack mackerel have shown a wide range of sizes, between 8 and 67 FL cm, with main modes fluctuating between 26 and 41 FL cm, and with larger values towards the end of the series (Figure 15).

During the first semester of 2023, the size-structured catch of Jack mackerel has ranged from 8 to 66 cm in FL, with a main mode of 37 cm in FL, and a low participation of immature individuals in catches, since operations in the northern part of the country have fluctuated in individuals around a main mode centered on 40 FL cm.



**Figure 15.** Length structure of Jack mackerel's catches for the period 2016 - June 2023 (Source: SPRFMO, 2023a).

Since 2011, age-structured Jack mackerel catches according to the new age group allocation criteria have shown a wide range of ages, with main modes fluctuating between age groups I to IV in the period 2011- 2018. Then, starting in 2019, the main mode of catches shifted to age group V (Figure 16).



**Figure 16.** Catch age-structured in number of Jack mackerel (using the new age assignment criteria), period 2011 to May 2023. Source: SPRFMO 2023a

### 10.1.2 Stock Assessment

Chilean Jack mackerel *Trachurus murphyi* was most recently assessed in 2023 as part of the 11<sup>th</sup> annual SPRFMO Scientific Committee meeting. The stock assessment followed from a benchmark workshop SPRFMO\_SCW14. 2022. During the SW14 benchmark, scientists from around the globe met to review the input data, evaluate and revise the assessment model, and develop and interpret model diagnostics to provide guidance on the best available science for the updated stock assessment (SPRFMO, 2023b).

The assessment was produced using the Joint Jack Mackerel (JJM) statistical catch-at-age model. This model was adopted as the assessment method in 2010. The Joint Jack Mackerel model (JJM) used by the SC to assess Jack mackerel stocks, recognizes four distinct fleets. Fleet 1 is a coastal purse seine fishery in northern Chile. Fleet 2 is a purse seine fishery in central-south Chile that extends into the high seas. Fleet 3 combines the far-north coastal purse seine fisheries occurring in the EEZs and Territorial waters of Ecuador and Perú. Finally, Fleet 4 corresponds to the offshore trawl fleet operating solely in the SPRFMO Area (SPRFMO, 2023b).

### Main Management Units

At least five management units of Chilean Jack mackerel associated to distinct fisheries are identified in the SE Pacific: the Ecuadorian fishery, which is managed as part of a more general pelagic fishery within the Ecuadorian EEZ; the Peruvian fishery, which is managed as part of a Jackmackerel, mackerel and sardine fishery directed exclusively for direct human consumption taking place almost entirely within the Peruvian EEZ; the northern and the central-southern Chilean fisheries which are managed as separate management units, with the northern fishery being mostly within the Chilean EEZ and the central-southern Chilean fishery which straddles the Chilean EEZ and the adjacent high sea; and, the purely high sea fishery which is a multinational fishery being managed entirely within the context of the SPRFMO. At present there is no directed fishery for Chilean Jack mackerel in the central and western South Pacific and around New Zealand, where incidental catches are very small.

### Stock Structure

There are a number of competing stock structure hypotheses, and up to five and more separate stocks have been suggested: i) a Peruvian stock (northern stock) which is a straddling stock with respect to the high seas; ii) a Chilean stock (southern stock) which is also a straddling stock with respect to the high seas; iii) a central Pacific stock which exists solely in the high seas; iv) a southwest Pacific stock which exists solely in the high seas; v) and, a New Zealand-Australian stock which straddles the high seas and both the New Zealand and Australian EEZs. Regarding specifically the eastern and central South Pacific, the SPRFMO has identified the following four alternative stock structure working hypotheses: 1) Jack mackerel caught off the coasts of Perú and Chile each constitute separate stocks which straddle the high seas; 2) Jack mackerel caught off the coasts of Perú and Chile constitute a single shared stock which straddles the high seas; 3) Jack mackerel caught off the Chilean area constitute a single straddling stock extending from the coast out to about 120°W; and, 4) Jack mackerel caught off the Chilean area constitute separate straddling and high seas stocks. (SPRFMO, 2023b).

Accordingly, the Jack mackerel Sub-group (JMSG) of the Science Working Group (SWG) of the SPRFMO at its 11<sup>th</sup> Session (SWG-11) carried out parallel assessments of the Jack mackerel stock(s) in the Eastern South Pacific under the two main working hypotheses already identified. That is: Jack mackerel caught off the coasts of Perú and Chile constitute a single shared stock which straddles the high seas (hypothesis 1); or that Jack mackerel caught off the coasts of Perú and Chile each constitute separate stocks (the Peruvian or northern and the Chilean or southern stock) which straddle the high seas (hypothesis 2). In following up on the SWG-11 recommendations, the SPRFMO Commission at its 1st Commission Meeting requested the newly established Scientific Commission (SC) to continue the work on evaluating alternative hypotheses on Jack mackerel stock population. Pending more conclusive findings on the stock population structure of Jack mackerel, the 2nd Commission meeting requested the SC to continue and expand the stock assessment work

under both stock hypotheses considered in the 11<sup>th</sup> SWG Meeting, and this continues to be one of the main tasks undertaken at SC11.

### Description of the model

The JJM (Joint Jack mackerel Assessment Model) is an explicit age-structured model that uses maximum likelihood for the estimation of key parameters that modulate the population dynamics of Jack mackerel in the SPRFMO convention area.

The process of population dynamics is defined by the standard equation of capture with various modifications such as those described by Fournier and Archibald (1982), Hilborn and Walters (1992) and Schnute and Richards (1995). This model was adopted by the SPRFMO as a method of population evaluation of jack mackerel and has been used since 2010. Since the adoption of the JJM model, it has been improved and the most notable components have been the option to include size composition data and the ability to estimate natural mortality by age and time. With this versatility, the model is more flexible and allows the use of catches in age or size for varied fleets and explicitly incorporate regime changes in the productivity of the population. The model consists of 4 components: (i) population dynamics, (ii) farm dynamics, (iii) observational models for the data, and (iv) the parameter estimation procedure.

Population dynamics assume that recruitments occur in January, while the spawning season is considered an instantaneous process in mid-November. Population age structures cover an age range between 1 and 12+ years and include a stochastic stock-recruit B-H ratio (Beverton and Holt, 1957). Mortality by age is composed of the sum of fishing mortalities by age-fleet and natural mortality, the latter assumed constant over time and between ages. The model is aggregated spatially even though the fisheries are geographically distinct. The initial population is based on an equilibrium condition and occurs in 1958 (12 years before the start of the model in 1970).

The dynamics of exploitation consider the interaction of fleets with the population through fishing mortality. Fishing mortality is assumed to be an aggregate of several separable fleet selectivity processes, which describe the specific age pattern of fishing mortality, catchability that scales fishing effort units to fishing mortality, and effort deviations, which are a random effect on fishing effort in relation to mortality. Selectivity is non-parametric specific by fishing fleet and time-variant. Catchability is fixed for each series of indices, however, some variations over time have been considered in some of these (e.g., acoustic biomass of Perú and Chile (south) and the CPUE of southern Chile).

The observational model distinguishes four data components that contribute to the total likelihood function: fleet catch data, age frequency data, size frequency data, and abundance indices. The observed total catch data is assumed to be unbiased and relatively accurate with a residue CV of 0.05. The probability distributions for the proportions of age and height frequency are assumed to be distributed multinomially. Sample sizes are specific to each fleet, but constant for years. For catches per fishery (4) and abundance indices (9) the log-normality assumption with constant CV but different per fishery is used.

**Table 21.** Years and types of information used in the JJM assessment models.

Fleet	Catch-at-age	Catch-at-length	Landings	CPUE	Acoustic	DEPM
1 North Chile purse seine	1980-2023	-	1970-2023	-	Index: 1984-1988; 1991; 2006-2021, 2023 Age comps: 2006-2007, 2009; 2013-2021, 2023	-
2 South-central Chile purse seine	1980-2023	-	1970-2023	1983-2023	1997-2009 Age comps: 2001-2009	Index: 1999-2001; 2003-2008 Age comps: 2001; 2003-2006, 2008
3 FarNorth	-	1980-2023	1970-2023	2002-2023	1985-2008; 2010-2013	-
4 International trawl off Chile	2015-2023	2015-2023*	1970-2023	China, EU, Korea, Russia, & Vanuatu (2008-2022)	-	-

\* Are converted to age using age-length keys of central-southern area off Chile, the EU, and Russia.

The parameters of the model are estimated by maximizing the log-likelihood of the data together with a priori probabilities together with the penalties. The estimation is done in a series of phases, the first of which uses arbitrary starting values for most parameters. The model has been implemented in ADMB language, the characteristics of which can be consulted in Fournier *et al.* (2012).

The most notable general characteristics of the model are the following:

- All indices are assumptions proportional to biomass.
- The selectivities of each fleet are variable by year and age.
- The size compositions of Fleet 3 are modeled considering the growth parameters of jack mackerel in Perú.
- The steepness of the stock-to-recruit ratio is set  $h=0.65$  and the standard error of the S/R ratio is assumed to be  $\sigma_R=0.6$ .

To update the stock assessment, the technical agreements made in 2022 at the SPRFMO benchmark workshop (SPRFMO\_SCW14. 2022) were used, which correspond to:

#### A. Age composition of fisheries and research cruises.

- New age compositions for Chilean fleets (Central, South and North) based on the new age assignment criteria. New weights by age were also used in the catch information.
- New age compositions for the offshore fleet, partly taking into account the new Chilean age-length keys (ALK), with truncation of the time series to 2015-2020.
- Data from EU "self-sampling" were included.
- The two age compositions of Chilean acoustic studies based on the new age assignment criterion.
- The weighting of the data on the MPH cruises in Chile was strongly lowered because the new age assignment criterion has not yet been applied to these data.

#### B. Research cruise data and CPUE-based indexes.

- A progressive increase in the efficiency of fishing effort called "effort creep" has been applied to the standardized CPUE series. For the offshore fleet, a 2.5% effort creep was applied based on Rousseau *et al.* (2019). For the Chilean and Peruvian fleets, 1.0% was used as an interim initial value. However, this will depend on further revisions before the next SC meetings.
- The CVs of the index data were evaluated and reviewed, and the values were chosen based on expert opinion.

#### C. Natural mortality

- A value of 0.28 was established for all ages and all years for the single stock model and for the southern stock of the two-stock model. The value was derived from the mode of M-values estimated with multiple methods using a natural mortality toolbox.

#### D. Maturity

- Maturity vector by age of SCW14-WD04\_2022, estimated using Jack mackerel data in Chile between September 2011 and January 2012 using the new age assignment criteria for the single-stock model and for the southern stock of the two-unit stock model.

E. Weights at the age of the stock.

- A weight-for-age vector derived from the average weight-for-age catch of Chilean fleets during the fourth quarter between 1995 and the current year, for the single-stock model, and for the southern stock in the two-stock model.

F. Weighting of compositions by age

- Justification of why iterative reweighting has been carried out.
- Francis (2011) weights of the effective sample size for age compositions have been derived for the single-stock model. These weights will remain constant until a future benchmark is made. The same will also apply weights in the two-stock model.

G. Productivity regimes.

- Schemes for the calculation of reference points.
- Schemes for calculating the phase of low recruitment.
- Average recruitment in a short period (2001-2015 due to the change in age assignment that affected the period of low recruitment).
- Low (0.65) and high (0.8) values of the slope ("steepness") to estimate the state of the stock.
- Only the lowest value of steepness = 0.65 for the estimation of F\_MSY.

H. Reference Points

- With a slope ( $h$ ) set at 0.65, the workshop proposed that the SC consider using Blim (in units of biomass spawned from females) as a reference point defined as the biomass below which recruitment damage is likely to occur. Blim is estimated as the minimum of the ratio of spawning biomass (SSBt) to unexploited spawning biomass (SSB f=0, t, adjusted for stock-to-recruit ratio). The ratio estimated during the benchmark was 8% and this estimate seems robust to sensitivity analyses.
- The workshop recommended that the SC use BMSY (also expressed as reproductive biomass) as estimated and conditioned on variable growth that has changed slightly over time.
- F\_MSY is also conditional on changes over time (including selectivity estimates).
- The final model (h1\_1.07) used by SC11 was the same model used in SC10 updated with data up to 2023, and with two modifications: 1) updating the weights to the age of the Peruvian data, and 2) halving the weighting of the last year of the offshore fleet abundance index.

To carry out the biomass and catch projections, the procedures agreed in 2022 at the SPRFMO benchmark workshop were applied:

- A. To use a slope of the stock-to-recruit ratio ( $h$ ) equal to 0.65.
- B. The workshop concluded that, given the environmental conditions and uncertainty in recent recruitment peaks, advice on stock projections should be based on the current low-productivity regime. Therefore, the period over which low productivity is calculated (for the stock-recruit curve estimation) has been updated, due to the new age assignment criterion, and is now 2001-2015.

Equilibrium-based reference points are calculated within the jjm model. The model estimates values of MSY and FMSY using a Newton-Raphson minimization routine that finds the value of fishing mortality, given the terminal year relative catches (and selectivities-at-age) by fleet, and the terminal year weights-at-ages for each fleet, that maximizes catch. Since weights-at-age and "effective" selectivity change each year, these values can vary. MSY is thus defined as the maximum amount of catch that allows the remaining stock to generate sufficient recruitment to maintain the population at the same level. BMSY is taken as the long-term average of biomass fished under MSY. Between 2013 and 2021, a provisional BMSY level of 5.5 million tons was instated based on an analyses executed at SC03. In SCW14\_2022, the provisional management reference point for BMSY was revised to a ten-year average of the model-estimated BMSY. A limit reference point Blim (where B refers to spawning biomass) for the single-stock hypothesis was also developed during SCW14\_2022. Blim

was defined as the spawning biomass level below which recruitment would likely be impaired. As such, there should be no fishing when the current spawning biomass is estimated to be below Blim. For Jack mackerel, Blim was computed from the lowest ratio of historical spawning biomass relative to the most-recently-estimated unfished spawning biomass. In SCW14\_2022, this ratio was estimated to be 8% of the unfished spawning biomass

### **Models for Stock Structure Hypothesis**

During SWG11, two types of population structure were evaluated, and this was continued for subsequent evaluations. Beginning in 2020 (SC8), models under the one-stock hypothesis carry “h1” in front of the model number, models under the two-stock hypotheses carry “h2” in front of the model number.

During the SPRFMO Jack mackerel Benchmark Workshop (SCW14\_2022), the single-stock and two-stock hypothesis implementations of the JJM assessment model, projections, environmental regimes, and reference points were reviewed. It was noted that there was a stronger retrospective pattern in the southern stock in the 2-stock model than in the single stock model. This could perhaps be explained by fish from the southern stock recruiting to the northern stock, thereby creating an overestimation of SSB. Regarding the retrospective pattern, it was suggested that the two-stock model may be unable to reconcile the recent increase in the Peruvian CPUE data with a lack of recruitment in the northern area. Due to the strong retrospective pattern in the two-stock model, it was suggested that – until the management strategy evaluation (MSE) has been completed - the one-stock model should preferably be used for management advice.

The SC agreed that over the 14 SPRFMO SC10-Report coming year additional work should be devoted to the two-stock model to better understand the reasons behind the lack of fit and patterns in the retrospective and this would best be carried out as part of the MSE for Jack mackerel.

Therefore, for the 2023 Jack mackerel stock assessment, although estimates were obtained under the 2-stock hypothesis, the advice was preferentially based on the estimates obtained under the single-stock hypothesis. Thus, the assessment will be evaluated by the results of the single-stock hypothesis model.

### **Description of Model Explorations**

As SC11 was an update assessment, the main model explorations involved incrementally adding new data components relative to the model and data adopted from SC10. These are labelled “h1\_0.x” and “h2\_0.x”, where h1 and h2 represent the stock structure hypothesis and x represents the number when a component was added.

### **Retrospective analysis and likelihood profile for long-term mean recruitment (R0)**

Retrospective patterns are systematic inconsistencies between series of population size estimates based on incremental periods of data (Mohn, 1999). In practice, the presence of a retrospective pattern suggests that a consistently under- or over-estimating spawning biomass in the last year, thereby impacting model-based decisions (Szuwalski *et al.*, 2014, 2017).

The possible causes of these patterns are inconsistency in the data and/or temporal changes in population processes that the model has not taken into account (Szuwalski *et al.*, 2014, 2017).

The exploration of possible specification errors of the hake assessment model was carried out through retrospective analysis (Mohn, 1999) of the estimates of spawning biomass, fishing mortality and recruitment.

The description of the results of the retrospective analysis was complemented by calculating the metric rho ( $\rho$ ), introduced by Mohn (1999) to describe the degree of retrospectivity.

$$\rho = \sum_{y=y_0}^{Y-1} \frac{S_{y,y} - S_{y,Y}}{S_{y,y}},$$

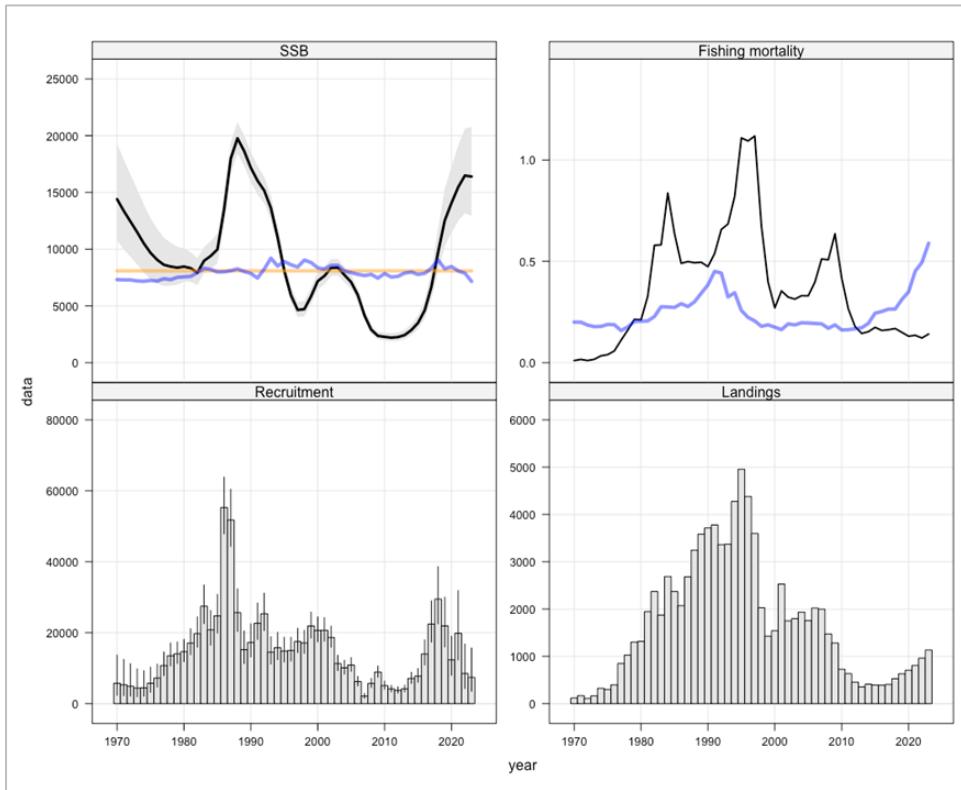
where  $y_0$  and  $Y$  are the first and last years for which the retrospective pattern was assessed. Recall that  $S_{y,Y}$  is the estimate of stock size in year  $y$  based on all catch and other stock data up to year  $Y$ . If the retrospective estimates for year  $y$  based on data only up to year  $y$  (i.e.,  $S_{y,y}$ ) for  $y=y_0, \dots, Y-1$  fluctuate randomly about  $S_{y,Y}$ , then  $\rho$  is approximately zero.

## Results

Figure 17 show a summary of the state of the Jack mackerel stock based on the levels and trends of spawning biomass, fishing mortality, recruitment and landings. The spawning biomass had a general downward trend from 1970 to 2012, with wide fluctuations that include the historical maximum of 20 million t in 1988, then from 2013 the trend reverses, reaching 16 million t in 2023, a value similar to that of 1991. The dynamically estimated spawning biomass in the MSY (blue line in Figure 17) remained relatively stable over the years between 5 and 6 million t.

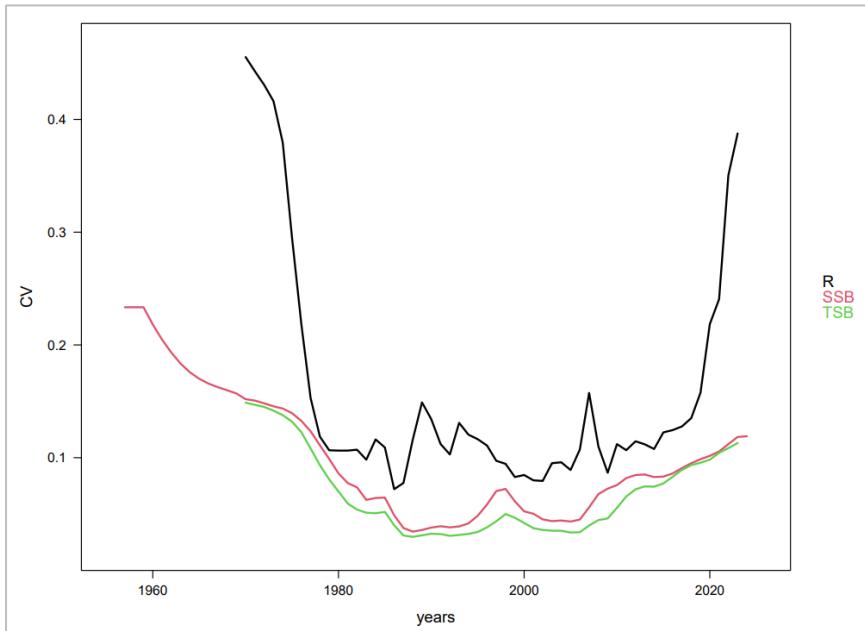
Global fishing mortality rates (combined fleets) presented three historical peaks (1974, 1997, 2009) and a decreasing trend from 2009 to 2022, decreasing to values as low (0.01) as those estimated for the beginning of the eighties. The dynamically estimated  $F_{MSY}$  fluctuated over the years, reflecting changes in recruitments, landings, and changes in selectivity patterns. Since 2012, the  $F_{MSY}$  has had an increasing trend, reaching its maximum value in 2023.

In the annual fluctuations of recruitments, three periods were identified: 1) high recruitments in 1980-2000, with the historical maximum in 1986-1987, 2) low recruitments in the period 2003-2015, and 3) recruitments that increase in 2016-2018, reaching the second historical maximum in 2018, and then decrease in 2019-2023, resuming the low levels of the second period.



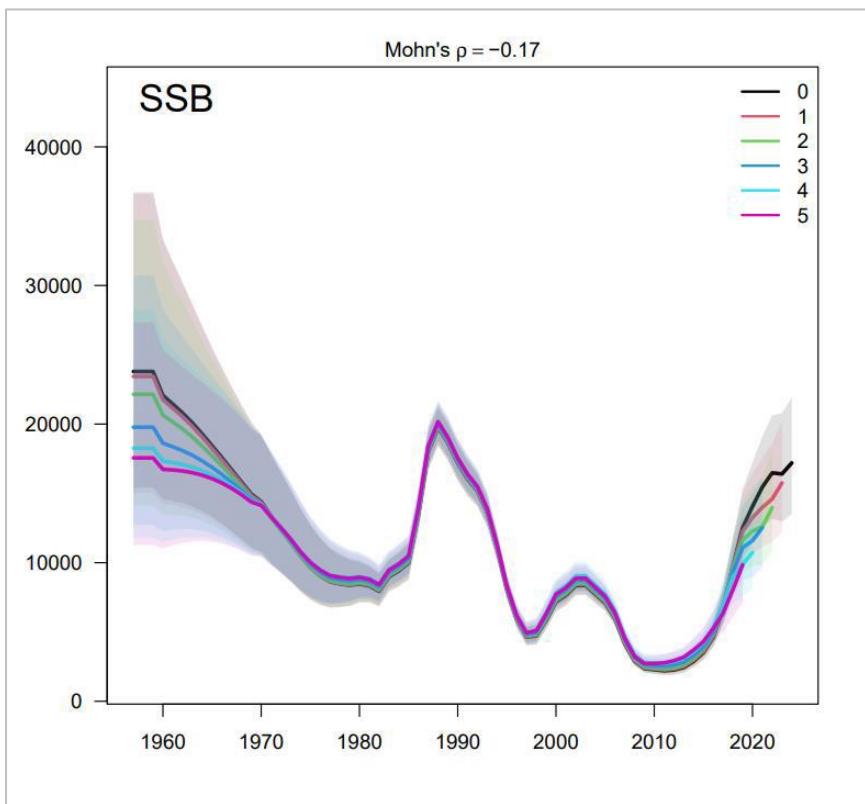
**Figure 17.** Model h1\_1.07 (single-stock hypothesis) summary estimates over time showing spawning biomass (kt; top left), recruitment at age 1 (millions; lower left), total fishing mortality (top right), and total catch (kt; bottom right). Blue lines represent dynamic estimates of *BMSY* (upper left) and dynamic estimates of *FMSY* (upper right). The orange line represents the average *BMSY* over the most recent ten year (Source: SPRFMO, 2023b).

The uncertainty (CV = coefficients of variation) of the estimates of the main variables is shown in Figure 18, which was characterized by being higher towards the beginning and at the end of the series of years. In the case of recruitment, the fluctuations were large with a U-shaped trend, which stands out for very high values (CV=0.4) in recent years. On the other hand, total and spawning biomasses were estimated with similar uncertainty, being in recent years (CV=0.1) close to half of the uncertainty of the initial years.

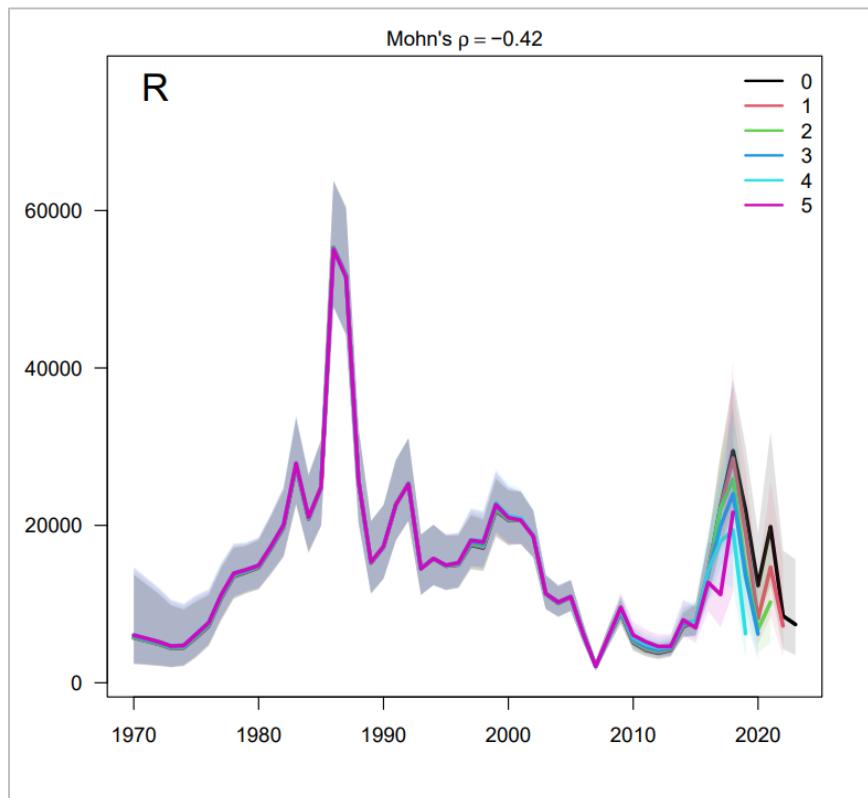


**Figure 18.** Uncertainty (CV= coefficients of variation) of the estimates of recruitments (R), total biomass (TSB) and spawning biomass (SSB) (Source: Payá, 2024).

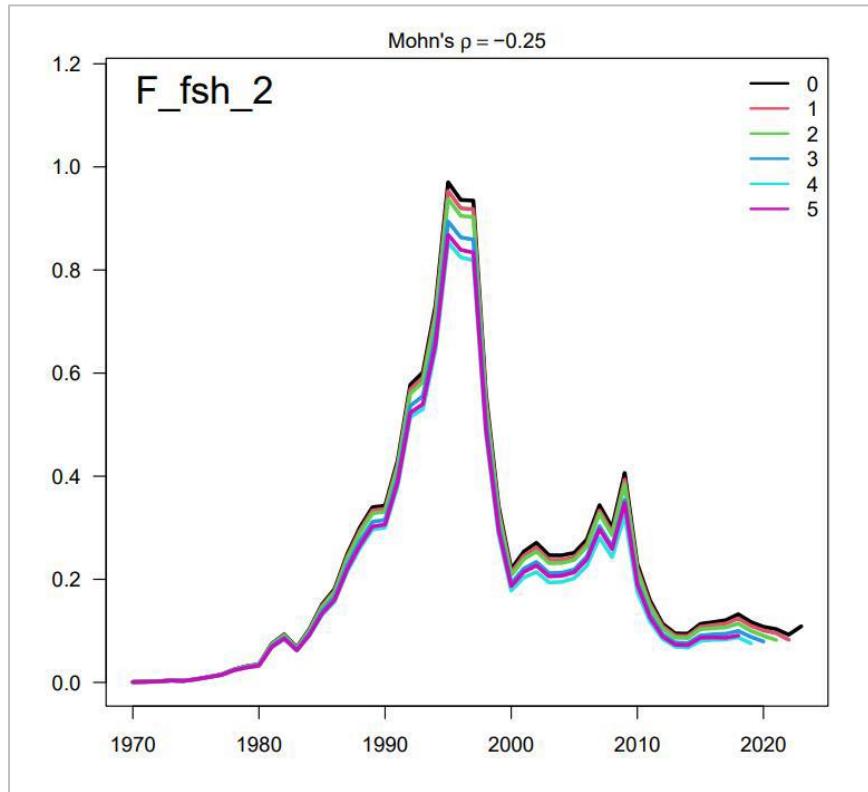
The model had a good retrospective behavior, the values of the Mohn parameter (Mohn, 1999) were small and negative, indicating a small tendency to underestimate the spawning biomass (Figure 19), recruitments (Figure 20) and fishing mortality of the Industrial purse seine fleet of the central-south zone (Figure 21).



**Figure 19.** Retrospective analysis of spawning biomass (Source: SPRFMO, 2023b).



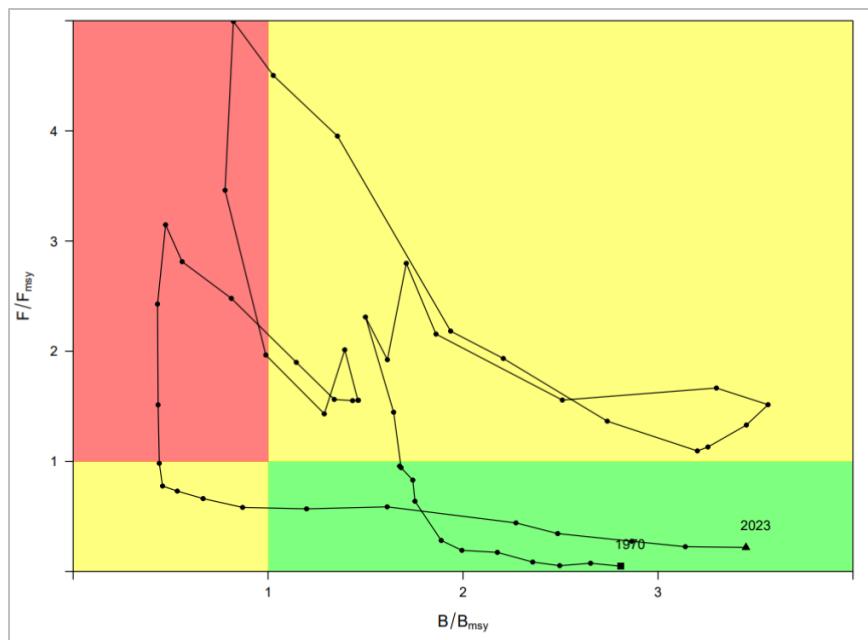
**Figure 20.** Retrospective analysis of recruitment (Source: SPRFMO, 2023b).



**Figure 21.** Retrospective analysis of fishing mortality in the south-central fleet of Chile (Source: Payá, 2024).

## Stock status

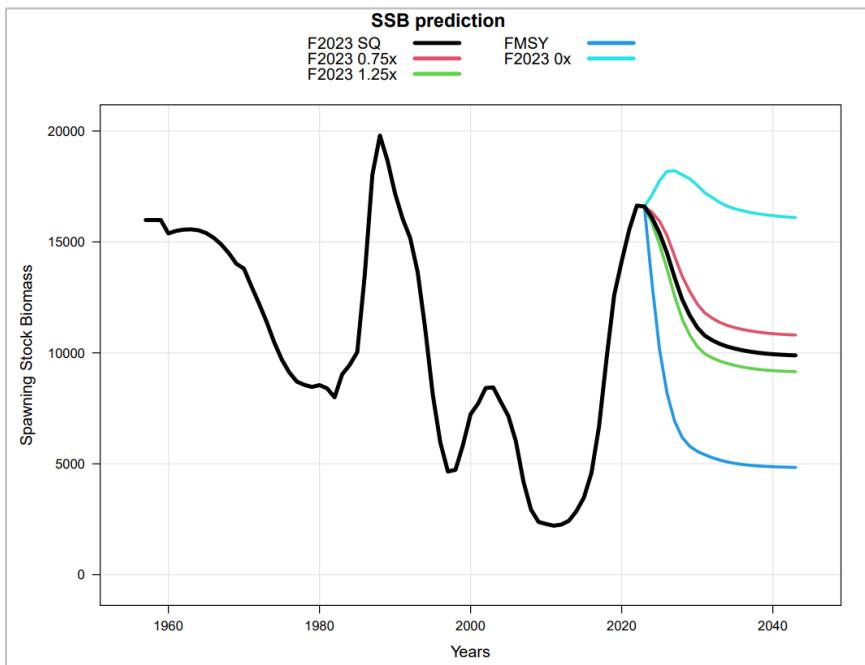
The exploitation condition of Jack mackerel is based on a system delineated by Biological Reference Points (BRPs) based on the MSY. This reference system allows the occurrence of overfishing ( $F > F_{MSY}$ ), overexploitation ( $SB < SB_{MSY}$ ) and under exploitation ( $F < F_{MSY}$  and  $SB > SB_{MSY}$ ) to be represented in a graphical scheme (called the Kobe graph) (Figure 22). The exploitation status of Jack mackerel in the eastern South Pacific in 2023 is under exploited.



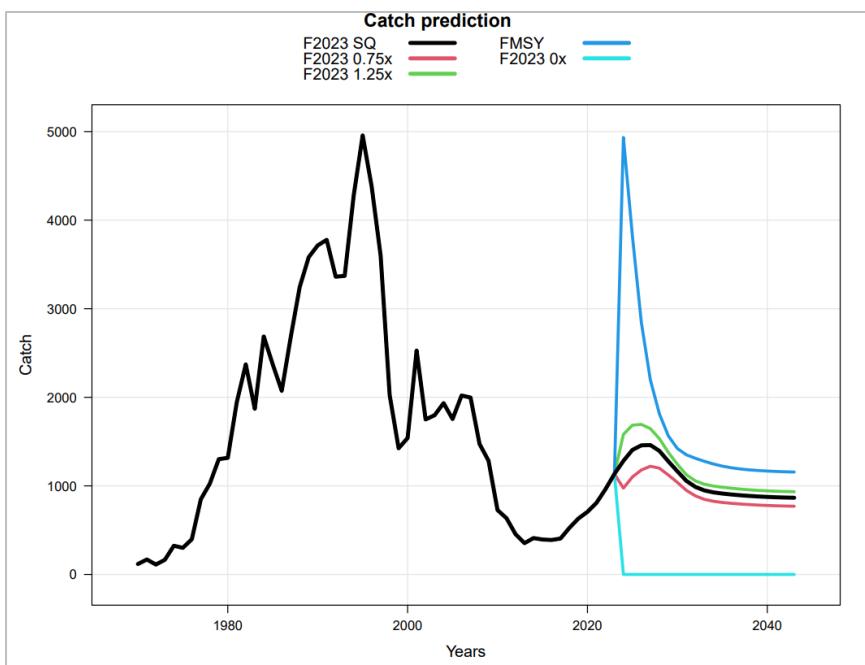
**Figure 22.** Stock status diagram (“kobe plot”). F= Fishing Mortality, B= Spawning Biomass, MSY= Maximum Sustainable Yield (Source: SUBPESCA, 2024).

## Stock projections

Projections of spawning biomass show that, if fishing were suspended, the stock would reach its initial biomass in 2043, while if the 2023 F is maintained, biomasses will decline to stabilize at 10 million t from 2035 (Figure 23). Increasing the F2023 by 25% or decreasing by 25% would not generate major impacts on the level of spawning biomass. The application of  $F_{MSY}$  would produce a sharp decrease in spawning biomass in the first 10 years of projection, to then stabilize at 5 million t, half of what would be produced with the F of 2023. On the other hand, when applying the  $F_{MSY}$  the 2024 catch would reach 4.9 million tonnes, then fall exponentially for approximately 5 years, and then stabilise at a level close to 1.2 million tonnes (Figure 24). These notable changes in the first years of the projection are due to the fact that the age structure of the stock in 2023 has a significant component of individuals that still have some time to grow in weight and contribute to biomass and catch, and that then when they recruit and the projected recruitments enter (condition of low recruitments) the levels of these variables will be adjusted downwards



**Figure 23.** Projections of spawning biomass for the period 2024-2043, assuming low recruitments and applying a strategy of constant fishing mortalities over the years. Different levels of F are projected that are multiples (0.0, 0.75, 1 or SQ, 1.25) of F2023 and F=F\_MSY (Source: Payá, 2024).



**Figure 24.** Projections of the total catch (in thousands of tonnes) for the period 2024-2043, assuming low recruitments and applying a strategy of constant fishing mortalities over the years. Different levels of F are projected that are multiples (0.0, 0.75, 1 or SQ, 1.25) of F2023 and F=FMSY (Source: Payá, 2024).

#### Advice

Catch with F\_MSY for 2024 and with Harvest Control Rule with stabilization rule.

The total catch resulting from applying the F\_MSY for 2024 was estimated at 4.9 million tonnes and for 2025 at 3.8 million tonnes (Table 22). In line with the “adjusted Annex K” rebuilding plan (SC2), catch advice relative to the previous year can only increase by a maximum of 15%. This results in advice of a 2024 catch level for

Jack mackerel within the entire Jack mackerel range to be at or below 1,242,000t t. In all scenarios, high probabilities were projected that the biomasses will be greater than the biomass in the MSY, except when the F\_MSY is projected where the probabilities drop to 45% in 2029 and 40% in 2023, this is expected since, in the long term, the probability should be close to 50%, that is, close to the median.

**Table 22.** Scenarios of projections under different strategies of exploitation of mortality by constant fishing (first column). The catches are projected for the years 2024 and 2025 (C thousand t), the spawning biomasses for the years 2025, 2029 and 2033 (B in thousands of t) and the probabilities (P) that these biomasses will exceed B\_MSY (Source: SPRFMO, 2023b)

Catch Scenario	Catch 2024 (kt)	Catch 2025 (kt)	B <sub>2025</sub>	P(B <sub>2025</sub> > B <sub>MSY</sub> ) %	B <sub>2029</sub>	P(B <sub>2029</sub> > B <sub>MSY</sub> ) %	B <sub>2033</sub>	P(B <sub>2033</sub> > B <sub>MSY</sub> ) %
F = 0	0	0	18415	100	20915	100	22109	100
F = F <sub>2023</sub>	1280	1405	16058	100	14450	97	14537	94
F = F <sub>MSY</sub>	4880	3807	10866	94	7766	45	7432	40
F=F <sub>2023</sub> x 0.75	973	1100	16594	100	15599	98	15756	96
F=F <sub>2023</sub> x 1.25	1579	1684	15551	100	13491	94	13539	91
TAC = TAC <sub>2023</sub>	1080	1207	16255	100	12377	95	11013	83
TAC = TAC <sub>2023</sub> +15%	1242	1367	15470	100	11821	92	10515	79
TAC = TAC <sub>2023</sub> +20%	1296	1419	15377	100	11646	91	10361	78

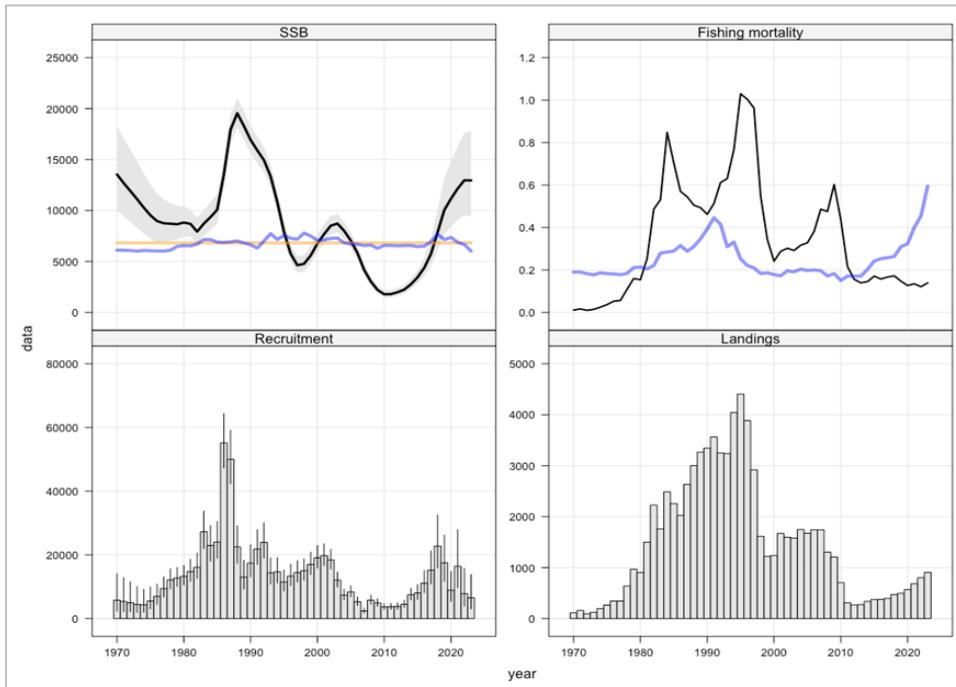
#### Comparison of one-stock and two-stock hypotheses

In conformity with the approach by the SC since 2012, a comparison was made between the 1-stock and 2-stocks model configurations. The 2 stocks hypothesis model showed similar trends with similar overall biomass levels, and a decline in recruitment in recent years. Fishing mortality remains low and below FMSY.

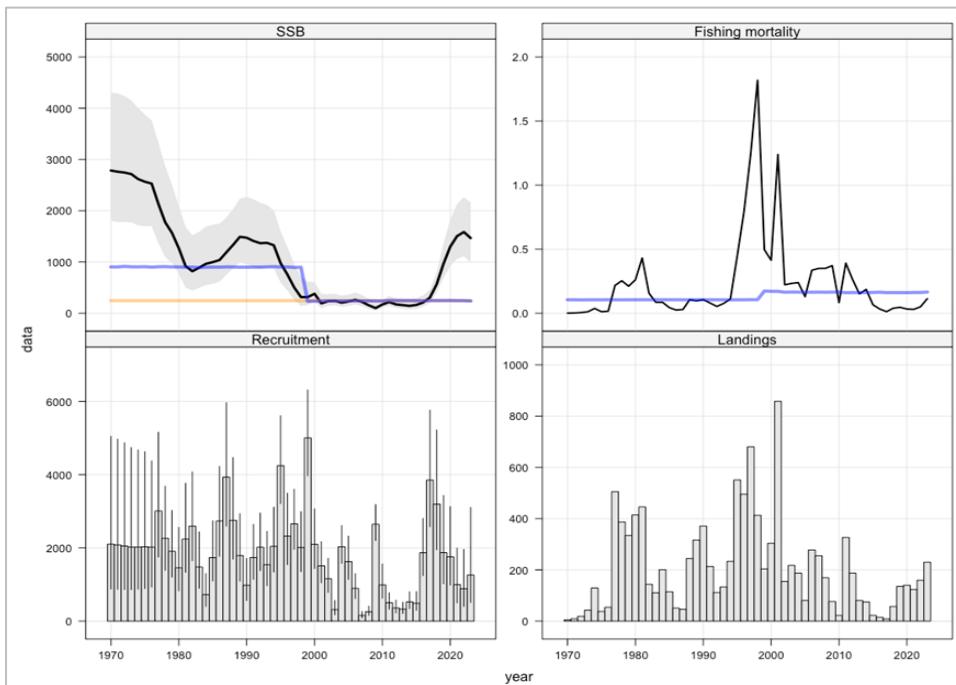
Near-term spawning biomass is expected to increase from the 2023 estimate of 12.9 million t to 13.7 million t in 2024 for the southern stock (with approximate 90% confidence bounds of 9.9 – 18.8 million t) and decrease from 1.47 million t to 1.44 million t for the far north stock (with approximate 90% confidence bounds of .98 – 2.1 million t) (Figure 25, Figure 26).

Recent increases in the model-calculated BMSY values (which is different from the constant BMSY) that are likely due to changes in selectivity of all fisheries combined, would imply an estimate of SSB at well over 50% over BMSY for both the single-stock and the two-stock hypotheses

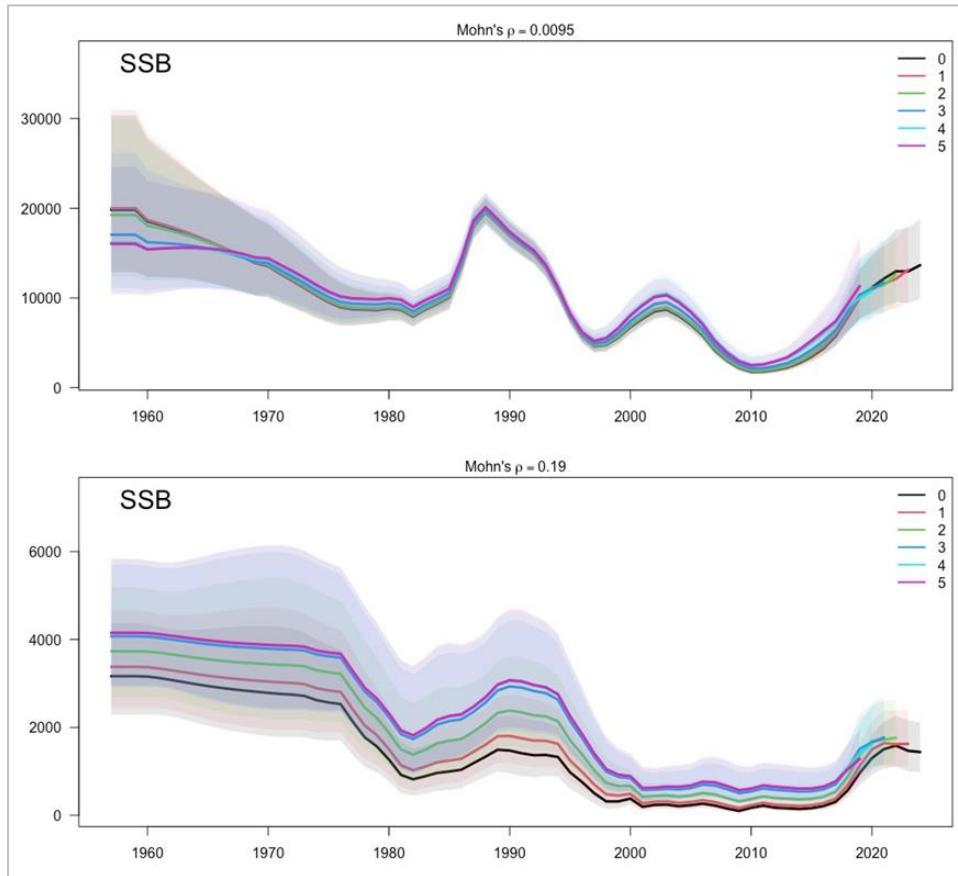
The 2 stocks hypothesis model showed little retrospective pattern in SSB for the south stock (Mohn's rho of 0.01 Figure 27) but had a slight tendency to over-estimate SSB for the north stock (Mohn's rho of 0.19; Figure 27). The model also tended to under-estimate recruitment for the south (Mohn's rho of -0.29; Figure 28), with better performance for the north stock (Mohn's rho of -0.04; Figure 28).



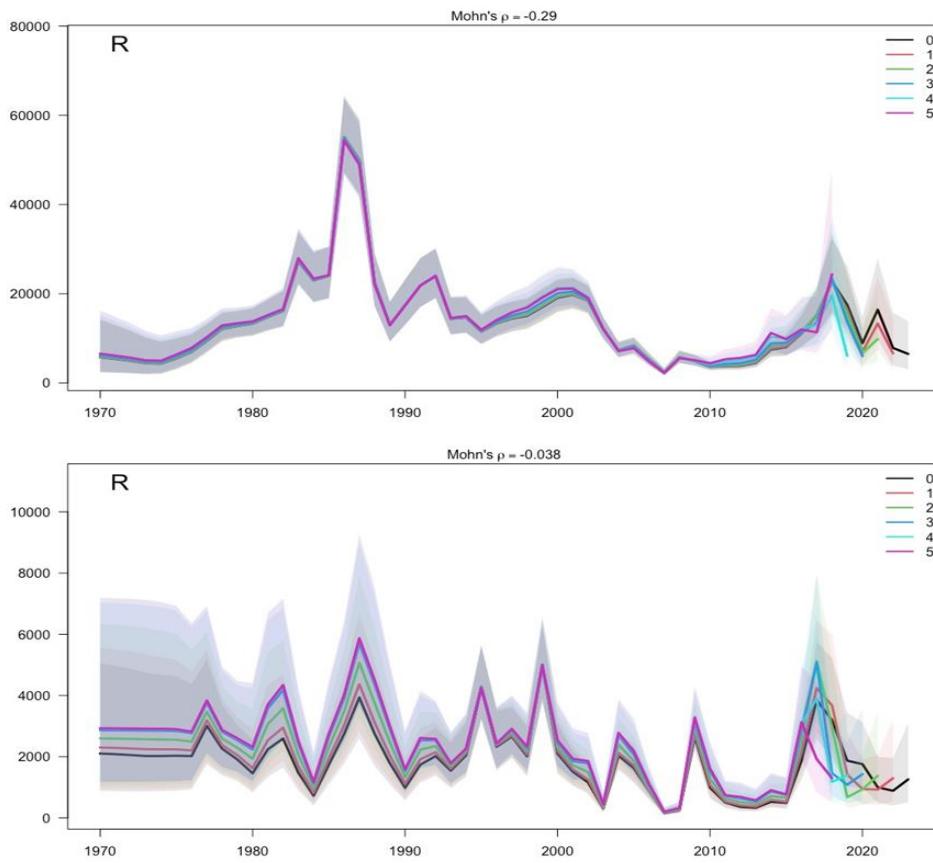
**Figure 25.** Model h2\_1.07 (two-stock hypothesis) summary estimates over time showing spawning biomass (kt; top left), recruitment at age 1 (millions; lower left), total fishing mortality (top right), and total catch (kt; bottom right) for the south stock. Blue lines represent dynamic estimates of BMSY (upper left) and of FMSY (upper right). The orange line represents the average BMSY over the most recent ten year (Source: SPRFMO, 2023b).



**Figure 26.** Model h2\_1.07 (two-stock hypothesis) summary estimates over time showing spawning biomass (kt; top left), recruitment at age 1 (millions; lower left), total fishing mortality (top right), and total catch (kt; bottom right) for the far north stock. Blue lines represent dynamic estimates of BMSY (upper left) and of FMSY (upper right). The orange line represents the average BMSY over the most recent ten years (Source: SPRFMO, 2023b).



**Figure 27.** Model retrospective of spawning biomass from 5 separate model runs for the southern stock (top) and far north stock (bottom), based on Model h2\_1.07 (two-stock hypothesis; Source: SPRFMO, 2023b).



**Figure 28.** Model retrospective of southern stock recruitment from 5 separate model runs for the southern stock (top) and far north stock (bottom), based on Model h2\_1.07 (two-stock hypothesis; Source: SPRFMO, 2023b).

### 10.1.3 Catch data

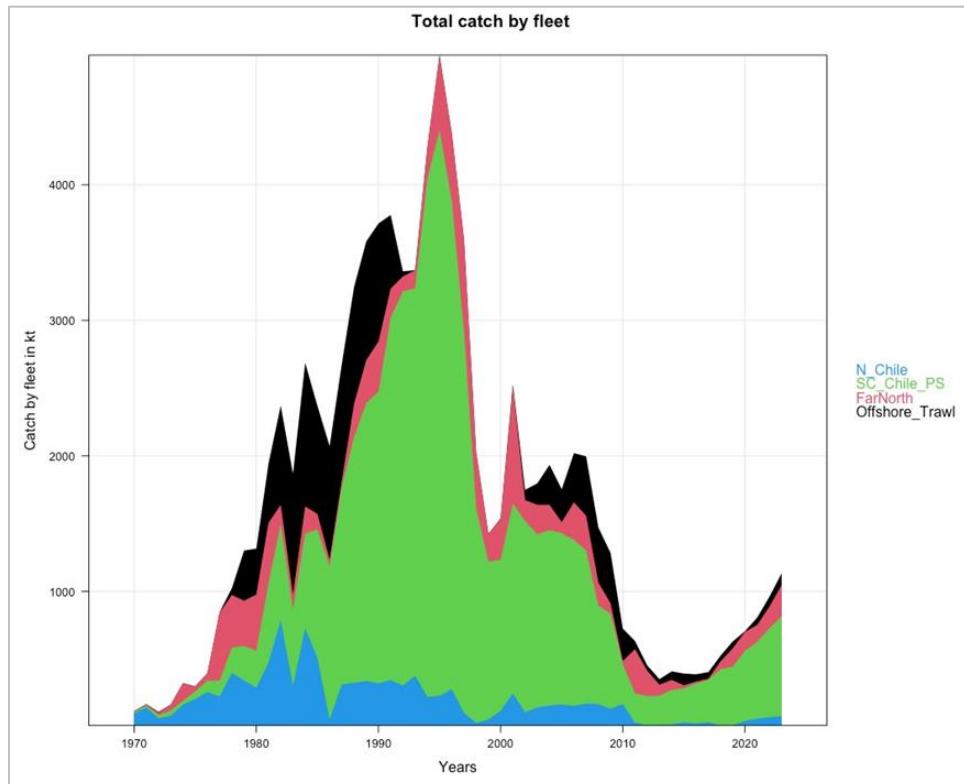
#### 10.1.3.1 History of the Chilean Jack Mackerel Fishery

Although there have been reported catches of Jack mackerel since the end of the 40's, the Chilean Jack mackerel fishery began commercially first in the northern part of Chile, in the mid-70's with significant levels of landings; Subsequently, since the mid-80s, the central-southern zone became the main area of operation of the Industrial purse seine fleet, with an exponential increase in catches due to the increase in fishing effort and the availability of resources in this area (SUBPESCA, 2017).

In more than 50 years of subregional Jack mackerel fisheries officially reported in the SPRFMO, a catch of approximately 88 million tons has been reported, where the State with the highest historical relative contribution has been Chile (73%), followed by the Russian Federation (12%) and Perú (10%), while the contribution of the remaining nations that participate or have participated in the fishery does not exceed 1.5% of this total individually (Walker *et al.*, 2023). In the period between 1970 and 2023, a total of 14 participating States have reported catches in the subregional Jack mackerel fishery established under the SPRFMO. In the early days of the fishery, in the seventies, catches of less than 170 thousand tons were reported; then the activity grew exponentially, along with the fleet, until the mid-nineties, reaching its historical maximum in 1995 with 4.96 million tons landed. In this regard, it is important to point out that in just three years (1994-1996) 16% (13.6 million tons) of the entire official history of the fishery was caught, evidencing an oversized fleet for the capacity to renew the resource. This was followed by an abrupt drop in catches to around 1.5 million tons between 1999 and 2000, with a slight recovery the following year, but then levelling off at around 1.9 million tons between 2002 and 2007. Subsequently, landings decreased in a sustained and important way, reaching a minimum in 2013 with 353 thousand tons, a figure similar to that reported in the mid-70's when

there was a small and incipient fleet. In the period 2014-2017, the official landing of Jack mackerel in the South Pacific fluctuated around 400 thousand tons, and then increased steadily and progressively until reaching a preliminary value of 961,428 thousand tons for the entire South Pacific in 2022.

The evolution of commercial catches of Chilean Jack mackerel is presented in which is separated by the four fleets identified in the SPRFMO: (1) FarNorth: Ecuador-Perú within its EEZ, (2) N\_Chile: North of Chile within the EEZ, (3) CS\_Chile\_PS: South Central Chile inside and outside the EEZ, and (4) Offshore\_Trawl: International fleet off Chile, but outside the EEZ. All these fleets fish with purse seine nets, except for the offshore fleet which fishes with half-water trawls.



**Figure 29.** Catch of Chilean Jack mackerel by fleet. Blue represents the northern Chilean fleet, green the south-central Chilean fleet, red the Far north fleet, and black the offshore trawl fleet (Source: SPRFMO, 2023b).

#### 10.1.4 Principle 1 catch

**Table 23.** Total Allowable Catch (TAC) and catch data.

TAC	Year	2024	Amount	1,135,297t
UoA share of TAC	Year	2024	Amount	819,720t
Total catch by UoC	Year (most recent)	2023	Amount	667,838.298t
	Year (second most recent)	2022	Amount	578,287.208t

## 10.1.5 Principle 1 Performance Indicator scores and rationales

### PI 1.1.1 – Stock status

PI 1.1.1		The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing		
Scoring Issue		SG 60	SG 80	SG 100
<b>Stock status relative to recruitment impairment</b>				
<b>a</b>	Guide post	It is <b>likely</b> that the stock is above the point where recruitment would be impaired (PRI).	It is <b>highly likely</b> that the stock is above the PRI.	There is a <b>high degree of certainty</b> that the stock is above the PRI.
	Met?	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>

#### Rationale

**There is a high degree of certainty that the stock is above the PRI.**

For this stock PRI, or the point at which recruitment is expected to be impaired, corresponds to the limit reference point SSBlim which is based on maintaining spawning stock biomass (SSB) above 9% of the expected SSB in the absence of fishing (SSB0).

Based on the latest stock assessment for this stock:

$$\text{PRI} = 0.09 * \text{SSB0} = \text{SSBlim} = 2,203 \text{ million tons}$$

$$\text{SSB2023} = 16400 \text{ million tons}$$

$$\text{SSB2023/SSBLim} = 7.44$$

The latest estimate for spawning stock biomass SSB2023/Blim= 7.44. Furthermore, the likelihood of SSB2023 being >Blim is well in excess of 95% (see Figure 17). Therefore, there is a high degree of certainty that the stock is above the PRI. Thus, **SG60 and SG80 and SG100 are met**.

Stock status in relation to achievement of Maximum Sustainable Yield (MSY)			
<b>b</b>	Guide post	The stock is at or fluctuating around a level consistent with MSY.	There is a <b>high degree of certainty</b> that the stock has been fluctuating around a level consistent with MSY or has been above this level over recent years.
	Met?	<b>Yes</b>	<b>Yes</b>

#### Rationale

**There is a high degree of certainty that the stock has been fluctuating around a level consistent with MSY or has been above this level over recent years.**

For this stock the level consistent with MSY corresponds to the target reference point SSBtarget which is based on maintaining spawning stock biomass (SSB) above 30% of the expected SSB in the absence of fishing (SSB0).

$$\text{SSBMSY} = (0.3 \text{SSB0})$$

$$\text{SSB2023} = 7,164 \text{ million tons t}$$

$$\text{SSB2023/SSBMSY} = 2.29$$

The latest estimate for spawning stock biomass SSB2023/SSBMSY= 2.29. Furthermore, the likelihood of SSB2023 being >BMSY is well in excess of 95% (see Figure 17). There is a high degree of certainty that the stock has been fluctuating around a level consistent with MSY or has been above this level over recent years. Thus, **SG60 and SG80 and SG100 are met**.

#### References

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SPRFMO 2023c. 11th Scientific Committee meeting report. 91 p. Wellington, New Zealand.

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<b>PI 1.1.1</b>	<b>The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing</b>		
<b>Stock status relative to reference points</b>			
Reference point used in scoring stock relative to PRI (Sla)	PRI = SSBlim (9 %SSB0)	SSBlim= 2,203 millions tons t	Current stock status relative to reference point SSB2023 =16400 millions tons SSB2023/SSBLim =7.44
Reference point used in scoring stock relative to MSY (Slb)	SSBMSY = (30 %SSB0)  FMSY	SSBMSY= 7,164 millions tons t  0.59	SSB2023= 16400 millions tons SSB2023/SSBMSY =2.29  F2023=0.13 F2023/FMSY=0.4

**Draft scoring range and information gap indicator added at Announcement Comment Draft Report**

Draft scoring range	Applicable SGs <u>likely</u> met			<u>Likely</u> overall PI score
	SG60	SG80	SG100	
	2 of 2	2 of 2	2 of 2	
Information gap indicator	Information sufficient to score PI			

**Overall Performance Indicator scores added from Client and Peer Review Draft Report**

Overall Performance Indicator score	Applicable SGs/elements met			Overall score
	SG60	SG80	SG100	
	X of x	X of x	X of x	
Condition number (if relevant)				

### PI 1.1.2 – Stock rebuilding

PI 1.1.2		Where the stock is reduced, there is evidence of stock rebuilding within a specified timeframe		
Scoring Issue		SG 60	SG 80	SG 100
<b>a</b>	<b>Rebuilding timeframes</b>			
	Guide post	A rebuilding timeframe is specified for the stock that is the <b>shorter of 20 years or 2 times its generation time</b> . For cases where 2 generations is less than 5 years, the rebuilding timeframe is up to 5 years.		The shortest practicable rebuilding timeframe is specified which does not exceed <b>one generation time</b> for the stock.
	Met?	NA		NA
<b>Rationale</b>				
Not Applicable. The Chilean Jack mackerel stock is not depleted.				
<b>b</b>	<b>Rebuilding evaluation</b>			
	Guide post	Monitoring is in place to determine whether the rebuilding strategies are effective in rebuilding the stock within the specified timeframe.	There is <b>evidence</b> that the rebuilding strategies are rebuilding stocks, <b>or it is likely</b> based on simulation modelling, exploitation rates or previous performance that they will be able to rebuild the stock within the <b>specified timeframe</b> .	There is <b>strong evidence</b> that the rebuilding strategies are rebuilding stocks, <b>or it is highly likely</b> based on simulation modelling, exploitation rates or previous performance that they will be able to rebuild the stock within the <b>specified timeframe</b> .
	Met?	NA	NA	NA
<b>Rationale</b>				
Not Applicable. The Chilean Jack mackerel stock is not depleted.				
<b>References</b>				

#### Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	Applicable SGs/elements <u>likely</u> met			<u>Likely</u> overall PI score
	SG60	SG80	SG100	
	2 of 2	1 of 1	0 of 1	
Information gap indicator	More information sought/Information sufficient to score PI			

#### Overall Performance Indicator scores added from Client and Peer Review Draft Report

Overall Performance Indicator score	Applicable SGs/elements met	Overall score
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PI 1.1.2	Where the stock is reduced, there is evidence of stock rebuilding within a specified timeframe		
	SG60	SG80	SG100
	X of x	X of x	X of x
Condition number (if relevant)			

## PI 1.2.1 – Harvest strategy

PI 1.2.1		There is a robust and precautionary harvest strategy in place		
Scoring Issue		SG 60	SG 80	SG 100
<b>Harvest strategy design</b>				
<b>a</b>	Guide post	The harvest strategy is <b>expected</b> to achieve stock management objectives reflected in PI 1.1.1 SG80.	The harvest strategy is responsive to the state of the stock and the elements of the harvest strategy <b>work together</b> towards achieving stock management objectives reflected in PI 1.1.1 SG80.	The harvest strategy is responsive to the state of the stock and is <b>designed</b> to achieve stock management objectives reflected in PI 1.1.1 SG80.
	Met?	Yes	Yes	Yes

### Rationale

**The harvest strategy is responsive to the state of the stock and is designed to achieve stock management objectives reflected in PI 1.1.1 SG80.**

Key elements of harvest strategies include:

- The control rules and tools in place, including the ability of the management system to control effort, taking into account issues such as overcapacity and its causes.
- The information base and monitoring stock status and the responsiveness of the management system and fleet to stock status.

The management of the Jack mackerel fishery at the national level is based entirely on the recommendations issued by the South Pacific Regional Fisheries Organization (SPRFMO) on a single Jack mackerel stock in the South Pacific. The SPRFMO Scientific Committee carries out the joint evaluation of the fishery, establishes the fisheries management and management measures for all the countries that make it up, controls and supervises fishing operations in the South Pacific on this fishery. The procedure for adopting the Jack mackerel quota within the framework of the SPRFMO begins with the joint stock assessment process, which is carried out annually within the framework of the SPRFMO Scientific Committee in September of each year, from this process, a recommendation is obtained for the Commission of the Organization of an Acceptable Biologically Catch (ABC) for Jack mackerel from the entire South Pacific. This ABC is reviewed and analyzed by the Chilean National Scientific Technical Committee of Jack Mackerel (CCT-J), in November of each year, which recommends the minimum and maximum range of said ABC. Subsequently, the Minister of Economy, Development and Tourism, taking up the recommendation of the CCT-J, defines for Chile the annual global Jack mackerel catch quota for the following year, based on the allocation established at the meeting of the Commission in 2024 for our country, corresponding to 66% of the quota established for the entire South Pacific (CMM 01- 2024).

There is a Chilean Jack Mackerel management plan (SUBPESCA 2017) in place that is supported by an operational framework with considerable stakeholder participation, scientific research, stock monitoring, comprehensive assessments, and peer reviews. According to the management plan the biological goal is to maintain a spawning biomass and catch levels that allow the fishery to recover to medium-long term levels of sustainability and the biological objective is to maintain and/or bring the Jack mackerel resource to a level around MSY (within the framework of the SPRFMO management objectives).

Since 2014, the Commission has used biological reference points as specified in the HCRs of the Annex K of COMM02-Report. At the 2nd Scientific Committee meeting in 2014, Annex K was adjusted to include a rule to create more stability in total allowable catches (TACs); this subsequently became known as “adjusted Annex K”. In 2022, SCW14 reviewed these biological reference points and introduced a limit reference point (Blim; where B refers to spawning biomass). The proposed 2022 harvest control rule (HCR; based on Annex K of the COMM02-Report, the “adjusted Annex K” HCR defined in the SC2 Report, and discussions at SCW14) is, thus, as follows:

**PI 1.2.1**
**There is a robust and precautionary harvest strategy in place**

- a)** If the biomass in the coming year is estimated to be below Blim then the TAC is set to zero and directed fishing for Jack mackerel is prohibited. Blim is to be computed from the ratio  $y_{lim} = \min(B_t/B_0, t)$ ; that is, the lowest ratio of historical spawning biomass relative to unfished. So, for the 2022 stock assessment,  $B_{lim} = y_{lim}B_0, 2023$ .
- b)** If  $B$  is below 80% BMSY (or a proxy), the trial catch for next year would be based on the minimum of the current  $F$  or FMSY, which would mean that in theory  $B$  would not go down. If the trial catch is greater than the replacement yield (i.e., the catch level that would result in the same  $B$  for the subsequent year) then the TAC would be set at the replacement yield. This would mean that at a minimum the biomass would remain stable and would not decrease.
- c)** If  $B$  is above 80% BMSY (or a proxy), the trial catch for the next year would be based on the estimated FMSY. If the trial catch is less than the replacement yield, the TAC will be set at or below the trial catch. If the trial catch is above the replacement yield, the method outlined in the previous bullet point should be used. The TAC will not be allowed to vary by more than 15% between years.
- d)** If  $B$  is above BMSY (or a proxy), then the TAC would be set based on FMSY. The TAC will not be allowed to vary by more than 15% between years.

**Harvest Control Rule**

Stock status	TAC calculation method
$B_{t+1} < B_{lim}$	Set TAC to zero; directed jack mackerel fishing prohibited
$B_{t+1} \leq 80\% \text{ of } B_{MSY} \text{ (or proxy)}$	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)
$B_{t+1} > 80\% \text{ of } B_{MSY} \text{ (or proxy)}$ and $B_{t+1} \leq B_{MSY} \text{ (or proxy)}$	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
$B_{t+1} > B_{MSY} \text{ (or proxy)}$	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

During the 10<sup>th</sup> Scientific Meeting in 2022, The SC accepted the proposed estimate of Blim from the Jack Mackerel Benchmark Workshop as part of the revised harvest control rule (HCR) from the adjusted Annex K.

Finally, during February 2023, the 11th meeting of the SPRFMO Commission was held, where the president of the Scientific Committee presented the main results and topics addressed at the SC10 meeting. In this regard, the SPRFMO Commission reported in its report (paragraph 16 of SPRFMO COMM11) the approval of the report of the Scientific Committee and its appreciation for the work carried out.

**SG60, SG80 and SG100 are met.**

**Harvest strategy evaluation**

<b>b</b>	Guide post	The harvest strategy is <b>likely</b> to work based on prior experience or plausible argument.	The harvest strategy may not have been fully <b>tested</b> but evidence exists that it is achieving its objectives.	The performance of the harvest strategy has been <b>fully evaluated</b> and evidence exists to show that it is achieving its objectives including being clearly able to maintain stocks at target levels.
	Met?	<b>Yes</b>	<b>Yes</b>	<b>No</b>

**Rationale**

**The harvest strategy may not have been fully tested but evidence exists that it is achieving its objectives**

## PI 1.2.1

### There is a robust and precautionary harvest strategy in place

The latest estimate for spawning stock biomass ratio is SSB2023/Blim= 7.44. Furthermore, the likelihood of SSB2023 being >Blim is well in excess of 95% (see Figure 17). The latest estimate for spawning stock biomass ratio is SSB2023/SSBMSY= 2.29. Furthermore, the likelihood of SSB2023 being >BMSY is well in excess of 95% (see Figure 17). Furthermore, overfishing is not occurring; F2023=0.13, FMSY 0.59, F2023/FMSY=0.4.

Therefore, while the harvest strategy may not have been fully tested, evidence exists that it is achieving its objectives based on the information on the lower exploitation rates and increases in Spawning Stock Biomass in recent years. **SG60 and SG80 are met.**

However, given that the harvest strategy will needs some refinement by testing the current HCRs with newly implemented Blim against proposed new HCRs throughout a new ongoing MSE to correct for some uncertainties such as stock structure. Furthermore, The SCW14\_2022 workshop noted that the current estimate of Blim (8%). could change over time with updated data. It is thought having high recruitment in a year, B0,t could be above average and increase the value of Blim. Therefore SCW14\_2022 workshop realized that could be an impact and agreed that it is necessary to look at how the revised HCR with the newly implemented Blim relationship changes with different steepness values and how that impacts the reference point. Therefore, it cannot be said that the performance of the harvest strategy has been fully evaluated and evidence exists to show that it is achieving its objectives including being clearly able to maintain stocks at target levels; **SG100 is not met.**

Harvest strategy monitoring	
<b>C</b>	Guide post
	Monitoring is in place that is expected to determine whether the harvest strategy is working.
	Met? <b>Yes</b>

### Rationale

#### **Monitoring is in place that is expected to determine whether the harvest strategy is working.**

Monitoring is in place which ensures that fishing vessels are in compliance with the various elements of the harvest strategy. Industrial fishery fleets are required to have VMS which records location and timing of fishing activity. All Industrial fishery vessels are required to have an automatic location and communication (ALC) device to transmit the vessel's position.

Compliance with individual vessel quotas is monitored at the point of landing through the SERNAPESCA Traceability system. Vessels must hail-in before landing and may land only at designated ports.

At-sea observers are deployed to record fishing activity and address conservation issues as required such as misreporting of catch, undersize catch, or high levels of incidental catch. Use of logbooks to record details of fishing activity and catch is mandatory. Surveillance at sea and aerial surveillance is carried out by IFOP AND SERNAPESCA, and monitoring of catch and fishing gear at sea and at dockside is conducted randomly.

Furthermore, new monitoring applications such as Image Recording Devices (DRI) to detect discards and bycatch at sea and Electronic Log System (SIBE) to report fishing activities (including discards and bycatch) in Chilean Jack mackerel industrial fisheries in Central South have been implemented since 2020.

In addition to the MCS activities to ensure compliance with the harvest strategy, the stocks are monitored data is collected through a series of fishery dependent monitoring programs (Effort, CPUE, size/age structures from commercial fisheries) and fishery-independent indicators (i.e., Spawning Stock Biomass and Abundance based Hydroacoustic research vessel survey, habitat distribution). There is also a monitoring program of the discards and bycatch for the central south Industrial purse seine Jack mackerel fishery. This information is updated and reviewed as part of the annual stock assessment process to provide information on stock status and hence on the performance of the harvest strategy: **SG60 is met.**

## d Harvest strategy review

PI 1.2.1		There is a robust and precautionary harvest strategy in place		
	Guide post			The harvest strategy is periodically reviewed and improved as necessary.
	Met?			Yes

#### Rationale

**The harvest strategy is periodically reviewed and improved as necessary.**

The harvest strategy is evaluated on an annual basis and improved as necessary through framework adjustments to management measures and amendments. The harvest strategy is also evaluated on an annual basis through a stock assessment review process which involves stakeholder representatives (i.e., SPRFMO Scientific Committee, Jack Mackerel Scientific committee, IFOP stock assessment scientists, NGOS), and through consultations with industrial fisheries groups in formal advisory committee meetings (Jack Mackerel Management Committee). This process evaluates stock status in relation to the harvest strategy and considers/recommends appropriate adjustments in TACs for the upcoming season.

Therefore, it can be said the harvest strategy is periodically reviewed and improved as necessary and **SG100 is met.**

Shark finning				
e	Guide post	It is <b>likely</b> that shark finning is not taking place.	It is <b>highly likely</b> that shark finning is not taking place.	There is a <b>high degree of certainty</b> that shark finning is not taking place.
	Met?	NA	NA	NA

#### Rationale

The target species (Chilean Jack mackerel) is not a species of shark; SIE is not relevant.

Review of alternative measures				
f	Guide post	There has been a review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock.	There is a <b>regular</b> review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock and they are implemented as appropriate.	There is a <b>biennial</b> review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock, and they are implemented, as appropriate.
	Met?	Yes	Yes	Yes

#### Rationale

**There is a biennial review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock, and they are implemented, as appropriate.**

According to discard reduction plan for Chilean Jack mackerel (SUBPESCA, 2019), there is an annual review of impact of unwanted catch on the status of target and non-target species. SUBPESCA (2019) proposed different alternative options to reduce unwanted catch on target, and non-target species as well as metrics to evaluate effectiveness of the management measures to reduce unwanted catches. These proposed evaluations of the management measures to mitigate bycatch impact are set to be conducted every year (Vega *et al.*, 2019, 2020, 2021, 2022; Ossas *et al.*, 2023).

One of the specific objectives in the Jack mackerel monitoring of discards program reports is to propose alternatives for changes, regulatory, technological, operational, market, cultural, user training, or other modifications, whose implementation promotes the reduction of discard and bycatch, as well as to evaluate the level of implementation and effectiveness of the mitigation measures contained in the enacted reduction plans.

**PI 1.2.1****There is a robust and precautionary harvest strategy in place**

There is an ongoing process of reviewing causes for the Jack mackerel discards as target species in the south-central industrial Jack mackerel purse seine fishery (Vega *et al.*, 2019, 2020, 2021, 2022; Ossas *et al.*, 2023; INPESCA, 2023).

In this context, the discard and bycatch mitigation plan that SUBPESCA has issued for this fishery is analysed in detail and it is considered as an analysis criterion whether or not the declared cause corresponds to the causes that the plan authorized for this fishery. Thus, for this fishery in the research program, a list of general causes is mostly considered, and since this fishery has a monitoring plan for mitigation measures, the criterion indicates the level of compliance with the causes according to the stipulations of the respective plan (Vega *et al.*, 2019; Ossas *et al.*, 2023; INPESCA, 2023).

Finally, stock status is usually assessed every year and scientific advice is provided for catch options and alternatives to unwanted catch. The Advisory Committee consultative process leads to a consensus recommendation on TACs and other conservation and management measures to reduce UoA-related mortality of unwanted catch of the target stock. As of 2018, estimates of discarding resources managed with quotas have been considered in the process of establishing annual global catch quotas for Chilean fisheries.

Among some of the new measurements for mitigation of discards of Jack mackerel issued after the authorization of the Jack mackerel discards reduction plan (2019) are as follows:

(2019) Mandatory sets of measures to avoid bycatch and discards in the Jack mackerel fishery established through Exempt Resolution N° 16 of 2019; [http://www.subpesca.cl/portal/615/articles-104138\\_documento.pdf26/2019](http://www.subpesca.cl/portal/615/articles-104138_documento.pdf26/2019).

(2020) Implementation manual of good practices (INPESCA, 2023).

(2020) Modification of the tolerance margin for the harvest of Jack mackerel individuals under legal minimum size; [https://www.subpesca.cl/portal/615/articles-107327\\_documento.pdf](https://www.subpesca.cl/portal/615/articles-107327_documento.pdf).

(2021) Regulation of the transfer of excess catch between purse seine vessels to avoid discarding; [https://www.subpesca.cl/portal/615/articles-110427\\_documento.pdf](https://www.subpesca.cl/portal/615/articles-110427_documento.pdf)

Ossa *et al.* (2023) analyzed the percentage of Jack mackerel discarded in the fishery showing an increase, going from 1.1% in 2015 (Vega *et al.*, 2017) to 9.3% in 2017 (Vega *et al.*, 2018). Over the following years after the implementation of the Jack mackerel discards reduction plan , a decrease in the percentage value, falling to 0.2% in 2020 (Vega *et al.*, 2021). Finally, during the last two years, this value has remained ≤1.5% of the total catch (Ossa *et al.*, 2023).

On their analysis they identified "reasons of safety in the operation (mechanical failure or risk of the crew)" as the major cause of discarding Jack mackerel and this was evident in the highest volume of discards and, in the highest percentage in discarded weight. The major reason of Jack mackerel discarding in the industrial purse seine fishery Central South (safety in the operation, mechanical failure or risk of the crew) is in compliance with the regulations of discards reduction plan where the discarding of the target species will only be authorized, for documented reasons of safety at sea, due to mechanical failure, risk to the crew of the ship or vessel (SUBPESCA, 2019).

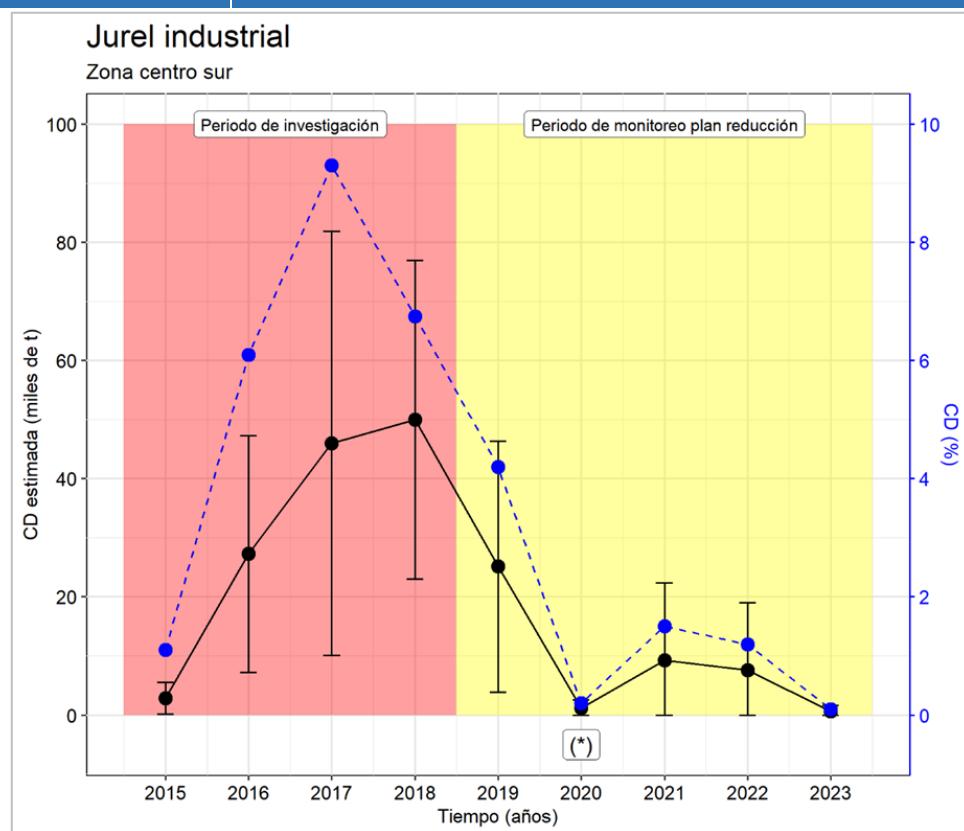
Finally, it can be concluded that for the Chilean Jack mackerel Central South industrial purse seine fishery, the fisheries management bodies have complied with all the legal and regulatory requirements in matters of discard and bycatch corresponding to the different phases of the process; diagnosis, reduction and control, either by allocating budget and developing research projects to collect adequate technical background, establishing reduction plans and reviewing all associated regulations and finally implementing in 100% of the fleet, modern control mechanisms and sanctions for non-compliance.

This process has been built collaboratively with users through different instances such as Management Committees, Scientific Committees, Industrial Guilds.

The results of the process are positive, having achieved the objectives of reducing discard and bycatch, as evidenced by the data collected by IFOP and SERNAPESCA, where currently the percentages of discard are close to zero in 2023 (Rodrigo Vega, 2024- personal communication in August 2024)

**PI 1.2.1**

There is a robust and precautionary harvest strategy in place



**Figure 30.** Information on the industrial mackerel fishery that operated in the south-central zone during the period 2015-2023. The variable with the y-axis on the left is the estimated discarded catch (solid black line, with confidence intervals included). The secondary y-axis shows the percentage of discarded catch (segmented blue line). Information from observers. (\*): Start of the period with the use of DRI systems (Rodrigo Vega personal communication July 22, 2024)

Given the almost zero percentages of discards for the target fishery and the high compliance of the fishery with the measures proposed from the fishery reduction plan, It can be said that there is a biennial review of the potential effectiveness and practicality of alternative measures to minimize UoA-related mortality of unwanted catch of the target stock, and they are implemented, as appropriate. **SG60, SG80 and SG100 are met.**

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**PI 1.2.1**
**There is a robust and precautionary harvest strategy in place**

pesca incidental en pesquerías pelágicas. Programa de monitoreo y evaluación de los planes de reducción del descarte y de la pesca incidental 2017-2018. Instituto de Fomento Pesquero, Valparaíso, Chile. 231 p. + Anexos.

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**Draft scoring range and information gap indicator added at Announcement Comment Draft Report**

Draft scoring range	Applicable SGs/elements <u>likely</u> met			<u>Likely</u> overall PI score
	SG60	SG80	SG100	
	3 of 3	3 of 3	3 of 4	
Information gap indicator	Information sufficient to score PI			

**Overall Performance Indicator scores added from Client and Peer Review Draft Report**

Overall Performance Indicator score	Applicable SGs/elements met			Overall score
	SG60	SG80	SG100	
	X of x	X of x	X of x	
Condition number (if relevant)				

**PI 1.2.2 – Harvest control rules and tools**

PI 1.2.2		There are well defined and effective harvest control rules (HCRs) in place		
Scoring Issue		SG 60	SG 80	SG 100
<b>a</b>	<b>HCRs design and application</b>			
	Guide post	HCRs are expected to reduce the exploitation rate as the PRI is approached and are either generally understood and in place, or available.	Well defined HCRs are in place that ensure that the exploitation rate is reduced as the PRI is approached, and are expected to keep the stock fluctuating	The HCRs are expected to keep the stock fluctuating at or above a target level consistent with MSY, or another more appropriate level taking into

PI 1.2.2		There are well defined and effective harvest control rules (HCRs) in place		
			around a target level consistent with (or above) MSY, or for key LTL species a level consistent with ecosystem needs.	account the ecological role of the stock, <b>most</b> of the time.
Met?	Yes	Yes		Not scored

#### Rationale

**Well defined HCRs are in place that ensure that the exploitation rate is reduced as the PRI is approached, and are expected to keep the stock fluctuating around a target level consistent with (or above) MSY, or for key LTL species a level consistent with ecosystem needs.**

Since 2014, the Commission has used biological reference points as specified in the HCR of the Annex K of COMM02-Report. At the 2nd Scientific Committee meeting in 2014, Annex K was adjusted to include a rule to create more stability in total allowable catches (TACs); this subsequently became known as “adjusted Annex K”. In 2022, SCW14 reviewed these biological reference points and introduced a limit reference point (Blim; where B refers to spawning biomass). The proposed 2022 harvest control rule (HCR; based on Annex K of the COMM02-Report, the “adjusted Annex K” HCR defined in the SC2 Report, and discussions at SCW14) is thus as follows:

- a. If the biomass in the coming year is estimated to be below Blim then the TAC is set to zero and directed fishing for Jack mackerel is prohibited. Blim is to be computed from the ratio  $y_{lim} = \min(B_t/B_0, t)$ ; that is, the lowest ratio of historical spawning biomass relative to unfished. So, for the 2022 stock assessment,  $Blim = y_{lim}B_0, 2023$ .
- b. If B is below 80% BMSY (or a proxy), the trial catch for next year would be based on the minimum of the current F or FMSY, which would mean that in theory B would not go down. If the trial catch is greater than the replacement yield (i.e., the catch level that would result in the same B for the subsequent year) then the TAC would be set at the replacement yield. This would mean that at a minimum the biomass would remain stable and would not decrease.
- c. If B is above 80% BMSY (or a proxy), the trial catch for the next year would be based on the estimated FMSY. If the trial catch is less than the replacement yield, the TAC will be set at or below the trial catch. If the trial catch is above the replacement yield, the method outlined in the previous bullet point should be used. The TAC will not be allowed to vary by more than 15% between years.
- b. If B is above BMSY (or a proxy), then the TAC would be set based on FMSY. The TAC will not be allowed to vary by more than 15% between years.

#### Harvest Control Rule

Stock status	TAC calculation method
$B_{t+1} < B_{lim}$	Set TAC to zero; directed jack mackerel fishing prohibited
$B_{t+1} \leq 80\% \text{ of } B_{MSY} \text{ (or proxy)}$	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)
$B_{t+1} > 80\% \text{ of } B_{MSY} \text{ (or proxy)}$ and $B_{t+1} \leq B_{MSY} \text{ (or proxy)}$	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
$B_{t+1} > B_{MSY} \text{ (or proxy)}$	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

During the 10th Scientific Meeting in 2022, the SC accepted the proposed estimate of Blim from the Jack Mackerel Benchmark Workshop as part of the revised harvest control rule (HCR) from the adjusted Annex K.

Finally, during February 2023, the 11th meeting of the SPRFMO Commission was held, where the president of the Scientific Committee presented the main results and topics addressed at the SC10 meeting. In this regard, the SPRFMO Commission

**PI 1.2.2**
**There are well defined and effective harvest control rules (HCRs) in place**

reported in its report (paragraph 16 of SPRFMO COMM11) the approval of the report of the Scientific Committee and its appreciation for the work carried out.

Given the above, **SG80a is met.**

HCRs robustness to uncertainty			
<b>b</b>	Guide post	The HCRs are <b>likely</b> to be robust to the main uncertainties.	The HCRs take account of a <b>wide</b> range of uncertainties including the ecological role of the stock, and there is <b>evidence</b> that the HCRs are robust to the main uncertainties.
	Met?	No	Not scored

**Rationale**

The harvest control rules (Annex K) adopted in the 2<sup>nd</sup> SPRFMO Commission meeting (SPRFMO, 2014a) were tested during the 2<sup>nd</sup> SPRFMO SC meeting. During the 2<sup>nd</sup> SPRFMO SC meeting Hintzen *et al.* (2014b) presented an evaluation of the proposed HCR for rebuilding Jack mackerel (SC-02-JM- 04) under a full management strategy evaluation considering stochastic projections. Outputs of the 2013 Jack mackerel stock assessment were used as the basis for these evaluations and a number of performance indicators were estimated. Performance indicators included, among others, were annual expected catch levels, variability in catch, rebuilding time to BMSY and probability of reaching BMSY in the medium term. Among the major sources of uncertainty were Recruitment, Growth, Natural Mortality and selectivity patterns for the four fleets for the period 2014-2042 (South-Central Chile, Northern Chile, Offshore and Far North).

Hintzen *et al.* (2014b) showed that the rebuilding plan proposed by the Commission showed a moderate increase in SSB compared to other alternative strategies. The performance of proposed HCRs improves in the medium and long-term projections (10 and 20 years).

Canales (2014) SC-02-JM-09 developed an approach to evaluate the HCR that appears as Annex K of CR-02. The Annex K HCR performance was compared against two of the alternative types of HCRs: one using alternative constant F values and another in which F declines proportional to biomass when the stock is below 80% of BMSY (and is at a fixed FMSY rate at higher stock sizes). The source of uncertainty was represented only by recruitment as a stochastic variable, which in logarithmic scale is normally distributed with mean equal to the average of the last 10 years and coefficient of variation  $\sigma R = 0.6$ . This situation was assumed since the recruitments are the main uncertainty source in the projection.

Results showed that the Annex K HCR performed well in terms of rebuilding relative to the others but had high inter-annual catch variability—mainly due to simulation cases where the fishery would be required to close. The other two types of HCRs had lower catch variability but generally slower rebuilding times.

A subset of alternative HCRs, and performance indicators, was prepared by the Scientific Committee for consideration by the Commission.

The “Annex K” HCR from the Jan 2014 Commission report was estimated to provide reasonable recovery times relative to the others but was characterized by high interannual variability and could result in complete fishery closures should a period of low recruitments occur.

A refinement was introduced to the Annex K HCR (Adjusted Annex K) that included a rule to stabilize TACs. Under this option, if SSB is greater than 80% of BMSY, the TAC is not allowed to vary by more than 15% from year to year. Under this plan, TAC fluctuations are significantly lower and catch stabilizes at around 600 kt. This HCR outperformed others in minimizing the chance of SSB declines and recovery time to BMSY.

At the 2nd Scientific Committee meeting in 2014, Annex K was adjusted to include a rule to create more stability in total allowable catches (TACs); this subsequently became known as “adjusted Annex K.”

**PI 1.2.2**
**There are well defined and effective harvest control rules (HCRs) in place**

Finally, in 2022 SCW14 reviewed the biological reference points from specified in Annex K of COMM02-Report and introduced a limit reference point (Blim; where B refers to spawning biomass). The proposed harvest control rule with including the Blimit (HCR; based on both Annex K of the COMM02-Report and the “adjusted Annex K” HCR defined in the SC2 Report) is thus as follows:

- a) if the biomass in the coming year is estimated to be below Blim then the TAC is set to zero and directed fishing for Jack mackerel is prohibited. Blim is to be computed from the ratio  $y_{lim} = \min(B_t/B_0, t)$ ; that is, the lowest ratio of historical spawning biomass relative to unfished. So, for the 2022 stock assessment,  $Blim = y_{lim}B_0, 2023$

The SCW14 workshop recommended that the current estimate of Blim would be about (8%). However, it was realized on the workshop that with updated data, this value could change over time. For example, in cases that there high recruitment in a year,  $B_0, t$  could be above average and increase the value of Blim. The workshop agreed that there could be an impact, and it was necessary to look at how this relationship changes with different steepness values and how that impacts the reference point. It was agreed that this should be considered in the future Management Strategy Evaluation (MSE) studies.

An important objective in the current Multi-annual workplan of the Scientific Committee (SC) of the South Pacific Regional Fisheries Management Organization (SPRFMO) (SPRFMO, 2023d) is the ‘MSE development to design alternative harvest control rule’. The objective is for this work to lead to the adoption of a management procedure to replace adjusted Annex K HCR from the current rebuilding plan which is currently used to provide catch advice on Chilean Jack mackerel. The stock is considered to have recovered from the time-series low around 2010, as intended by the rebuilding plan, and is now around the proxy biomass reference levels. Management procedures should thus be explored and evaluated with focusing on the long-term exploitation of the stock.

For adequate management of Chilean Jack mackerel over its range the Commission requested an update of the management procedure for Chilean Jack mackerel. This work has begun (via contract within the EU) and comprises a new Management Strategy Evaluation (MSE). An MSE will help resolve a number of key issues relative to managing the resource. The operating model used for simulating data and testing management procedures will integrate over critical sources of uncertainty on: a) Stock structure hypotheses, b) Growth and growth variability, c) Natural mortality (and variability), d) productivity (regimes and stock-recruitment relationships).

Given that there are major uncertainties such as the robustness of the newly adopted Blimit HCR against different recruitment scenarios, stock structure hypotheses, growth and growth variability, natural mortality (and variability),productivity (regimes and stock-recruitment relationships),deviances between the Operating Model (OM) and the stock assessment model used for projecting populations forward ,movement of fish between regions (in the meta-population model),recruitment regimes in the OM, implementation error (i.e. between what the Management Procedure MP dictates and what happens in the following year), it cannot be said that the HCRs are likely to be robust to the main uncertainties. **SG80b is not met.**

HCRs evaluation				
<b>C</b>	Guide post	There is some evidence that tools used or available to implement HCRs are appropriate and effective in controlling exploitation.	Available evidence indicates that the tools in use are appropriate and effective in achieving the exploitation levels required under the HCRs.	Evidence clearly shows that the tools in use are effective in achieving the exploitation levels required under the HCRs.
	Met?	Yes	Yes	Not scored

**Rationale**

**Available evidence indicates that the tools in use are appropriate and effective in achieving the exploitation levels required under the HCRs.**

Fishing mortality (F) has been significantly reduced in recent years resulting in that the current fishing mortality F2023 to be below the target level FMSY[F2023=0.13 < FMSY=0.59] (SPRFMO, 2023b). In fact, the stock has consistently been estimated as rebuilt since 2018, and not subject to overfishing since 2013, relative to the dynamically-estimated MSY reference points.

## PI 1.2.2

### There are well defined and effective harvest control rules (HCRs) in place

The latest estimate for spawning stock biomass SSB2023/Blim= 7.44. Furthermore, the likelihood of SSB2023 being >Blim is well in excess of 95% (see figure16). The latest estimate for spawning stock biomass SSB2023/SSBMSY= 2.29. Furthermore, the likelihood of SSB2023 being >BMSY is well in excess of 95%. **SG60 and SG80 are met.**

#### References

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#### Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	Applicable SGs/elements <u>likely</u> met			<u>Likely</u> overall PI score
	SG60	SG80	SG100	
	2 of 2	2 of 3	X of x	
Information gap indicator	More information sought related to 1.2.2 will be a focus on the site visit for this re-assessment.			

#### Overall Performance Indicator scores added from Client and Peer Review Draft Report

Overall Performance Indicator score	Applicable SGs/elements met			Overall score
	SG60	SG80	SG100	
	X of x	X of x	X of x	
Condition number (if relevant)				

### PI 1.2.3 – Information and monitoring

PI 1.2.3		Relevant information is collected to support the harvest strategy		
Scoring Issue		SG 60	SG 80	SG 100
<b>Range of information</b>				
<b>a</b>	Guide post	Some relevant information related to stock structure, stock productivity and fleet composition is available to support the harvest strategy.	Sufficient relevant information related to stock structure, stock productivity, fleet composition and other data are available to support the harvest strategy.	A comprehensive range of information (on stock structure, stock productivity, fleet composition, stock abundance, UoA removals and other information such as environmental information), including some that may not be directly related to the current harvest strategy, is available.
	Met?	Yes	Yes	No

#### Rationale

**Sufficient relevant information related to stock structure, stock productivity, fleet composition and other data is available to support the harvest strategy.**

Research studies have provided considerable knowledge of all aspects of Chilean Jack Mackerel life history, population biology, ecology and stock structure.

Information on catch data for the JJM model represents a summation of catch values from various members of SPRFMO to form four “fleets”: Fleet 1 (northern Chile), Fleet 2 (central-south Chile), Fleet 3 (the far north fleet) and Fleet 4 (the offshore trawl fleet), which are intended to be consistent with the gear and general areas of fishing. Length data are available from all major fisheries both inside and outside the EEZs. Length distributions are converted into age distributions using annual age-length keys. Several CPUE data series from the commercial fisheries are used in the model. Since 2022 (SC10), all CPUE series include a factor that compensates for efficiency increases of fishing operations as estimated in global effort analysis). There are several benchmark workshops that involved correction of ageing of Jack mackerel that resulted in further revisions to age composition data for both Chilean fleets, as well as the offshore fleet for older years. In addition, several biological variables (growth, weight, maturity, natural mortality) were re-estimated and updated in these workshops (SPRFMO, 2023b).

The Chilean Jack mackerel research programme has included surveys using hydro-acoustics and the daily egg production method (DEPM). Stock productivity and abundance are monitored by way of an annual RV survey which provides ongoing, fishery-independent indices of abundance and biomass at age as well detailed information on size, age and maturity composition. These acoustic surveys that estimate the biomass and distribution of Jack mackerel, have also been conducted along the Chilean coast, inside and outside of the EEZ, using scientific vessels. Additionally, comprehensive acoustic surveys have been conducted from the Chilean commercial fleet. (SPRFMO, 2023b).

The Peruvian Jack mackerel research programme includes egg and larvae surveys and hydro-acoustic stock assessment surveys. Mean weight-at-age is required for all fishing fleets and biomass indices in order to relate biomass quantities to the underlying model estimates of Jack mackerel abundance (in numbers). Mean weight is calculated by year by taking the mean length-at-age in the catch and a length-weight relationship derived for the year or from a growth function. There are Jack mackerel studies using environmental indices describing the potential habitat of this species based on available monthly data on SST, Sea Surface Salinity (SSS), water masses (WM), oxycline depth (OD), and chlorophyll (CHL) (SPRFMO, 2023b).

There are several studies that have been conducted to resolve the population structure, which include studies of parasites, life-history traits, morphometry and meristic traits, otolith morphology, otolith microchemistry, oceanographic modelling, and genetics (SPRFMO 2023a).

**PI 1.2.3**
**Relevant information is collected to support the harvest strategy**

IFOP has research programs that annually monitors Catch, Effort, fleet dynamics, biological data (Length, Age, Biomass, Growth, maturity) of the Jack mackerel Industrial purse seine fishery (SPRFMO, 2023a). There is also a program that study the discards of Jack mackerel as target species, non-target fish species as well as bycatch of seabirds, marine mammals and sea turtles (SUBPESCA, 2019). The monitoring of the discards and bycatch are done by an observer program. In 2022, sampling coverage for the South-Central Purse seine industrial fishery within Chile EEZ by scientific observers onboard fishing vessels was 22.3%, and at-port sampling coverage was 16.9%, with a total combined sampling coverage of 39.2% (SPRFMO, 2023a; Ossa *et al.*, 2023).

The compliance with measures of Chile Jack Mackerel purse seine fishery discards reduction plan and handling protocols are being monitored remotely by electronic monitoring systems EMS (Image Recording Devices (DRI) and Electronic Logbook System (SIBE)) onboard all vessels of the industrial fleet. (SPRFMO, 2023a).

Detailed information on the number and type of vessels in the fishery is collected through the licensing system. The temporal and spatial pattern of the fishery, gear usage, etc. are well known. Catch monitoring within the South-Central Purse seine fishery has many components. All vessels are required to hail-out to SERNAPESCA prior to departing on a fishing trip and are also required to hail-in from sea prior to returning to port. Both hails are captured by a third-party, independent dockside monitoring company who records information on the vessel as well as the catch on board. A variety of information must also be reported to SERNAPESCA in fishery monitoring documents completed by the captain for each trip. All of the majority of the commercial Industrial Purse Seine fleet is required to carry an approved Vessel Monitoring System (VMS) on board when on a fishing trip. The VMS unit transmits positional information to a communication service provider who, in turn, makes the information available to SERNAPESCA.

The majority of Chilean Jack mackerel landings are monitored at the point of offloading by independent, third-party dockside monitors. The monitors verify the weight and the species of fish offloaded. IFOP staff undertakes dockside sampling to characterize the age and size composition of the landings.

Furthermore, The area where Chilean Jack mackerel inhabits in the EEZ zones of Chile and Perú and the SPRFMO area, has been the focus of extensive ecosystem research for many years SPRFMO, 2021 Jack Mackerel Species Profile. Therefore, sufficient relevant information related to stock structure, stock productivity, fleet composition and other data is available to support the harvest strategy; **SG60 and SG80 are met**.

There are still gaps of knowledge in the biology of the species, (i.e., early life history, recruitment dynamics, natural mortality, growth) as well as the impact of environmental correlates to the species distribution. Furthermore, despite many studies addressing stock structure, it is uncertain if there is one stock, 2 stocks or there is metapopulation.

Given the above, it cannot be said that a comprehensive range of information (on stock structure, stock productivity, fleet composition, stock abundance, UoA removals and other information such as environmental information), including some that may not be directly related to the current harvest strategy, is available; **SG100 is not met**.

Monitoring				
b	Guide post	Stock abundance and UoA removals are monitored and <b>at least one indicator</b> is available and monitored with sufficient frequency to support the harvest control rule.	Stock abundance and UoA removals are <b>regularly monitored</b> at a level of accuracy and coverage consistent with the harvest control rule, and <b>one or more indicators</b> are available and monitored with sufficient frequency to support the harvest control rule.	All information required by the harvest control rule is monitored with high frequency and a high degree of certainty, and there is a good understanding of inherent <b>uncertainties</b> in the information [data] and the robustness of assessment and management to this uncertainty.
	Met?	Yes	Yes	No

**Rationale**

## PI 1.2.3

### Relevant information is collected to support the harvest strategy

**Stock abundance and UoA removals are regularly monitored at a level of accuracy and coverage consistent with the harvest control rule, and one or more indicators are available and monitored with sufficient frequency to support the harvest control rule.**

Information on catch data for the JJM model represents a summation of catch values from various members of SPRFMO to form four “fleets”: Fleet 1 (northern Chile), Fleet 2 (central-south Chile), Fleet 3 (the far north fleet) and Fleet 4 (the offshore trawl fleet), which are intended to be consistent with the gear and general areas of fishing. (SPRFMO, 2023b).

The Chilean Jack mackerel research programme has included surveys using hydro-acoustics and the daily egg production method (DEPM). Stock productivity and abundance are monitored by way of an annual RV survey which provides ongoing, fishery-independent indices of abundance and biomass at age as well detailed information on size, age and maturity composition. These acoustic surveys that estimate the biomass and distribution of Jack mackerel, have also been conducted along the Chilean coast, inside and outside of the EEZ, using scientific vessels. Additionally, comprehensive acoustic surveys have been conducted from the Chilean commercial fleet. (SPRFMO, 2023b). The Peruvian Jack mackerel research programme includes egg and larvae surveys and hydro-acoustic stock assessment surveys.

The majority of Chilean Jack mackerel landings from industrial and artisanal are monitored at the dockside point of offloading by dockside monitors. The independent, third-party monitors verify the weight and the species of fish offloaded. IFOP Science undertakes dockside sampling to characterize the age and size composition of the landings. Walker *et al.* (2023).

IFOP has research programs that annually monitors Catch, Effort, fleet dynamics, biological data (Length, Age, Biomass, Growth, maturity) of the Jack mackerel Industrial purse seine fishery (SPRFMO, 2023a). There is also a program that study the discards of Jack mackerel as target species, non-target fish species as well as bycatch of seabirds, marine mammals and sea turtles (Ossa *et al.*, 2023).

The monitoring of the discards and bycatch are done by an observer program. In 2022 sampling coverage for the South-Central purse seine industrial fishery within Chile EEZ by scientific observers onboard fishing vessels was 22.3%, and at-port sampling coverage was 16.9%, with a total combined sampling coverage of 39.2%. (Ossa *et al.*, 2023). This coverage is in compliance with the requirements of SPRFMO where it requires countries to ensure a minimum 10% scientific observer coverage in the Jack mackerel fishery

The compliance with measures of Chile Jack Mackerel purse seine fishery discards reduction plan and handling protocols are being monitored remotely by electronic monitoring systems EMS (Image Recording Devices (DRI) and Electronic Logbook System (SIBE)) onboard all vessels of the industrial fleet. The Electronic Logbook Systems (SIBE) is used to report documents in a set-by-set basis, total catches, bycatch and discards, locations of sets and other fishery information according to the requirements of the Law for the in the entire industrial fleet. (SPRFMO, 2023a).

Therefore, stock abundance and UoA removals are regularly monitored at a level of accuracy and coverage consistent with the harvest control rule, and one or more indicators are available and monitored with sufficient frequency to support the harvest control rule; **SG60 and SG80 are met.**

However, while possible sources of uncertainty in data from the fishery are known, it cannot be said that all information required by the harvest control rule is monitored with high frequency and a high degree of certainty, and there is a good understanding of inherent uncertainties in the information (stock structure, age and growth data) and the robustness of assessment and management to these uncertainties; **SG100 is not met.**

Comprehensiveness of information			
<b>C</b>	Guide post	There is good information on all other fishery removals from the stock.	
	Met?	<b>Yes</b>	

### Rationale

**PI 1.2.3**
**Relevant information is collected to support the harvest strategy**
**There is good information on all other fishery removals from the stock.**

Chilean Jack Mackerel is harvested by industrial and artisanal fishermen and catch is reported for all trips from the Industrial and Artisanal sectors. The majority of Chilean Jack mackerel landings from industrial and artisanal sectors are monitored at the dockside point of offloading by independent, third-party dockside monitors and complemented in logbooks. These monitors verify the weight and the species of fish offloaded, thereby quantifying total removals for each species by all fisheries. More recently, a monitoring study of discards in the Southern Central demersal groundfish fishery was initiated in 2015 (Ossa *et al*, 2023) with the purpose to provide estimates of discards for the North and South Central Industrial and artisanal fisheries. Data on Industrial discards and Artisanal discards information have been used by the Jack Mackerel management have been used to elaborate the Jack Mackerel discards reduction plan (SUBPESCA, 2019).

Also as of 2020, industrial vessel owners have the obligation to report, in real time and in a set-by-set basis, all catches, discards and incidental catch through the Electronic Logbook System (SIBE) tool that has been implemented by the National Fisheries and Aquaculture Service, according to the Law (SPRFMO, 2023a). The information that must be reported in the electronic logbooks includes:

- Geographic Location of the set.
- Time (beginning and end) of the set.
- Amount (weight) or number of specimens caught by species or species groups.
- Incidental catch by species or species groups.
- Additional information (notes).

Therefore, there is good information on all other fishery removals from the stock. **SG80c is met.**

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**Draft scoring range and information gap indicator added at Announcement Comment Draft Report**

Draft scoring range	Applicable SGs/elements <u>likely</u> met			<u>Likely</u> overall PI score
	SG60	SG80	SG100	
	2 of 2	3 of 3	0 of 2	
Information gap indicator	Information sufficient to score PI			

**Overall Performance Indicator scores added from Client and Peer Review Draft Report**

Overall Performance Indicator score	Applicable SGs/elements met	Overall score

PI 1.2.3	Relevant information is collected to support the harvest strategy		
	SG60	SG80	SG100
	X of x	X of x	X of x
Condition number (if relevant)			

## PI 1.2.4 – Assessment of stock status

PI 1.2.4		There is an adequate assessment of the stock status		
Scoring Issue		SG 60	SG 80	SG 100
<b>a</b>	<b>Appropriateness of assessment to stock under consideration</b>			
	Guide post		The assessment is appropriate for the stock and for the harvest control rule.	The assessment takes into account the major features relevant to the biology of the species and the nature of the UoA.
	Met?		<b>Yes</b>	<b>No</b>

### Rationale

#### **The assessment is appropriate for the stock and for the harvest control rule**

The Chilean Jack mackerel assessment uses a statistical catch-at-age (SCA) model to assess the stock status and a Management Strategy Evaluation model is currently developing to evaluate the impact of a suite of harvest strategies on the biomass/population trends and landings. Statistical catch-at-age methods analyze data on the age of fish captured in scientific surveys and by fisheries to provide management advice. They require at least one index of stock size, such as a survey index or record of commercial fishery catch and effort. They also require records of the total catch from each fishery targeting a stock over time. An advantage of SCA for fisheries' stock assessment is that it can make full use of both age- and size-specific information, including factors important for describing population dynamics, such as growth, maturity, fecundity, natural mortality, and gear selectivity, and all of them may be functions of age or size for the species in question (Cope, 2013; Maunder and Punt, 2013). When SCA are used, they provide estimates of biological reference points based on processes like recruitment, catchability, the adult stock–recruitment relationship, and fishing and natural mortality.

The statistical catch-at-age (SCA) model estimates historical biomass, fishing mortality, recruitment and biological reference points, and recruitment and is used to condition, or parameterize, the MSE operating model. Therefore, the assessment takes into account the major features relevant to the biology of the species and the nature of the UoA; **SG80 is met**.

However, there are still some sources of uncertainty in the major features of the biology of Jack mackerel and the nature of the UoAs. According to SPRFMO (2023b), one of the higher priority items for consideration continues to be the catch-at-age estimates (based on age-determinations being conducted from different labs) and mean body weights at age assumed in the model. Another priority for consideration is the development of guidelines for standardization of CPUE indices and the collection of relevant data. In particular, evaluations of efficiency improvements for the Peruvian and Chilean fishing fleets were noted. Results of the data weighting and the retrospective pattern analysis also warrant further investigation. The issue of evaluating sensitivities to the early fishery age composition data was raised. The SC noted that this might be a fruitful avenue for investigation in subsequent assessments, particularly since these data (pre -1990) are less well-documented. Residual patterns in the age composition for the North Chilean fleet remain unresolved and warrant further investigation as well.

Finally, one of the long-standing questions and uncertainties with the Jack mackerel assessment and management is around the stock structure, and specifically whether there are multiple stocks or a single stock. The SC MSE working group is considering building an operating model OM into a MSE that allows testing the robustness of candidate management procedures MPs to these different, potential hypotheses. The 2023 stock assessment identified there, is a need for a closer evaluation comparing the performance of the JJM model under the single-stock and two-stock hypotheses that would be likely conducted using simulation and MSE.

Based on the above, it cannot be said that the assessment considers the major features relevant to the biology of the species and the nature of the UoA. **SG100 is not met**.

#### **b Assessment approach**

PI 1.2.4		There is an adequate assessment of the stock status		
	Guide post	The assessment estimates stock status relative to generic reference points appropriate to the species category.	The assessment estimates stock status relative to reference points that are appropriate to the stock and can be estimated.	
	Met?	Yes	Yes	

#### Rationale

**The assessment estimates stock status relative to reference points that are appropriate to the stock and can be estimated.**  
 The 2023 stock assessment provides an estimate of stock status in relation to reference points established for the Chilean Jack mackerel; the latest such estimates are:

Stock status relative to reference points		
Type of reference point	Value of reference point	Current stock status relative to reference point
PRI = SSBlim (9 %SSB0)	SSBlim= 2,203 million tons t	SSB2023 =16400 million tons  SSB2023/SSBLim =7.44
SSBMSY = (30 %SSB0)	SSBMSY= 7,164 million tons t	SSB2023= 16400 million tons  SSB2023/SSBMSY =2.29
FMSY	0.59	F2023=0.13 F2023/FMSY=0.4

#### SG60b and SG80b are met.

Uncertainty in the assessment				
C	Guide post	The assessment identifies major sources of uncertainty.	The assessment takes uncertainty into account.	The assessment takes into account uncertainty and is evaluating stock status relative to reference points in a probabilistic way.
	Met?	Yes	Yes	Yes

#### Rationale

**The assessment takes into account uncertainty and is evaluating stock status relative to reference points in a probabilistic way.**

The Joint Jack Mackerel stock assessment model (JJM) is meant to provide a practical, yet realistic representation of Chilean Jack Mackerel stock dynamics, fishery harvesting process, and monitoring data so that non-linear stock dynamics, time lags, and data uncertainties can be taken into account in annual TAC advice. Assessment outputs are based on a Bayesian framework. Further, the model does incorporate the majority of uncertainties for some of the important parameters such as growth, mortality and selectivity. Some of the uncertainties on the model are explored in sensitivity analyses of estimates from the assessment model due to uncertainty in abundance indices, catch length composition, selectivity and biological data (i.e., Growth Natural mortality). There are also diagnostics and retrospective patterns analysis to test the robustness of the model based on distinct alternative of runs or scenarios. The model estimates values of MSY and FMSY using a Newton-Raphson minimization routine that finds the value of fishing mortality, given the terminal year relative catches (and selectivities-at-age) by fleet, and the terminal year weights-at-ages for each fleet, that maximizes catch. The JJM Statistical catch-at-age model use a Bayesian approach, where it estimates uncertainty with an approach known as Markov Chain Monte Carlo, which results in relative goodness-of-fit estimates for a range of values for all the parameters. One advantage of this approach is that it can directly incorporate prior information about the parameter values and can pass the uncertainty through to the biological reference points and to the estimates of how the stock may respond to future management actions. The assessment provides

**PI 1.2.4**
**There is an adequate assessment of the stock status**

estimates over time showing spawning biomass, recruitment at age 1 (millions); total fishing mortality total catch with 95% of confidence limits. The model produces dynamic estimates of *BMSY* and dynamic estimates of *FMSY*. The assessment model provides kove plots to visualize the level of uncertainty on the reference points. The model provides Scenarios of projections of SSB under different strategies calculating the probabilities (P) that the SSB will exceed *BMSY*.

**SG60c, SG60c, SG100c are met.**

Evaluation of assessment			
<b>d</b>	Guide post		The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored.
	Met?		Yes

**Rationale**

**The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored.**

The Joint Jack Mackerel (JJM) assessment model was developed from a series of workshops initiated by SPRFMO from 2009-2010 (SPRFMO, 2010a; SPRFMO, 2010b). Those workshops intended to define and/or establish the technical standards and available stock assessment methods for estimating the maximum sustainable yield (MSY) and the biological reference points (BRP) associated with it. After a series of comparison of performance from different models (JJM, evolutionary model, ICA model, Triple Instantaneously Separable VPA), the JJM stood up as the more robust model.

Another review of the robustness of the JJM model was done on the sixth workshop of the Scientific Committee (SCW06) held in Valparaiso, Chile, 28-30 May 2018 (SPRFMO 2018).

A “full” assessment was executed during the May 2018 workshop, held in Valparaiso, Chile. The workshop evaluated many different model sensitivities as well as alternative assessment methodologies (Stock Synthesis (SS3), State-space Assessment Model (SAM), Surplus Production in Continuous Time (SPiCT) model). The workshop concluded on a preferred assessment configuration (model 1.13) for Commission advisory purposes using the Joint Jack Mackerel (JJM) model.

Since its adoption, the JJM model has been improved by Benchmark Workshops. The most notable changes have been options to include length composition data (and specifying or estimating growth) and the capability to estimate natural mortality by age and time. The model is flexible and permits the use of catch information either at age or size for any fleet, and explicitly incorporates regime shifts in population productivity.

Key uncertainties associated with both the assessment and projections in estimation and expectations of future environmental conditions that may affect robustness are addressed by exploring different assumptions in model runs and comparing the results.

Key uncertainties in the assessment include:

- Stock structure: considered through applying both single and two stock models.
- Natural mortality, M: highly uncertain, assumed constant for all ages and through time. Value of 0.28 for all ages and all years for the single-stock model and the south stock of the two-stock model, was derived from the mode of M values estimated with multiple methods using the Natural Mortality Toolbox
- Input data quality: a number of model runs excluded or included various data components and others changed the weighting of different data components.

Changes in regime may affect future recruitment levels, which in turn will affect estimates of biomass through projections. Uncertainties about environmental regimes have thus been addressed through the range of scenarios used in the projections with differing values of recruitment regimes and stock recruitment steepness parameters.

## PI 1.2.4

### There is an adequate assessment of the stock status

Other approaches that were investigated to evaluate the model robustness was the magnitude of retrospective patterns in output values such as R, SSB or F. An analytical retrospective analysis involves running the model multiple times, each time removing the final year of data (for five years). Diagnostic plots showed weak retrospective patterns confirming the robustness of the model.

An alternative to the analytical retrospective analysis, which is based on the current model formulation, the “historical retrospective analysis” instead compares quantities derived from assessments previously adopted by the SC. This indicates the year-to-year changes in estimates of stock trends and reference points.

The results were mostly in line with the previous year’s estimates, albeit with the SC11 model showing a larger increase in biomass for 2022 and 2023 than the previous model. The trends in the CPUE and age composition data were likely driving this change. Estimates of fishing mortality in recent years remain similar to that of the previous SCs, almost following the estimates from SC10 exactly. Recruitment estimates appear mostly in line with those of previous models, similar to SC10. Overall, the trends appear consistent over time. Another interesting comparison to make is that of the management reference points (biomass (B) at maximum sustainable yield (MSY) and fishing mortality (F) at MSY; BMSY and FMSY respectively) estimated over the years. Previously, updates to the ageing methodology in 2022 likely led to a change in the perception of stock biomass, likely resulting in an increase in the estimate of BMSY. The updates to the data for the 2023 resulted in similar estimates of the reference points to the SC10 model (The stock has consistently been estimated as rebuilt since 2018, and not subject to overfishing since 2013, relative to the dynamically-estimated MSY reference points).

Based on the above, it can be said that the assessment has been tested and shown to be robust. It can also be said that alternative hypotheses and assessment approaches have been rigorously explored. **It meets 100d.**

Peer review of assessment	
<b>e</b>	Guide post
	The assessment of stock status is subject to peer review.
Met?	
Yes	
Yes	

### Rationale

#### The assessment has been internally and externally peer reviewed.

Jack Mackerel stock assessment benchmark workshops are done by the SPRFMO SC Jack Mackerel working group internally to review the stock assessment. **SG80 is met.** During these workshops the stock assessment evaluations undergo external peer review as well, involving invited experts (e.g., Dan Ovando, SCW14 2022) who analyze the assessment data, models, and assumptions employed, among other things. **Thus, SG100 is also satisfied.** Evidence of external reviews comes from Benchmark stock assessment workshops peer reviews reports by (SCW14 2022). **SG80 and SG100 are met.**

### References

- ASTT. 2010. Report from the assessment simulation task team on Chilean Jack mackerel stock assessment, August 16-20th 2010, University of Washington, Seattle USA.
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### Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	Applicable SGs/elements <u>likely</u> met
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PI 1.2.4	There is an adequate assessment of the stock status			
	SG60	SG80	SG100	Likely overall PI score
	2 of 2	4 of 4	3 of 4	≥80
Information gap indicator	Information sufficient to score PI			
<b>Overall Performance Indicator scores added from Client and Peer Review Draft Report</b>				
Overall Performance Indicator score	Applicable SGs/elements met			Overall score
	SG60	SG80	SG100	
X of x		X of x	X of x	
Condition number (if relevant)				



## 11 Principle 2

### 11.1 Backgorund

Principle 2 - Environmental impact of fishing (also referred to as P2) of the MSC Fisheries Standard v2.01 states that:

*"Fishing operations should allow for the maintenance of the structure, productivity, function and diversity of the ecosystem (including habitat and associated dependent and ecologically related species) on which the fishery depends."*

The information presented in this section is provided to support the rationale set out for the Principle 2 Performance Indicators for the 3 following components:

- Primary species
- Secondary species
- Endangered, Threatened or Protected (ETP) species

Primary species in the catch are those within scope of the MSC program that are not covered under P1 and where management tools and measures are in place, intended to achieve stock management objectives reflected in either limit or target reference points.

Secondary species are species in the catch that are within scope of the MSC program, not covered under P1, not considered "primary" and that are out-of-scope of the program, but where the definition of ETP species is not applicable.

Depending on the percentage of catches, as well as their resilience or vulnerability to the fishery, primary and secondary species are classified as main or minor. Information on potential resilience of individual species is obtained from FishBase, which included specific information on a species, size, maturity, fecundity, growth rates, and trophic level. According to the MSC Fisheries Standard v2.01 (SA3.4.2.2) for evaluating species resilience, a 2% threshold on the total weight of catch is applied for less resilient species and 5%, for more resilient species.

ETPs species are those are those recognised by national and international ETP legislation and species classified as "out-of scope" (amphibians, reptiles, birds and mammals) that are listed in the IUCN Redlist as vulnerable (VU), endangered (EN) or critically endangered (CE).

In 2015, with the Exempt Resolution N° 524 of 2015, of the Undersecretariat of Fisheries, modified by Exempt Resolution N° 1258 and N° 1746 of 2017, N° 746 of 2018, a research program of discards and incidental catches for industrial Jack mackerel fishery and its accompanying was authorised for the regions between Valparaíso (V) and Araucanía (IV), Los Ríos (XIV) and Los Lagos (X) and international water under the convention of South Pacific Regional Fisheries Management Organisation (SPRFMO). Scientific observers have been working onboard of the vessels monitoring the levels of bycatch and the interactions of the fishery with seabirds, marine mammals and reptiles, as well as the associated non-target species. Data collected from 2015-2018 were used to develop the "Plan for the Reduction of Discards and Incidental Catches in the Industrial Fishery of Jack Mackerel and its Bycatch between the Regions of Valparaíso to Los Lagos and International Waters under the Convention of the South Pacific Regional Fisheries Management Organisation (SPRFMO)", which was authorized by the Exempt Resolution 1626 /2019.

In 2019, when the initial assessment of Chilean Jack mackerel fishery was performed, the catch composition and consequently the determination of the MSC categories was based on results of the report of the findings

of the observer and self-sampling research carried out between January 2015 and December 2016 published by IFOP (2017). A total of 74 observer trips aboard industrial jack mackerel vessels took place in 2015 and 2016, covering 5.7% of the fishing trips and data collected was compared with the self-reported logbook records for the period. Marine mammals, birds and reptiles data were collected by scientific observers during 1,165 fishing hauls of the fishery (IFOP, 2017). The results provided technical background for the preparation of the discard reduction plan for this fishery. With the implementation of the Plan, there were some changes in the catch composition of this fishery and reduction of the incidental catches and discards for several species.

For this re-assessment, catches data from the last 4 years (2019-2022), therefore, right after the authorization of the Plan, were used for determining the relevant species to be evaluated in this new stage of the assessment. The average coverage for discards of the fishing trips by scientific observers for this period, was of 8.45% (Vega *et al.*, 2020, 2021, 2022 and Ossa *et al.*, 2023). While the average coverage for incidental catches of marine mammals, birds and reptiles data of the fishing trip was 11.15%, with 1,226 fishing hauls followed by scientific observers (Vega *et al.*, 2024).

For determining the non-seabirds primary and secondary species of this fishery, it was used data of total catches of the species caught by the central - southern Chilean jack mackerel industrial purse seine fishery registered on the logbooks provided in attachment of the reports of the research and monitoring program on discard and bycatch in pelagic fisheries published by IFOP (Vega *et al.*, 2020, 2021, 2022 and Ossa *et al.*, 2023) on the following link:

<https://www.ifop.cl/en/busqueda-de-informes/>

For the purpose of this assessments, all non-birds species that composed more than 0.1% of the total catch composition were considered for the primary and secondary species assessment.

Regarding seabirds, the specimens that were recorded by scientific observers for the Chilean jack mackerel industrial purse seine fishery operating in the central - southern Chile and international waters provided on IFOP reports of research and monitoring program on discard and bycatch in pelagic fisheries were analyzed (Vega *et al.*, 2020, 2021, 2022 and Ossa *et al.*, 2023). From those, the specimens that were not covered by the ETP criteria specified in SA3.1.5 of MSC Fisheries Standard v2.01 were considered main secondary, according to SA3.7.1.2.

#### **11.1.1.1 Primary species**

According to data provided on logbooks from the discards program between 2019-2022, no species of the Bycatch of the Chilean Jack mackerel industrial purse seine fishery operating in central southern composing more than 0.1% of the total catches have management tools and measures in place, intended to achieve stock management objectives reflected in either limit or target reference points. Therefore, there are no primary species in this fishery.

#### **11.1.1.2 Secondary species**

The seabirds specimens that were recorded by scientific observers for the Chilean jack mackerel industrial purse seine fishery operating in the central - southern Chile and international waters provided on IFOP reports of research and monitoring program on discard and bycatch in pelagic fisheries were analysed (Vega *et al.*, 2020, 2021, 2022 and Ossa *et al.*, 2023) for identifying ETPs and main secondary species. Two seabirds specimens were not covered by the ETP criteria specified in SA3.1.5 of MSC Fisheries Standard v2.01: peruvian pelican (*Pelecanus thagus*) and sooty shearwater (*Ardenna grisea*). They were not identified in any binding international agreements and have a "Near Threatened" status in Chile (DS 23/2019 MMA) and in IUCN Red

list (BirdLife International, 2018c and 2019). According to SA3.7.1.2 of MSC Fisheries Standard v2.01, species that are defined as “out-of-scope” (amphibians, reptiles, birds, mammals) and are not classified as ETP, shall be considered main secondary. Therefore, these species were classified accordingly. The main secondary bird species identified for this fishery is presented in Table 24 below.

**Table 24.** Compilation of total catches data of main secondary seabird species reported by scientific observers during the 2019-2022 period in the Chilean Jack mackerel industrial purse seine fishery operating in south central Chile and international waters, as provided in IFOP reports (Vega *et al.*, 2020, 2021, 2022 and Ossa *et al.*, 2023). Scientific observers covered an average of 11.15% of the fishing trip and 1,226 of the fishing hauls (Vega *et al.*, 2024).

Latin name	Common name		Total catch (4 years)	Mortality (4 years)	MSC Classification
	English	Spanish			
<i>Pelecanus thagus</i>	Peruvian pelican	<i>Pelicano peruano</i>	7	1	Main secondary
<i>Ardenna grisea</i>	Sooty shearwater	<i>Fardela negra</i>	1	1	Main secondary

In the initial assessment, albatross species (*Thalassarche* spp.) and cape petrel (*Daption capense*) were considered main secondary species for this fishery as well, however there were no reports of catches of them by the scientific observers since the 2015-2016 research cruise performed in IFOP (2017), thus they are not considered secondary species for this fishery anymore.

The only minor secondary non-bird species identified for the fishery was chub mackerel (Table 25)

**Table 25.** Compilation of total catches data of the minor secondary non-birds species reported by scientific observers from the central - southern Chilean Jack mackerel industrial purse seine fishery during the 2019-2022 period. Scientific observers covered an average of 8.45% of the fishing trips (Vega *et al.*, 2020, 2021, 2022 and Ossa *et al.*, 2023).

Latin name	Common name		Average total catch (t) (4 years)	% Average Total catch (4 years)	MSC Classification
	English	Spanish			
<i>Scomber japonicus</i>	Chub mackerel	<i>Caballa</i>	514.10	1.33	Minor secondary

In the initial assessment, blue flathead (*Cubiceps caeruleus*), snoek (*Thyrsites atun*), south Pacific hake (*Merluccius gayi gayi*) and Patagonian grenadier/hoki (*Macrorunus megallanicus*) and Humboldt squid (*Dosidicus gigas*) were considered minor secondary species. However, in the last 4 years Humboldt squid composed an average of only 0.0003% of the catches (16 tons) and there were no records of catches of the other mentioned species on the logbooks provided by the discards program, thus they were all excluded from the scope of this assessment.

#### 11.1.1.3 ETP species

Chile is a member country of several agreements for the conservation of ETP species such as Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), Convention on Biological Diversity (CBD), Convention on Migratory Species (CMS), Agreement on the Conservation of Albatrosses and Petrels (ACAP), International Convention for the Regulation of Whaling (ICRW), Ramsar Convention on Wetlands, Agreement on Measures for the Conservation of Sharks in the South Pacific (SPIMA), Western and Central Pacific Fisheries Commission, CODEFF BirdLife international, *Convención de las Naciones Unidas por los Derechos del Mar* (CONVEMAR), Agreement on the Conservation of African-Eurasian Migratory Waterbirds (AEWA) and different international agreements with countries around the world to preserve the marine life

as "Chile - United States Memorandum of Understanding on Cooperation for the Conservation and Management of Terrestrial and Marine Protected Areas".

There are 70 protected species in Chile, according to the Decree N° 225 of 1995, amended by Decree N° 135 of 2005 and N°434 of 2007, all from Ministry of Economy. The species are protected by a total ban for a period of 30 years, from November 11th, 1995 until November 10th, 2025.

The ETP species identified as interacting with this fishery are presented in Table 26. **Error! Reference source not found.** The National status of the species pointed in the table and the related decree were built based on the spreadsheet provided during the 19° Wild Species Classification Process, when the status of several species was updated. In this process, species are evaluated under the categories extinct (EX), critically endangered (CR), endangered (EN), vulnerable (VU), near threatened (NT), least concern (LC) and data deficient (DD).

**Table 26. ETP species reported by scientific observers during the 2019-2022 period in the Chilean Jack mackerel industrial purse seine fishery operating in south central Chile and international waters, as provided in IFOP reports (Vega et al., 2020, 2021, 2022 and Ossa et al., 2023).**

Latin name	Common name		National status	Decree	CITES Appendix I	CMS	IUCN	AEWA	Total catches (4 years)	Mortality (4 years)
	English	Spanish								
<i>Otaria byronia</i>	South American sea lion	<i>Lobo marino comum</i>	LC	DS 13/2013 MMA	No	-	LC	-	266	0
<i>Larus dominicanus</i>	Kelp gull	<i>Gaviota dominicana</i>	EN	DS 50/2008 MINSEGPRES	No	-	LC	Yes	2	0
<i>Ardenna creatopus</i>	Pink-footed shearwater	<i>Fardela blanca</i>	EN	DS 10/2023 MMA	No	ACAP Annex 1	VU	No	2	2
<i>Spheniscus humboldti</i>	Humboldt penguin	<i>Pinguino de Humboldt</i>	VU	DS 50/2008 MINSEGPRES	Yes	-	VU	No	1	0
<i>Spheniscus magellanicus</i>	Magellanic penguin	<i>Pinguino de Magalhães</i>	NT	DS 10/2023 MMA	No	-	LC	No	1	1

The South American sea lion (*Otaria byronia*) is an out-of-scope species that has been monitored by IFOP, but is not considered protected by Decree N° 225 of 1995 or its amends and it has a "Least Concern" status by the National Regulation and IUCN. Nevertheless, there have been specific regulations for this species to be considered protected in the Exclusive Economic Zone - EEZ Chilean waters in the past. Currently, according to Exempt Decree 202100004 a harvesting ban has been established for this species up to 27th January 2031. Therefore, South American sea lion is considered an ETP species for this assessment purpose.

In the initial assessment, black-browed albatross (*Thalassarche melanophrys*), grey-headed albatross (*Thalassarche chrysostoma*), white chinned petrel (*Procellaria aequinoctialis*), leatherback turtle (*Dermochelys coriacea*) and wandering albatross (*Diomedea exulans*) were also included in the ETPs list of this fishery. However, with exception of black-browed albatross, there were no reports of catches of them by the scientific observers since the 2015-2016 research cruise performed in IFOP (2017). There was one catch of black-browed albatross in 2018, which resulted in death. Nevertheless, as here only data from 2019 and onwards have been used, this species will not be considered an ETP.

#### 11.1.1.4 Advances on the management and information of the fishery

The "Plan for the Reduction of Discards and Incidental Catches in the Industrial Fishery of Jack Mackerel and Its Bycatch between the Regions of Valparaíso to Los Lagos and International Waters under the Convention of the South Pacific Regional Fisheries Management Organisation (SPRFMO)" has been implemented in 2019 and research programs focused on discards and incidental catches in the industrial jack mackerel fishery and its Bycatch has been operating since 2015.

The Plan is contained in Annex 1 of the Technical Report (R.Pesq.) N° 106 of 2019, of the Undersecretariat of Fisheries and considers the following aspects:

- Review of management and conservation measures and their modification to reduce the discard of jack mackerel as a target species and associated species.
- Plan monitoring program and evaluation of measures, use of the image recording device (IRD), use of electronic logs to report each fishing set, mandatory boarding of scientific observers in selected vessels.
- Training program and dissemination of measures.
- Code of good practices to reduce waste.

The programs predicted on the plan have provided data of total catches and discards, described species compositions, recorded and analysed biological indicators of target species and Bycatch, determined and described discard practices and their causes, quantified total mortality and type of interactions of birds, mammals, and sea turtles with the fishery and analysed the spatial and temporal variations of these indicators. The main reasons for discards (in weight and frequency) have been attributed to operations reasons, such as security, (mechanical failure or crew risk) and exceeds capacity operation, process capacity or plant instructions (Vega *et al.*, 2020, 2021, 2022 and Ossa *et al.*, 2023). Most of the interactions with seabirds and sea lions occurs during net hauling and setting of the purse seine. The main cause of seabird mortality has been from injuries from the fishing net. The most common type of interaction that and sealions seabirds have with the fishery has been feeding on the catch, followed by feeding of the discards for birds and caught by the net, for sea lions (Ossa *et al.*, 2023).

Coverage of discards monitored trips for industrial vessels increased from an average of 5.7% in 2015-2016 to 8.45% in the last 4 years (IFOP, 2017 and Vega *et al.*, 2020, 2021, 2022 and Ossa *et al.*, 2023).

From 2014-2021 a program for dissemination of the results of the discard and bycatch research program and the contents of the reduction plan was developed with the fishermen. Users received timely and updated information on the research program and discussion of proposals for mitigation measures were held, elements that were incorporated in the documents that were subsequently sent to SUBPESCA. This allowed the exchange opinions and experiences about the fishing operation, implication of the program and finally contributions or fishermen's apprehensions about the proposed measures.

Two manuals of good practices for pelagic Chilean fishery were produced, one in 2020 by INPESCA and another one in 2021 by CIAM (INPESCA, 2020 and CIAM, 2021). The INPESCA manual specific was tailored specifically to the fishery of this assessment. As a part of the practices, there were protocols for the mitigation, handling and release of birds, marine mammals and reptiles, as well as descriptions of the Transfer of Surplus Fishing Haul - TEL (*Traspaso de Excedentes del Lance de Pesca*) maneuver and the rule of change of fishing area. The TEL maneuver involves transferring surplus catch to another vessel with available storage capacity and it was regulated by Res. Ex. 862 25/03/21 Minecom Subpesca. The rule of change of fishing area consists in communicating to the rest of the fleet when there is presence of bycatch in fishing operations and search for another fishing zone.

The dissemination of good practices for reducing discards and incidental catches in the fishery have been proven to be effective. INPESCA (2023) monitored the jack mackerel industrial purse seine fleets of south-central Chile from 2020-2022 and noticed a low level of incidental catches and accompanied fauna species from 2020 to 2022 and suggested that this might be related with application of TEL and the rule of change of fishing area. It was also reported an increase of the release of sea lions alive from 44.9% in 2020 to 98.3% in 2022. ATF-Chile in collaboration between the companies subscribed to PESCADORES INDUSTRIALES DEL BIOBÍO and SONAPESCA, carried out in 2022 an external review process of the development of local protocols of good practices applied to the jack mackerel fishery and verified that between 18.2-22.2% of the people of the crews were aware of good practice for reducing the incidental catches of birds (ATF- Chile, 2022).

It was also noticed a reduction on discards and incidental catches over the years that even implicated on the changes of the species composition for assessing this fishery. Apart from chub mackerel, the only species reported on fishing logbooks of the discards program in the last four years were Humboldt squid and southern rays bream, which composed an average of nearly 0.0003% and 0.0001% of the total catch, respectively (Table 27). A substantial decrease on the incidental catches of seabirds, mammals and reptiles was documented as well by the scientific observers comparing to the initial catches when the Plan was being prepared.

**Table 27. Compilation of total catches data of non-seabirds species reported by scientific observers from the central - southern Chilean Jack mackerel industrial purse seine fishery during the 2019-2022 period. Scientific observers covered an average of 8.45% of the fishing trips (Vega et al., 2020, 2021, 2022 and Ossa et al., 2023).**

Latin name	Common name		2019		2020		2021		2022		Average	
	English	Spanish	Total catch (t)	% Total catch								
<i>Scomber japonicus</i>	Chub mackerel	<i>Caballa</i>	952.945	0.0329	321.680	0.0066	641.417	0.0120	140.349	0.0017	514.098	1.3285
<i>Dosidicus gigas</i>	Humboldt squid	<i>Jibia</i>	0.000	0.0000	50.000	0.0010	0.000	0.0000	15.000	0.0002	16.250	0.0003
<i>Brama australis</i>	Southern rays bream	<i>Hacha, palometa, reineta</i>	1.210	0.0000	0.4900	0.0000	0.000	0.0000	0.000	0.0000	0.425	0.0001

**Table 28. Compilation of total catches data of seabirds species reported by scientific observers during the 2019-2022 period in the Chilean Jack mackerel industrial purse seine fishery operating in south central Chile and international waters, as provided in IFOP reports (Vega et al., 2020, 2021, 2022 and Ossa et al., 2023). Scientific observers covered an average of 11.15% of the fishing trip and 1,226 of the fishing hauls (Vega et al., 2024). CIP = Number of animals captured/number of total records (number of fishing hauls); MIP = Number of dead animals/number of total records (number of fishing hauls).**

Latin name	Common name		Catches		Dead		CIP		MIP	
	English	Spanish	2015-2016	2017-2022	2015-2016	2017-2022	2015-2016	2017-2022	2015-2016	2017-2022
<i>Larus dominicanus</i>	Kelp gull	<i>Gaviota dominicana</i>	224	20	0	1	0.0050	0.8000	0.0000	0.0004
<i>Ardenna creatopus</i>	Pink-footed shearwater	<i>Fardela blanca</i>	13	3	13	3	0.0003	0.0001	0.0003	0.0067
<i>Thalassarche melanophrys</i>	Black-browed albatross	<i>Albatros de Ceja Negra</i>	214	0	0	1	0.0050	0.0900	0.0000	0.0000
<i>Thalassarche chrysostoma</i>	Grey headed albatross	<i>Albatros de Cabeza Gris</i>	28	0	0	0	0.0006	2.1050	0.0000	0.0000
<i>Procellaria aequinoctialis</i>	White chinined petrel	<i>Fardela Negra Grande</i>	7	0	0	1	0.0200	0.0030	0.0200	0.0004
<i>Dermochelys coriacea</i>	Leatherback turtle	<i>Tortuga laud</i>	1	0	0	0	0.0020	0.0004	0.0000	0.0000
<i>Diomedea exulans</i>	Northern storm petrel	<i>Albatros errante</i>	1	0	0	0	0.0020	0.0004	0.0000	0.0000
<i>Otaria byronia</i>	South American sea lion	<i>Lobo marino comum</i>	1751	266	14	0	2.7000	0.8000	0.0090	0.0050
<i>Spheniscus humboldti</i>	Humboldt penguin	<i>Pingüino de Humboldt</i>	0	14	0	1	0.0000	0.0050	0.0000	0.0004
<i>Spheniscus magellanicus</i>	Magellanic penguin	<i>Pingüino de Magaháes</i>	0	1	0	1	0.0000	0.0004	0.0000	0.0004

A protocol for ensure the adequate record of images with the use of IRD in industrial purse seine fishery of south-central Chile has been approved (RES.EX. N°2738/2019) and currently all industrial vessels have implemented the device on the vessels (INPESCA, 2023).

### 11.1.1.5 Habitats

The MSC Fisheries Standard v2.01 requires habitats interacting with the fishery to be defined as ‘Commonly-Encountered’, ‘VME’ or ‘Minor’, with definitions as given in Table 29.

**Table 29. Habitat definitions as per the MSC Fisheries Certification Requirements v2.01.**

FCR reference	Definition
<b>SA3.13.3.1</b>	A commonly encountered habitat shall be defined as a habitat that regularly comes into contact with a gear used by the UoA, considering the spatial (geographical) overlap of fishing effort with the habitat's range within the management area(s) covered by the governance body(s) relevant to the UoA.
<b>SA3.13.3.2</b>	A Vulnerable Marine Ecosystem (VME) shall be defined as is done in paragraph 42 subparagraphs (i)-(v) of the FAO Guidelines (definition provided in GSA3.13.3.2). This definition shall be applied both inside and outside EEZs and irrespective of depth.

FCR reference	Definition
GSA3.13.3.2	<p>VMEs have one or more of the following characteristics, as defined in paragraph 42 of the FAO Guidelines:</p> <ul style="list-style-type: none"> <li>Uniqueness or rarity – an area or ecosystem that is unique or that contains rare species whose loss could not be compensated for by similar areas or ecosystems.</li> <li>Functional significance of the habitat – discrete areas or habitats that are necessary for survival, function, spawning/ reproduction, or recovery of fish stocks; for particular life-history stages (e.g., nursery grounds, rearing areas); or for ETP species.</li> <li>Fragility – an ecosystem that is highly susceptible to degradation by anthropogenic activities.</li> <li>Life-history traits of component species that make recovery difficult – ecosystems that are characterised by populations or assemblages of species that are slow growing, are slow maturing, have low or unpredictable recruitment, and/or are long-lived.</li> <li>Structural complexity – an ecosystem that is characterised by complex physical structures created by significant concentrations of biotic and abiotic features</li> </ul>
N/a	Minor habitats are those that do not meet the above definitions.

Following MSC Fisheries Standard, SA3.13.5, when assessing the status of habitats and the impacts of fishing, teams are required to consider the full area managed by the local, regional, national, or international governance body(s) responsible for fisheries management in the area(s) where the UoA operates (the “managed area” for short). Moreover, in SA3.13.5.1, MSC mentions that the team shall use available information (e.g., bioregional information) to determine the range and distribution of the habitat under consideration, and whether this distribution is entirely within the “managed area” or extends beyond the “managed area”.

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Therefore, the Chilean jack mackerel (*Trachurus murphyi*) is widely distributed across the South Pacific Ocean, extending from the subtropical waters off South America to New Zealand and Australia. This species inhabits the waters off Chile and Peru, reaching as far north as the Galapagos Islands and as far south as 56°S, the southernmost area of Chile. Jack mackerel exhibit seasonal migrations, moving north of 40°S during spring and summer for spawning and then shifting south of 40°S in autumn and winter to feed.

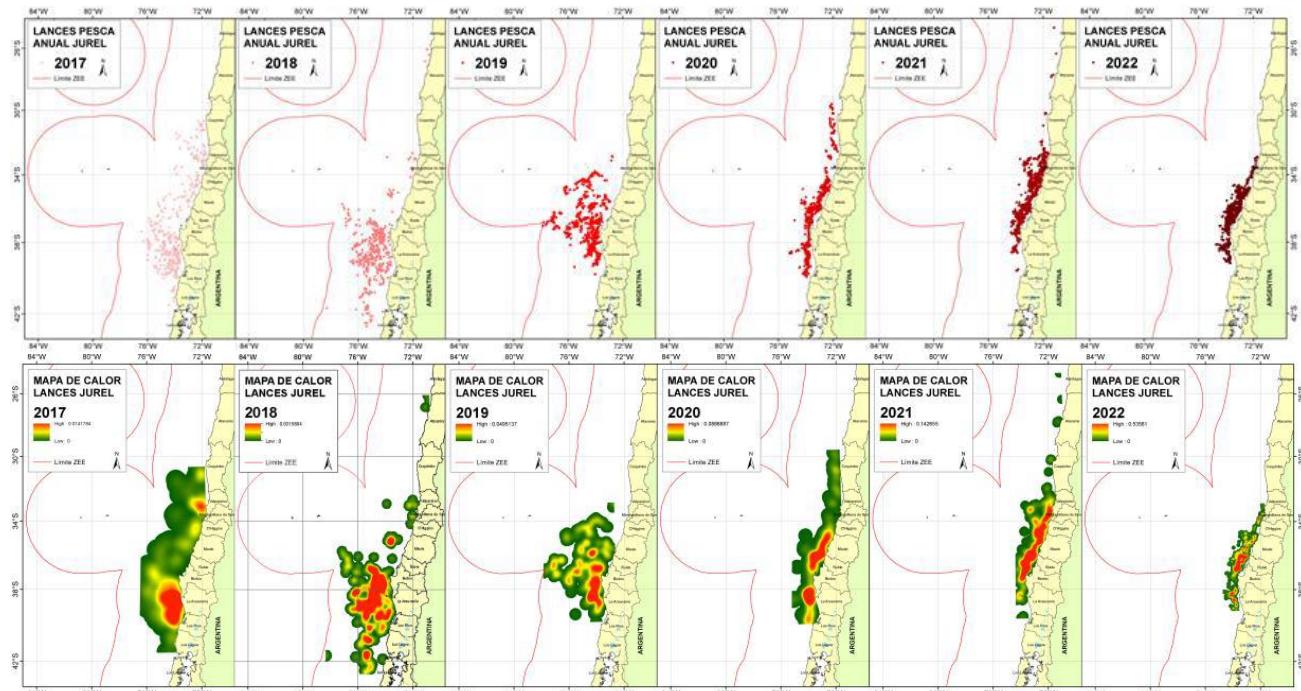
This species inhabits both coastal and offshore waters, often forming large schools. While typically found in the upper part of the water column, jack mackerel can also be found at depths of up to 400 meters. Fishing efforts are concentrated in shallower waters, up to 200 meters deep, ensuring that the fishery occurs within the water column without contacting the seafloor.

As required by MSC, the assessment team must define the common habitats encountered in the fishery and identify any potential minor habitats impacted. According to the latest report from INPESCA, the primary habitat affected by the fishery is the water column, with no significant impact on minor habitats. The gear type used, purse seine nets, is not prone to being lost, thereby minimizing the risk of ghost fishing.

The spatial distribution of fishing effort by the industrial purse-seine fleet in Biobío during the period 2017–2022 (Figure 31) indicates that fishing activity primarily occurred within the Exclusive Economic Zone (EEZ) across a broad latitudinal range. However, there has been an annual trend toward more coastal operations, with a noticeable reduction in latitudinal coverage, which became more evident in 2022. From 2020 to 2022,

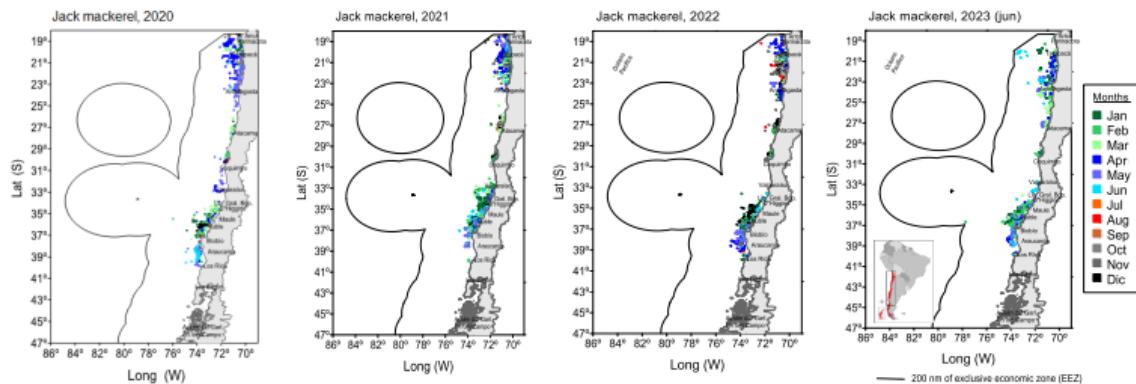
operations have predominantly taken place within the 60 nautical miles offshore strip. Monthly operational shifts can sometimes involve movements of up to 250 nautical miles, mainly in a south-north direction, allowing for coverage across multiple regions within the South-Central area of the country during inter monthly periods.

It is important to note that the spatial information on jack mackerel fishing hauls has been obtained from observers of the Fisheries Research Institute (INPESCA) onboard the vessels, as well as from self-reports provided by the fleet through the electronic fishing logbook and VMS (Figure 31).



**Figure 31. Spatial distribution of jack mackerel fishing hauls conducted by the Chilean industrial fleet from Biobío (A), and heat maps showing the concentration of fishing hauls (B) for the period 2017-2022. Source INPESCA 2023.**

Further, in the last report presented by Chile to the SPFRMO to the scientific committee for the Kack mackerel resource, it was mentioned by IFOP studies that since 2020, the spatial distribution of the Jack mackerel catches in the center-south zone of Chile have been concentrated near the coast, within 100 nm. Likewise, in the northern part of the country the captures of this resource have also been concentrated near the coast, on average within the first 50 nm, initially associated with the operation of the fleet directed to Anchovy, transiting to target fishing of Jack mackerel towards the most recent years. That information is in the lines with the information reported by INPESCA as it can be seen in the figure below (Figure 32).



**Figure 32. Spatial-temporal distribution of the industrial purse seine fleet targeting Jack mackerel for the 2020-2022 and Jun 2023 period. Source: IFOP 2023.**

During the SO156 cruise in March 2001, sediments were explored at depths of 100-4600 m off Iquique, Antofagasta, Valparaíso, Concepción, and Chiloé. Using a multibeam system, sediment samples were collected, revealing fine grains, clays, and authigenic deposits like phosphorites and carbonates. Northern regions showed high organic content (30-35%), while southern regions had lower organic content (10-20%).

Sediments in shallow areas near Mejillones and Concepción were rich in organic matter. Sedimentation rates increase with latitude, influenced by both organic and terrestrial inputs. Higher rainfall in the south leads to substantial sediment discharge from rivers, affecting sediment composition and transport.

Sediment accumulation rates rise with depth, showing signs of slumps, especially in the north. Biological and physical disturbances promote particle resuspension and fluid advection, altering sediment properties like porosity. In wider southern shelves (35-37°S), sediments are olive green and sometimes sulphur-smelling due to anaerobic degradation.

Sediment distribution on the continental margin is influenced by bottom topography, terrestrial inputs, and organic production. Three zones can be identified based on topography and hydrography: a narrow northern shelf, a wider central-southern shelf with submarine canyons, and a complex southern margin with fjords and basins. Submarine canyons channel material directly to the slope, affecting sediment transport and deposition.

Latitudinal and longitudinal sediment variations depend on shelf width, bottom morphology, continental input, water column production, and associated fauna. (Melo *et al.*, 2007).

The study cited above also conducted the granulometric analysis that in combination with other data defined and summarized the main characteristics to identify the type of habitats. Considering the platform width at different latitudes, the southern zone shows soft, muddy bottoms across a broader depth range, exposed to a low-oxygen zone from 50 to ~450 m depth along the SE Pacific continental margin. Moving northward, this low-oxygen zone becomes a water column feature, not affecting the bottom sediments, thus altering biogeochemical processes.

Sediments vary latitudinally and longitudinally based on platform width, bottom morphology (submarine canyons), continental input, water column production, oxygen content, and associated fauna. Other variables include organic content (total organic carbon, stable isotopes, chlorophyll-a), indicating the origin and degradation of organic matter. Data on CaCO<sub>3</sub> and SiO<sub>2</sub> (opal) highlight the significance of biogenic and inorganic inputs and the biogeochemical processes forming authigenic rocks (phosphorites and carbonates).

When the habitats are associated to submarine canyons, notably the San Antonio canyon ( $33^{\circ}\text{S}$ ) and the Itata and Bío-Bío river canyons ( $37^{\circ}\text{S}$ ), the platform is divided creating areas that facilitate material deposition. Thus, this zone generates muddy sediments with a high organic matter content (16-18%), comparable to other high biological production areas in the north (14-22%), despite topographic and rainfall differences. (Melo *et al.*, 2007).

Table 30 shows the bottom characteristics of different areas from the study by Melo *et al.* (2007). The advisory team is not aware of any more recent studies with these characteristics, and with this table and the previous data, habitats have been identified (Table 31).

**Table 30.** Background of the study area and surrounding zones (MOT: Total organic matter, COT: Total organic carbon, Bottom OD: Dissolved oxygen in bottom waters, Surface Density = density based on porosity at the surface of the sediments) (Source: Melo *et al.*, 2007).

Latitud	Localidad	Profundidad (m)	Granulometría	MOT (%)	$\delta^{13}\text{C}$	COT %	$\text{CaCO}_3$ %	$\text{SiO}_2$ %	OD fondo ( $\text{mL L}^{-1}$ )	Densidad sup. ( $\text{g cm}^{-3}$ )	Otros antecedentes	Referencias
22°S	sur de Iquique	111-517 891	fango 55-92%	15-22	-30 a -25 -25 a -20				0.24-0.97	0.4-0.5	50-98.8 $\mu\text{g g}^{-1}$ Cl-a	7,11
18-22°S	Arica-Tocopilla	180-523					1.4				Restos orgánicos: escamas de peces y huesos	6,12
23°S	Mejillones	75				~10.3	25	0.15			Sedimentos color verde oliva y presencia de restos orgánicos	15,16
23°S	Antofagasta	142 295 518	arenas (>94%) fango (73.8%) arenas (94%) fango (5.5%)	14		4.8			0.02-0.05 0.06 0.90	1.2	4.6-7.8 $\mu\text{g g}^{-1}$ Cl-a en todas las profundidades	11,12
27-28°S	Caldera al sur	100-500 400-500	> arenas fina-muy fina y < rocas y arenas gruesas (<4.7) <sup>a</sup>	6.4-16.3				0.7-1.4				2,17
27-33°S	Caldera a Valparaíso zona profunda	>969 1947	5 phl, bien sorteado, distribución leptocúrtica			4.3 - 20.6 16					Bajo contenido de Fe/Al, aporte de rocas plutónicas acidas del borde costero	1,12
29-33°S	Norte de Coquimbo a Valparaíso	100-200 400-600 1498	arenas finas a muy finas <6.5 phl, lomo arcillas	<3 a ~5			0.1-2.4 2.1	0.6-2			Alta Intemperización rocas del borde costero, predominancia de illitas ricas en Al y cloritas en las zonas profundas	3,12,18
34-38°S	Pichilemu al sur	160-3100									huecos de ballena, escamas de peces	6
35-42°S	Constitución a Chiloé	>680				2.3 - 11.6					Alto contenido de Fe/Al indica alto aporte de rocas basálticas-andesíticas	1
36°S	Concepción	64 122-365 535	lomo arcillas, arenas (<5%) y alto contenido de fango lomo arcillas, arenas (27%)	18 13-18 (6) <sup>b</sup>	-20 a -30 en todo rango de profundidades	12.06 1.13-3.06 2.06	0.19 0.13-0.79 3.7	0.2-0.5 en todo rango de profundidades 2.92			10.3-35.7 $\mu\text{g g}^{-1}$ Cl-a en zonas más someras 2.3-3.5 $\mu\text{g g}^{-1}$ en zonas más profundas	7,8,9,10, 11,12, 13
41-42°S	Chiloé	160-480 852	58-45% arenas, resto fango lomo arcillas			1.3-1.6 2.1-4.5	2.6 4.0-1.28-2.79 4.5	3-12			1.5-2.50 $\mu\text{g g}^{-1}$ Cl-a color verde oliva	4,5,10, 11,12,14

<sup>a</sup> zonas de arena gruesa

<sup>b</sup> cerca de la desembocadura del río Itata a los 201 m

#### Referencias:

- 1. Klump et al., 2000
- 2. Lamy et al., 1998a
- 3. Lamy et al., 1999
- 4. Lamy et al., 2001
- 5. Lamy et al., 2002
- 6. Millesi et al., 2005 y ref. incluidas
- 7. Muñoz et al., 2004
- 8. Neira et al., 2001
- 9. Niggemann & Schubert, 2006
- 10. Palma et al., 2005
- 11. Quiroga et al., 2005
- 12. Romero & Hebein, 2002
- 13. Schubert et al., 2000
- 14. Silva & Prego, 2002
- 15. Valdés et al., 1998
- 16. Valdés et al., 2003
- 17. Proyecto FIP97-25
- 18. Proyecto FIP99-08

As mentioned in the PCR for this fishery (Knapman et al 2019), Ecologically or Biologically Significant Marine Areas (EBSAs) are regions of the ocean that hold special ecological or biological importance.<sup>5</sup> These areas are identified based on criteria such as uniqueness, rarity, and their significance for the life-history stages of species, among other factors.

In Chile, several EBSAs have been identified, particularly in the Eastern Tropical and Temperate Pacific region. Notable EBSAs in this region include the Juan Fernández Archipelago, known for its unique marine biodiversity and many endemic species, the Desventuradas Islands, which are vital for the conservation of various marine species, and the Humboldt Current System, significant for its high productivity and the presence of numerous commercially important marine species.

These areas are crucial for the conservation of marine biodiversity and are often the focus of various conservation and management efforts to ensure the sustainability of marine ecosystems. Additionally, as cited

<sup>5</sup> (<http://www.cbd.int/ebsa/ebsas>).

by Melo et al 2007 and other studies, there are coral reefs and other areas in Chile that could be classified as Vulnerable Marine Ecosystems (VMEs). In Chile, several VMEs have been identified, particularly in the South Pacific region. Some notable VMEs in Chile include:

- Nazca-Desventuradas Marine Park: This area is known for its unique marine biodiversity and is home to many endemic species.
- Juan Fernández Ridge: This region includes seamounts that are crucial habitats for various marine species.
- Chilean Fjords: These fjords are rich in cold-water corals and sponges, making them significant VMEs.
- 

These areas are protected to prevent significant adverse impacts from activities like bottom fishing, ensuring the conservation of these sensitive marine ecosystems.

None of these areas are impacted by the fishery under assessment. Therefore, no interactions or impacts on these areas have been identified, and they have not been further analysed in this assessment.

Although the SPFMRO have a working group and conduct studies for the bottom fishery which could have impacts on those habitats. These fisheries are typically occurring in New Zealand and Australia. The SPRFMO Scientific Committee emphasizes the need for the Commission to implement precautionary measures to protect vulnerable ecosystem elements. Vulnerable Marine Ecosystems (VMEs), identified in CMM 03-2019 and CMM 3a-2019, are relevant only for fishing gear that contacts the seafloor, such as bottom trawls, midwater trawls, and bottom lines. However, no VMEs have been identified in the fishing areas outside the 200 nautical mile EEZs for the fishery under assessment.

In 2018, the SPRFMO Scientific Committee established a task group on habitats and ecosystems, focusing on jack mackerel. This group uses various data sources, including acoustic data from fishing vessels, to understand environmental impacts on fish species. The Habitat Working Group, created in 2018, continues this work, using data from multiple sources to develop models of jack mackerel habitat dynamics.

No gear loss has been reported in the Chilean Jack mackerel fishery, and regulations require gear to be marked with trackers. Overall, the habitat impacts from this fishery are minimal, with no VMEs identified in the fishing areas outside the 200 nm zone.

**Table 31.** Definition of habitats overlapping with the fishery according to MSC's requirement.

Habitat	MSC category	Substratum	Geomorphology	Biota
Column water	Main	NA	NA	Zooplancton
sands and rocks	Minor	Medium-hard	Low – medium	Benthic and infaunal invertebrates

#### **11.1.1.5.1      Habitat management**

In Chile, 41% of the ocean is protected, but only 0.04% is effectively managed. Most of the protected areas (92%) are in open waters, such as Juan Fernández and Desventuradas, where threats are fewer due to their distance from the mainland. Coastal zones face greater management challenges and are not part of this evaluation.

Chile has implemented several marine conservation designations, including marine parks, reserves, Marine Coastal Protected Areas for Multiple Uses (AMCPU), Nature Sanctuaries, and Ramsar sites. Additional measures include Benthic Resource Management Areas (AMERB), which grant artisanal fisher organizations exclusive rights to sustainably collect benthic resources, and Marine Coastal Spaces of Indigenous Peoples (ECMPO), which allocate marine area management rights to indigenous communities.

Effective conservation is hindered by governance challenges, requiring continuous knowledge exchange between scientists and decision-makers to support evidence-based decisions. This process should be transparent, involve stakeholders, and include regular reviews.

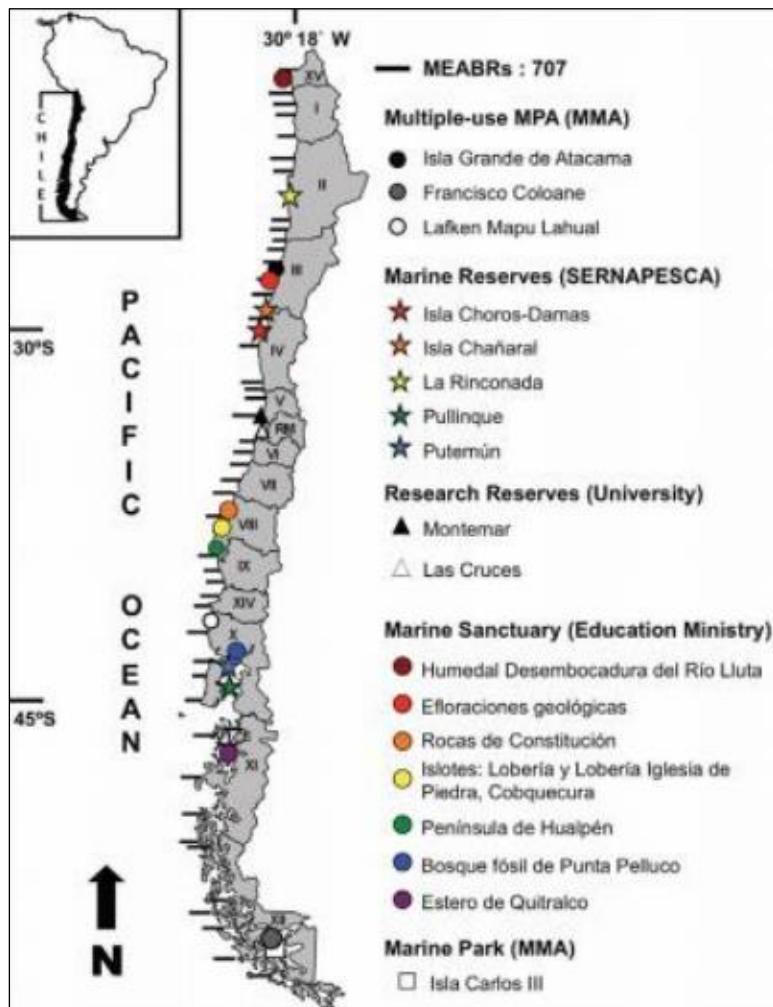
Chile employs three primary methods for habitat protection: Marine Protected Areas (MPAs), Vulnerable Marine Ecosystems, and AMERBs. These areas aim to conserve marine biodiversity through administrative and regulatory measures that control fishing activities and minimize ecosystem impacts. The management system is overseen by SUBPESCA, with enforcement by SERNAPESCA. Marine parks and reserves are critical for preserving ecological units and hydrobiological resources, while AMERBs provide artisanal fishers with exclusive rights based on sustainable management plans.

Despite progress in habitat and ecosystem studies since the 2013 fishing law update, the effectiveness of management systems remains a concern for fisheries which has a higher impact on the seafloor surface.

### Marine Protected Areas (MPAs)

Current MPAs cover 463,000 km<sup>2</sup>, but only a small portion has well-defined management plans, indicating a need for enhanced protection measures (Figure 33).

Efforts are ongoing to evaluate and improve the management effectiveness of conservation areas throughout Chile, highlighting ongoing challenges in habitat protection and management.



**Figure 33.** Protected areas in Chile and different figures under the Chilean legislation to protect and conserve marine ecosystems (Source: SERNAPESCA and Plataforma costera).

SERNAPESCA publishes a guide for identifying and managing marine reserves and parks, with the most recent version available on its website being from 2022.

In the new National Biodiversity Strategy (ENB) 2017-2030, five strategic objectives were defined, aiming primarily to:

1. Promote the sustainable use of biodiversity for human well-being.
2. Develop public awareness, knowledge, and participation in safeguarding biodiversity as a source of well-being.
3. Protect and restore biodiversity and its ecosystem services.

A key point highlighted in this strategy is the identification and delineation of vulnerable marine ecosystems, where extractive fishing activities that affect the seafloor are prohibited.

Resolution No. 451 of 2015 by SUBPESCA amended the fishing law to include a number of seamounts classified as vulnerable ecosystems and protected them from bottom fishing activities due to their fragility. Such activities are not permitted in these areas, and a list with the names and coordinates can be found in the resolution.<sup>6</sup>

In addition, this regulation, D.S. N° 238-04, the Regulation on Marine Parks and Marine Reserves of the General Fisheries and Aquaculture Law (Updated), establishes the general regulations applicable to parks and reserves, as well as their administrative and recreational uses.<sup>7</sup>

#### **11.1.1.5.2      Habitat information**

The spatial information on jack mackerel fishing operations has been gathered through onboard observers from the Institute of Fisheries Research (Inpesca) and self-reports submitted by fleet pilots and captains via the electronic fishing logbook (BEP), developed in collaboration with Inpesca. Additionally, data from the IFOP sampling and discard improvement programs provide estimates of the habitats encountered by these fisheries. Programs conducted by the SPRFMO also contribute valuable habitat information, with data from research cruises further enhancing this understanding. Moreover, information reported to the bottom fishery impact assessment section by the SCW12 helps to identify the affected habitats.

These assessments must include a detailed fishing plan, providing a quantified description of the fishing activities. This includes details on the vessels used, ensuring compliance with CMM 05 (Record of Vessels) and confirming their appearance on the SPRFMO's approved vessel list submitted by flag states. The plan should also provide a detailed description of the fishing methods employed, along with necessary gear plans (mostly for bottom surface contact gear). This information should cover aspects like net or bottom-line types, net dimensions, trawl-door specifications, ground gear types, fishing height off the bottom, net opening, and soak times, all crucial for evaluating potential impacts.

Furthermore, the fishing plan outlines the seabed depth range fished, the target species, potential bycatch species, and temporal aspects of the fishing activities, including the duration and frequency of operations. Effort indices, such as the number of vessels, tows, tow durations, and cumulative effects, are also provided. Estimated total catch and discard quantities by target and bycatch species are included. For new or exploratory fisheries, all of the above information is required, along with any additional requirements specified in CMM

<sup>6</sup> [articles-92513\\_documento.pdf \(subpesca.cl\)](#)

<sup>7</sup> [Microsoft Word - DS 238-04 \(subpesca.cl\)](#) & [Reservas marinas y parques marinos - SUBPESCA Normativa](#)

13 (Exploratory Fisheries). Therefore, the information to recognize the encountered habitats in this fishery is available.

#### **11.1.1.6 Ecosystems**

The ATFospheric and oceanographic conditions in the central-southern region of Chile are influenced by upwelling events. During the austral spring and summer, prevailing winds promote coastal upwelling, leading to pronounced changes in oceanographic conditions and in the exchange of gases and heat between the ATFsphere and the sea. The ocean off south-central Chile is subject to seasonal upwelling whose intensity is mainly controlled by the latitudinal migration of the southeast Pacific subtropical anticyclone. During austral spring and summer, the mean flow is equatorward favoring coastal upwelling, but periods of strong southerly winds are intermixed with periods of relaxed southerlies or weak northerly winds (downwelling favorable). This sub-seasonal, high-frequency variability of the coastal winds results in pronounced changes in oceanographic conditions and air-sea heat and gas exchanges (Aguirre *et al.*, 2021).

The jack mackerel is a generalist feeder, capable of exploiting a wide range of prey, suggesting that it may act as a conduit for energy transfer between primary producers and top predators. However, its diverse diet indicates that it is not limited to this role alone. Although little is known about its predators, juvenile jack mackerel has been identified in the stomach contents of albacore tuna and swordfish, suggesting that it may be preyed upon by species similar to other carangids, such as tunas, swordfish, and sharks.

Due to its large size and its role as both predator and prey, jack mackerel is likely an important node in the Pacific Ocean's food webs. Its depletion could lead to significant and lasting changes in the abundance of its predators and prey, which might not be easily reversed even if fishing mortality is reduced. (IFOP 2023).

In Peru, jack mackerel's diet has shown a preference for Euphausiidae, although since 2000, its feeding has become more diverse, including species such as *Pleuroncodes monodon* and *Zoea* larvae, with larger specimens consuming more mesopelagic fish. These dietary changes appear to coincide with multidecadal climatic variations.

The large-scale extraction of a key species like jack mackerel can disrupt predator-prey relationships, potentially leading to changes in the structure of the food web. These community structure changes may not necessarily be reversed by reducing fishing pressure. Ecotrophic models suggest that fishing could negatively impact important resources like jack mackerel, affecting the flow of matter in food webs and altering pelagic ecosystems in upwelling systems (IFOP 2024).

At the SPFRMO level, the ecossutem approach follows the FAO Ecosystem Approach to Fisheries (EAF) 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. A 2020 review of the application of the FAO EAF management within areas beyond national jurisdiction (ABNJ) by FAO (Fletcher 2020) identified a set of 13 key EAF components that apply to most fisheries and jurisdictions. This review updates the results presented in Fletcher (2020) with an assessment of the current status of EAF components in SPRFMO.

The assessment of retained species involves the publication of the main species captured and their catch levels annually in an information paper to the Commission. There is an annual stock assessment for Jack mackerel and periodic stock assessments for Orange roughy, which are reviewed by the Scientific Committee. CMM 03 (Bottom Fishing) requires a full bottom fishing impact assessment with the best available data, allowing the Scientific Committee to advise the Commission on whether any proposed bottom fishing would contribute to significant adverse impacts on deep sea fish stocks for which no stock assessment has been completed. A series of ecological risk assessments using PSA and SAFE methodologies have been undertaken as part of this requirement, covering a large number of target and non-target species, including teleosts and chondrichthyans (sharks, rays, and chimeras). Management of catch with specific allocations to Members for Jack mackerel (CMM 01), Orange Roughy (CMM 03a), and other species (CMM 03a) is based on Scientific Committee advice. CMM 02 (Data Standards) specifies monitoring of catches (including biological sampling)

for all species. Members report information on biological sampling conducted to the Scientific Committee via annual reports.

For non-retained species, CMM 02 (Data Standards) specifies monitoring of catches for all species, including discarded species. CMM 16 (Observer Programme) requires the collection of specific data on levels of discards for all species. Paragraph 21 of CMM 03 (Bottom Fishing) requires a full bottom fishing impact assessment with the best available data, allowing the Scientific Committee to advise the Commission on whether any proposed bottom fishing would contribute to significant adverse impacts on bycatch species. A series of ecological risk assessments using PSA and SAFE methodologies have been undertaken as part of this requirement, covering a large number of target and non-target species, including teleosts and chondrichthyans. CMM 13 (Exploratory Fisheries) is designed to ensure that new and exploratory fishery resources are developed on a precautionary and gradual basis and to promote the sustainable management of new and exploratory fisheries. CMM 02 (Data Standards) and CMM 16 (Observer Programme) set out a comprehensive monitoring programme for all species, including recording discards.

Special species are addressed through CMM 03 (Bottom Fishing), which requires a full bottom fishing impact assessment with the best available data, including consideration of interactions with marine mammals, reptiles, seabirds, and other species of concern. CMM 09 (Seabirds) requires the Scientific Committee to report on the number and location of seabird interactions annually and provide advice and recommendations to the Commission on possible improvements to further mitigate seabird interactions. Annex 14 of CMM 02 (Data Standards) defines a list of “other species of concern,” for which incidental captures must be reported, as informed by organizations such as CMS, the IUCN, and CITES. CMM 09 (Seabirds) specifies seabird mitigation measures. CMM 03 (Bottom Fishing) requires the Scientific Committee to provide advice biennially to the Commission on any recommended spatial or temporal closures or spatially/temporally limited gear prohibitions for any identified hotspots of marine mammals, seabirds, reptiles, or other species of concern, or any recommended bycatch limits and/or measures for an encounter protocol for any of these species. CMM 02 (Data Standards) and CMM 16 (Observer Programme) set out a comprehensive monitoring programme for special species (seabirds, mammals, reptiles, and a listed set of Species of Concern) as well as mitigation methods in place.

Direct fishing effects on the broader ecosystem are managed through CMM 03 (Bottom Fishing), which requires a full bottom fishing impact assessment with the best available data, including consideration of cumulative impacts, allowing the Scientific Committee to advise the Commission on whether any proposed bottom fishing would contribute to significant adverse impacts on VMEs. SC8-DW07 rev1 includes a cumulative risk assessment for the current effects of fishing on benthic habitats, biodiversity, and VMEs. CMM 03 (Bottom Fishing) sets VME thresholds, management arrangements to be observed in the event of an encounter with a potential VME, and management actions such as the closing of some areas to some or all fishing gears. CMM 17 (Marine Pollution) requires vessels to make all reasonable efforts to combat, minimize, and eliminate abandoned, lost, or otherwise discarded fishing gear, prohibits vessels from discharging plastics into the sea, and restricts the discharge of oil products, other garbage, and sewage. CMM 02 (Data Standards) and CMM 16 (Observer Programme) set out a comprehensive monitoring programme for all species. CMM 17 (Marine Pollution) sets up a monitoring framework for lost gear.

Cumulative fishery effects on the broader ecosystem are addressed through CMM 03 (Bottom Fishing), which requires a full bottom fishing impact assessment with the best available data, including consideration of cumulative impacts, allowing the Scientific Committee to advise the Commission on whether any proposed bottom fishing would contribute to significant adverse impacts on deep sea fish stocks for which no stock assessment has been completed, bycatch species, and/or VMEs. Article 3 1(a) (ii) of the Convention outlines that fishing shall be commensurate with the sustainable use of resources, taking into account the impacts on non-target and/or associated or dependent species, as well as the general obligation to protect and preserve the marine environment. CMM 02 (Data Standards) and CMM 16 (Observer Programme) set out a comprehensive monitoring programme for all species.

Environmental external drivers are analyzed by the Habitat Monitoring Working Group of the Scientific Committee, which seeks to understand the relationship between environmental information and changes in the spatial distribution and abundance of target species such as *Trachurus murphyi*, with the aim of producing elements that would allow the introduction of information on habitat and behavioral ecology into assessment models.

Climate change, driven by anthropogenic activities, will directly affect marine fishery catches, impacting economies that depend on fishing and fishing communities. Biophysical effects, such as ocean acidification and changes in freshwater availability, will alter the distribution and productivity of marine populations.

Fisheries, as dynamic socioecological systems, are already experiencing accelerated changes due to factors like markets and governance. These systems will face a constantly evolving context in response to future climate impacts. The vulnerability of fisheries depends on their exposure to these changes and their capacity to adapt, which varies according to socioeconomic and cultural contexts.

To address climate change, institutions and individuals are working to anticipate and adapt to these changes, which could include shifting occupations, implementing early warning systems, or creating insurance mechanisms. Jack mackerel is being identified as a species that could have a relevant impacts due to climate change impacts on the wider ecosystems.

#### **11.1.1.6.1 Ecosystem management and information**

The ecosystem-based approach is a primary objective of the fisheries law, with significant progress made, including:

- Establishment of Scientific and Management Committees, providing forums for both fishermen and scientists.
- Integration of sustainable management criteria into decision-making processes.
- Acknowledgment of traditional knowledge and practices related to fisheries resources.

Despite these advancements, significant challenges remain:

- Improved institutional coordination and systematization of institutional memory are needed.
- Developing capacities among public officials to lead participatory decision-making processes is essential.

In summary, while the ecosystem-based approach is a valuable tool for the recovery and sustainability of fisheries in Chile, its implementation continues to be a complex process.

### 11.1.2 Principle 2 Performance Indicator scores and rationales

#### PI 2.1.1 – Primary species outcome

PI 2.1.1		The UoA aims to maintain primary species above the point where recruitment would be impaired (PRI) and does not hinder recovery of primary species if they are below the PRI		
Scoring Issue		SG 60	SG 80	SG 100
<b>Main primary species stock status</b>				
a	Guide post	<p>Main primary species are <b>likely</b> to be above the PRI.</p> <p>OR</p> <p>If the species is below the PRI, the UoA has measures in place that are <b>expected</b> to ensure that the UoA does not hinder recovery and rebuilding.</p>	<p>Main primary species are <b>highly likely</b> to be above the PRI.</p> <p>OR</p> <p>If the species is below the PRI, there is either <b>evidence of recovery</b> or a demonstrably effective strategy in place <b>between all MSC UoAs which categorise this species as main</b>, to ensure that they collectively do not hinder recovery and rebuilding.</p>	There is a <b>high degree of certainty</b> that main primary species are above the PRI <b>and are fluctuating around a level consistent with MSY</b> .
	Met?	Yes	Yes	Yes

#### Rationale

**There is a high degree of certainty that main primary species are above the PRI and are fluctuating around a level consistent with MSY.**

An analysis of catch composition from logbooks of the discards program over the period 2019 - 2022 (Vega *et al.*, 2020, 2021 and 2022 and Ossa *et al.*, 2023) concluded that there are no primary species in the catch from the Chilean jack mackerel industrial purse seine fishery. No species of the Bycatch composing more than 0.1% of the total catches have management tools and measures in place, intended to achieve stock management objectives reflected in either limit or target reference points. In the absence of any catch of main primary species, **the SG 60, 80 and 100 requirements are met**, following SA3.2.1 of MSC Fisheries Standard v2.01, which says that “If a team determines that a UoA has no impact on a particular component, it shall receive a score of 100 under the Outcome PI”.

Minor primary species stock status			
b	Guide post		<p>Minor primary species are highly likely to be above the PRI.</p> <p>OR</p> <p>If below the PRI, there is evidence that the UoA does not hinder the recovery and rebuilding of minor primary species.</p>
	Met?		Yes

#### Rationale

**PI 2.1.1**      **The UoA aims to maintain primary species above the point where recruitment would be impaired (PRI) and does not hinder recovery of primary species if they are below the PRI**

An analysis of catch composition from logbooks of the discards program over the period 2019 - 2022 (Vega *et al.*, 2020, 2021 and 2022 and Ossa *et al.*, 2023) concluded that there are no primary species in the catch from the Chilean jack mackerel industrial purse seine fishery. No species of the Bycatch composing more than 0.1% of the total catches have management tools and measures in place, intended to achieve stock management objectives reflected in either limit or target reference points. In the absence of any catch of main primary species, **the SG 60, 80 and 100 requirements are met**, following SA3.2.1 of MSC Fisheries Standard v2.01, which says that "If a team determines that a UoA has no impact on a particular component, it shall receive a score of 100 under the Outcome PI".

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#### Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Individual scoring elements (add rows as required; delete if not scoring by elements)	Applicable SGs <u>likely</u> met per individual scoring element			<u>Likely</u> scoring element scores
	SG60	SG80	SG100	
Draft scoring range	Applicable SGs/elements <u>likely</u> met			<u>Likely</u> overall PI score
	SG60	SG80	SG100	
	2 of 2	2 of 2	2 of 2	>80
Information gap indicator	Information sufficient to score PI			

#### Overall Performance Indicator scores added from Client and Peer Review Draft Report

Individual scoring elements (add rows as required; delete if not scoring by elements)	Applicable SGs met per individual scoring element			Scoring element scores
	SG60	SG80	SG100	
Overall Performance Indicator score	Applicable SGs/elements met			Overall score

<b>PI 2.1.1</b>	The UoA aims to maintain primary species above the point where recruitment would be impaired (PRI) and does not hinder recovery of primary species if they are below the PRI		
	SG60	SG80	SG100
	X of x	X of x	X of x

Condition number (if relevant)

## PI 2.1.2 – Primary species management strategy

PI 2.1.2		There is a strategy in place that is designed to maintain or to not hinder rebuilding of primary species, and the UoA regularly reviews and implements measures, as appropriate, to minimise the mortality of unwanted catch		
Scoring Issue		SG 60	SG 80	SG 100
Management strategy in place				
<b>a</b>	Guide post	There are <b>measures</b> in place for the UoA, if necessary, that are expected to maintain or to not hinder rebuilding of the main primary species at/to levels which are likely to be above the PRI.	There is a <b>partial strategy</b> in place for the UoA, if necessary, that is expected to maintain or to not hinder rebuilding of the main primary species at/to levels which are highly likely to be above the PRI.	There is a <b>strategy</b> in place for the UoA for managing main and minor primary species.
	Met?	Yes	Yes	Yes

### Rationale

**There is a strategy in place for the UoA for managing main and minor primary species.**

An analysis of catch composition from logbooks of the discards program over the period 2019 - 2022 (Vega *et al.*, 2020, 2021 and 2022 and Ossa *et al.*, 2023) concluded that there are no primary species in the catch from the Chilean jack mackerel industrial purse seine fishery. No species of the Bycatch composing more than 0.1% of the total catches have management tools and measures in place, intended to achieve stock management objectives reflected in either limit or target reference points. In the absence of any catch of primary species, **the SG 60, 80 and 100 requirements are met**, following SA3.2.1 of MSC Fisheries Standard v2.01, which says that “If a team determines that a UoA has no impact on a particular component, it shall receive a score of 100 under the Outcome PI”.

Management strategy evaluation				
<b>b</b>	Guide post	The measures are considered <b>likely to work</b> , based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/species).	There is some <b>objective basis for confidence</b> that the measures/partial strategy will work, based on some information directly about the fishery and/or species involved.	Testing supports <b>high confidence</b> that the partial strategy/strategy will work, based on information directly about the fishery and/or species involved.
	Met?	Yes	Yes	Yes

### Rationale

**Testing supports high confidence that the partial strategy/strategy will work, based on information directly about the fishery and/or species involved.**

An analysis of catch composition from logbooks of the discards program over the period 2019 - 2022 (Vega *et al.*, 2020, 2021 and 2022 and Ossa *et al.*, 2023) concluded that there are no primary species in the catch from the Chilean jack mackerel industrial purse seine fishery. No species of the Bycatch composing more than 0.1% of the total catches have management tools and measures in place, intended to achieve stock management objectives reflected in either limit or target reference points. In the absence of any catch of primary species, **the SG 60, 80 and 100 requirements are met**, following SA3.2.1 of MSC Fisheries Standard v2.01, which says that “If a team determines that a UoA has no impact on a particular component, it shall receive a score of 100 under the Outcome PI”.

PI 2.1.2	<b>There is a strategy in place that is designed to maintain or to not hinder rebuilding of primary species, and the UoA regularly reviews and implements measures, as appropriate, to minimise the mortality of unwanted catch</b>		
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Management strategy implementation			
c	Guide post	There is <b>some evidence</b> that the measures/partial strategy is being <b>implemented successfully</b> .	There is <b>clear evidence</b> that the partial strategy/strategy is being <b>implemented successfully</b> and is achieving its overall objective as set out in scoring issue (a).
	Met?	<b>Yes</b>	<b>Yes</b>

#### Rationale

**There is clear evidence that the partial strategy/strategy is being implemented successfully and is achieving its overall objective as set out in scoring issue (a).**

An analysis of catch composition from logbooks of the discards program over the period 2019 - 2022 (Vega *et al.*, 2020, 2021 and 2022 and Ossa *et al.*, 2023) concluded that there are no primary species in the catch from the Chilean jack mackerel industrial purse seine fishery. No species of the Bycatch composing more than 0.1% of the total catches have management tools and measures in place, intended to achieve stock management objectives reflected in either limit or target reference points. In the absence of any catch of main primary species, **the SG 60, 80 and 100 requirements are met**, following SA3.2.1 of MSC Fisheries Standard v2.01, which says that "If a team determines that a UoA has no impact on a particular component, it shall receive a score of 100 under the Outcome PI".

Shark finning				
d	Guide post	It is <b>likely</b> that shark finning is not taking place.	It is <b>highly likely</b> that shark finning is not taking place.	There is a <b>high degree of certainty</b> that shark finning is not taking place.
	Met?	<b>NA</b>	<b>NA</b>	<b>NA</b>

#### Rationale

Shark species are very infrequently caught and there is no evidence of shark finning taking place, thus this SI is not applicable. The "article 5 bis" of the general law (LGPA n. 20.525) includes a modification in which is told that any finning activity is illegal and vessels practicing any illegal activity in relation with this article will be prosecute and enforcement regulations will be applied. Different types of fines are stipulated for any suspicious illegal activity regarding finning. Monitoring is carried out by the obligation to comply with the logbook reported to IFOP and SERNAPESCA. Scientific observers have been on board of the fishery and did not report any shark finning being carried out.

Review of alternative measures				
e	Guide post	There is a review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of main primary species.	There is a <b>regular</b> review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of main primary species and they are implemented as appropriate.	There is a <b>biennial</b> review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of all primary species, and they are implemented, as appropriate.

<b>PI 2.1.2</b>		There is a strategy in place that is designed to maintain or to not hinder rebuilding of primary species, and the UoA regularly reviews and implements measures, as appropriate, to minimise the mortality of unwanted catch		
	Met?	Yes	Yes	Yes
Rationale				
<b>There is a biennial review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of all primary species, and they are implemented, as appropriate.</b>				
<p>An analysis of catch composition from logbooks of the discards program over the period 2019 - 2022 (Vega <i>et al.</i>, 2020, 2021 and 2022 and Ossa <i>et al.</i>, 2023) concluded that there are no primary species in the catch from the Chilean jack mackerel industrial purse seine fishery. No species of the Bycatch composing more than 0.1% of the total catches have management tools and measures in place, intended to achieve stock management objectives reflected in either limit or target reference points. In the absence of any catch of main primary species, <b>the SG 60, 80 and 100 requirements are met</b>, following SA3.2.1 of MSC Fisheries Standard v2.01, which says that "If a team determines that a UoA has no impact on a particular component, it shall receive a score of 100 under the Outcome PI".</p>				
References				
<p>Ossa L., Suárez B., Jiménez M.F., Henríquez S., González A., Ojeda R. 2023. Informe Final. Convenio de Desempeño 2022. Programa de investigación y monitoreo del descarte y la captura de pesca incidental en pesquerías pelágicas, año 2022-2023. Subsecretaría de Economía Y EMT/Agoosto 2023. <a href="https://www.ifop.cl/en/busqueda-de-informes/">https://www.ifop.cl/en/busqueda-de-informes/</a></p> <p>Vega R., Ossa L., Suárez B., Jiménez M.F., Henríquez S., González A., Ojeda R., Le-Bert J., Simeone A., Anguita C., Sepúlveda M., Pérez M., Santos C., Cavieres J., Paredes P., Cari I., Zárate P., Devia D. 2020. Informe Final. Convenio de Desempeño 2019. Programa de observadores científicos: Programa de investigación y monitoreo del descarte y la captura de pesca incidental en pesquerías pelágicas, 2019-2020. Subsecretaría de Economía Y EMT/Noviembre 2020. <a href="https://www.ifop.cl/en/busqueda-de-informes/">https://www.ifop.cl/en/busqueda-de-informes/</a></p> <p>Vega R., Ossa L., Suárez B., Jiménez M.F., Henríquez S., González A., Ojeda R., Oro D., Simeone A., Anguita C., Hüne M., Cari I., Zárate P., Clavijo L., Devia D. 2021. Informe Final. Convenio de Desempeño 2020. Programa de investigación y monitoreo del descarte y la captura de pesca incidental en pesquerías pelágicas, 2020-2021. Subsecretaría de Economía Y EMT/Septiembre 2021. <a href="https://www.ifop.cl/en/busqueda-de-informes/">https://www.ifop.cl/en/busqueda-de-informes/</a></p> <p>Vega R., Ossa L., Suárez B., Jiménez M.F., Henríquez S., González A., Ojeda R., Le-Bert J., Simeone A., Anguita C., Hüne, M., Cari I., Zárate P. y D. Devia. 2022. Informe Final. Convenio de Desempeño 2021. Programa de observadores científicos: Programa de investigación y monitoreo del descarte y la captura de pesca incidental en pesquerías pelágicas, año 2021-2022. Subsecretaría de Economía Y EMT/Noviembre 2022. <a href="https://www.ifop.cl/en/busqueda-de-informes/">https://www.ifop.cl/en/busqueda-de-informes/</a></p> <p>CIAM. 2021. Manual de Buenas Prácticas y Normas Pesqueras para la Sustentabilidad de los Recursos. <a href="https://www.corpesca.cl/wp-content/uploads/2014/08/Manual-de-bunas-pr%C3%A1cticas-y-normas-pesqueras-para-la-sustentabilidad-de-los-recursos.pdf">https://www.corpesca.cl/wp-content/uploads/2014/08/Manual-de-bunas-pr%C3%A1cticas-y-normas-pesqueras-para-la-sustentabilidad-de-los-recursos.pdf</a></p>				

#### Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Individual scoring elements (add rows as required; delete if not scoring by elements)	Applicable SGs <u>likely</u> met per individual scoring element			<u>Likely</u> scoring element scores
	SG60	SG80	SG100	
	4 of 4	4 of 4	4 of 4	100
Draft scoring range	Applicable SGs/elements <u>likely</u> met			

<b>PI 2.1.2</b>	There is a strategy in place that is designed to maintain or to not hinder rebuilding of primary species, and the UoA regularly reviews and implements measures, as appropriate, to minimise the mortality of unwanted catch			
	SG60	SG80	SG100	<u>Likely</u> overall PI score
	All met	All met	None met	>80

Information gap indicator	Information sufficient to score PI			
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**Overall Performance Indicator scores added from Client and Peer Review Draft Report**

Individual scoring elements (add rows as required; delete if not scoring by elements)	Applicable SGs met per individual scoring element			Scoring element scores
	SG60	SG80	SG100	
	X of x	X of x	X of x	
Applicable SGs/elements met			Overall score	
Overall Performance Indicator score	SG60	SG80	SG100	
	X of x	X of x	X of x	
Condition number (if relevant)				

### PI 2.1.3 – Primary species information

PI 2.1.3		Information on the nature and extent of primary species is adequate to determine the risk posed by the UoA and the effectiveness of the strategy to manage primary species		
Scoring Issue		SG 60	SG 80	SG 100
		<b>Information adequacy for assessment of impact on main primary species</b>		
<b>a</b>	Guide post	<p>Qualitative information is <b>adequate to estimate</b> the impact of the UoA on the main primary species with respect to status.</p> <p>OR</p> <p>If RBF is used to score PI 2.1.1 for the UoA:</p> <p>Qualitative information is adequate to estimate productivity and susceptibility attributes for main primary species.</p>	<p>Some quantitative information is available and is <b>adequate to assess</b> the impact of the UoA on the main primary species with respect to status.</p> <p>OR</p> <p>If RBF is used to score PI 2.1.1 for the UoA:</p> <p>Some quantitative information is adequate to assess productivity and susceptibility attributes for main primary species.</p>	<p>Quantitative information is available and is <b>adequate to assess with a high degree of certainty</b> the impact of the UoA on main primary species with respect to status.</p>
	Met?	Yes	Yes	Yes

#### Rationale

**Quantitative information is available and is adequate to assess with a high degree of certainty the impact of the UoA on main primary species with respect to status.**

An analysis of catch composition from logbooks over the period 2019 - 2022 (Vega *et al.*, 2020, 2021 and 2022 and Ossa *et al.*, 2023) concluded that there are no primary species in the catch from the Chilean jack mackerel industrial purse seine fishery. No species of the Bycatch composing more than 0.1% of the total catches have management tools and measures in place, intended to achieve stock management objectives reflected in either limit or target reference points. In the absence of any catch of primary species, **the SG 60, 80 and 100 requirements are met**, following SA3.2.1 of MSC Fisheries Standard v2.01, which says that “If a team determines that a UoA has no impact on a particular component, it shall receive a score of 100 under the Outcome PI”.

<b>Information adequacy for assessment of impact on minor primary species</b>				
<b>b</b>	Guide post			Some quantitative information is adequate to estimate the impact of the UoA on minor primary species with respect to status.
	Met?			Yes

#### Rationale

**Some quantitative information is adequate to estimate the impact of the UoA on minor primary species with respect to status.**

An analysis of catch composition from logbooks over the period 2019 - 2022 (Vega *et al.*, 2020, 2021 and 2022 and Ossa *et al.*, 2023) concluded that there are no primary species in the catch from the Chilean jack mackerel industrial purse seine fishery. No species of the Bycatch composing more than 0.1% of the total catches have management tools and measures in place, intended to achieve stock management objectives reflected in either limit or target reference points. In the absence of any catch of primary species, **the SG 60, 80 and 100 requirements are met**,

**PI 2.1.3**

**Information on the nature and extent of primary species is adequate to determine the risk posed by the UoA and the effectiveness of the strategy to manage primary species**

following SA3.2.1 of MSC Fisheries Standard v2.01, which says that “If a team determines that a UoA has no impact on a particular component, it shall receive a score of 100 under the Outcome PI”.

Information adequacy for management strategy				
<b>C</b>	Guide post	Information is adequate to support <b>measures</b> to manage <b>main</b> primary species.	Information is adequate to support a <b>partial strategy</b> to manage <b>main</b> primary species.	Information is adequate to support a <b>strategy</b> to manage all primary species, and evaluate with a <b>high degree of certainty</b> whether the strategy is achieving its objective.
	Met?	Yes	Yes	Yes

**Rationale**

**Information is adequate to support a strategy to manage all primary species, and evaluate with a high degree of certainty whether the strategy is achieving its objective**

An analysis of catch composition from logbooks over the period 2019 - 2022 (Vega *et al.*, 2020, 2021 and 2022 and Ossa *et al.*, 2023) concluded that there are no primary species in the catch from the Chilean jack mackerel industrial purse seine fishery. No species of the Bycatch composing more than 0.1% of the total catches have management tools and measures in place, intended to achieve stock management objectives reflected in either limit or target reference points. In the absence of any catch of primary species, **the SG 60, 80 and 100 requirements are met**, following SA3.2.1 of MSC Fisheries Standard v2.01, which says that “If a team determines that a UoA has no impact on a particular component, it shall receive a score of 100 under the Outcome PI”.

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**Draft scoring range and information gap indicator added at Announcement Comment Draft Report**

Draft scoring range	Applicable SGs/elements <u>likely</u> met
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<b>PI 2.1.3</b>	<b>Information on the nature and extent of primary species is adequate to determine the risk posed by the UoA and the effectiveness of the strategy to manage primary species</b>			
	SG60	SG80	SG100	<u>Likely</u> overall PI score
	3 of 3	3 of 3	3 of 3	>80
Information gap indicator	Information sufficient to score PI			

**Overall Performance Indicator scores added from Client and Peer Review Draft Report**

Overall Performance Indicator score	Applicable SGs/elements met			Overall score
	SG60	SG80	SG100	
	X of x	X of x	X of x	
Condition number (if relevant)				

### PI 2.2.1 – Secondary species outcome

PI 2.2.1		The UoA aims to maintain secondary species above a biologically based limit and does not hinder recovery of secondary species if they are below a biological based limit		
Scoring Issue		SG 60	SG 80	SG 100
<b>Main secondary species stock status</b>				
<b>a</b>	Guide post	Main secondary species are likely to be above biologically based limits.  OR  If below biologically based limits, there are measures in place expected to ensure that the UoA does not hinder recovery and rebuilding.	Main secondary species are highly likely to be above biologically based limits.  OR  If below biologically based limits, there is either evidence of recovery or a demonstrably effective partial strategy in place such that the UoA does not hinder recovery and rebuilding.  AND  Where catches of a main secondary species outside of biological limits are considerable, there is either evidence of recovery or a, demonstrably effective strategy in place between those MSC UoAs that have considerable catches of the species, to ensure that they collectively do not hinder recovery and rebuilding.	There is a high degree of certainty that main secondary species are above biologically based limits.
	Met?	Peruvian pelican: Yes Sooty shearwater: Yes	Peruvian pelican: Yes - RBF Sooty shearwater: Yes -RBF	Peruvian pelican: Yes Sooty shearwater: No

#### Rationale

**The main secondary species for this fishery are Peruvian pelican and sooty shearwater.**

The assessment team has used the same approach that in the PCR from 2019 to apriori score this PI in the ACDR stage. While fishery reference points (such as MSY or biomass thresholds) do not directly apply to seabird species like the Peruvian Pelican and Sooty Shearwater, population trends and conservation status serve as indicators of biological limits. Population declines, breeding failure, or ecosystem disruption can signal that these species are approaching a critical threshold that requires intervention. At the same time as the RBF is announced, the assessment team plans to verify during the site visit whether the information used to score this PI can be established as a BBL. If it cannot, the team will conduct an RBF for those two species at the end of the site visit.

Peruvian pelican was not identified in any binding international agreements and it has a “Near Threatened” status in Chile (DS 23/2019 MMA) and in IUCN Red list (BirdLife International, 2018). The population is increasing globally and in the most recent population estimate places it at 100,000-1,000,000 individuals (BirdLife International, 2018). In four years, there was 7 catches of this species. As the abundance of this species is very high compared to the level of interaction with the fishery and as there is an increasing trend of the population, there is a high degree of certainty that the species is above biologically based limits, meeting the **SG 60, 80 and 100 requirements**.

PI 2.2.1		The UoA aims to maintain secondary species above a biologically based limit and does not hinder recovery of secondary species if they are below a biological based limit		
Sooty shearwater was not identified in any binding international agreements and it has a “Near Threatened” status in Chile (DS 23/2019 MMA) and in IUCN Red list (BirdLife International, 2019). Although the rate of decline of the whole population has not been quantified, moderately rapid population declines are suspected (BirdLife International, 2019). It is one of the world’s most abundant and wide-ranging pelagic birds, with an estimated global population of 4.4 million pairs, roughly equating to 19.0–23.6 million individuals (Newman <i>et al.</i> 2009, Waugh <i>et al.</i> 2013). In four years, there was only one catch of this species. The abundance of this species is very high compared to the level of interaction with the fishery, however, considering the decreasing trend in the population it is considered that only the <b>SG 60 and 80 requirements are presently met.</b>				
		Minor secondary species stock status		
<b>b</b>	Guide post		Minor secondary species are highly likely to be above biologically based limits.  OR  If below biologically based limits', there is evidence that the UoA does not hinder the recovery and rebuilding of secondary species	
	Met?		<b>Yes</b>	
<b>Rationale</b>				
<b>Minor secondary species are highly likely to be above biologically based limits.</b>				
An analysis of catch composition from logbooks of the discards program over the period 2019 - 2022 (Vega <i>et al.</i> , 2020, 2021, 2022 and Ossa <i>et al.</i> , 2023) concluded that chub mackerel is the only minor secondary species in the catch of the jack mackerel industrial purse seine fishery. Chub mackerel was not identified in any binding international agreements and it has a “Least Concern” status in Chile (DS 23/2019 MMA) and in IUCN Red list (Collette <i>et al.</i> , 2023). The population is stable (Collette <i>et al.</i> , 2023). According to stock assessment of chub mackerel in Peru, the spawning biomass is above the maximum sustainable yield (IMARPE, 2023). Thus, there is a high degree of certainty that chub mackerel is above biologically based limits. <b>SG 60, 80 and 100 requirements.</b>				
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**PI 2.2.1**

**The UoA aims to maintain secondary species above a biologically based limit and does not hinder recovery of secondary species if they are below a biological based limit**

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**Draft scoring range and information gap indicator added at Announcement Comment Draft Report**

Individual scoring elements (add rows as required; delete if not scoring by elements)	Applicable SGs <u>likely</u> met per individual scoring element			<u>Likely</u> scoring element scores
	SG60	SG80	SG100	
1 Peruvian pelican	1 of 1	1 of 1	1 of 1	100
2 Sooty shearwater	1 of 1	1 of 1	0 of 1	80
3 Chub mackerel			1 of 1	100
Draft scoring range	Applicable SGs/elements <u>likely</u> met			<u>Likely</u> overall PI score
	SG60	SG80	SG100	

PI 2.2.1	The UoA aims to maintain secondary species above a biologically based limit and does not hinder recovery of secondary species if they are below a biological based limit			
	All met	All met	Not meet for Sooty shearwater	>80
Information gap indicator	Information sufficient to score PI			

**Overall Performance Indicator scores added from Client and Peer Review Draft Report**

Individual scoring elements (add rows as required; delete if not scoring by elements)	Applicable SGs met per individual scoring element			Scoring element scores
	SG60	SG80	SG100	
1 Peruvian pelican	X of x	X of x	X of x	
2 Sooty shearwater	X of x	X of x	X of x	
3 Chub mackerel				
Overall Performance Indicator score	Applicable SGs/elements met			Overall score
	SG60	SG80	SG100	
	X of x	X of x	X of x	
Condition number (if relevant)				

## PI 2.2.2 – Secondary species management strategy

PI 2.2.2	There is a strategy in place for managing secondary species that is designed to maintain or to not hinder rebuilding of secondary species and the UoA regularly reviews and implements measures, as appropriate, to minimise the mortality of unwanted catch			
Scoring Issue	SG 60	SG 80	SG 100	
<b>Management strategy in place</b>				
<b>a</b>	Guide post	There are <b>measures</b> in place, if necessary, which are expected to maintain or not hinder rebuilding of main secondary species at/to levels which are highly likely to be above biologically based limits or to ensure that the UoA does not hinder their recovery.	There is a <b>partial strategy</b> in place, if necessary, for the UoA that is expected to maintain or not hinder rebuilding of main secondary species at/to levels which are highly likely to be above biologically based limits or to ensure that the UoA does not hinder their recovery.	There is a <b>strategy</b> in place for the UoA for managing main and minor secondary species.
	Met?	Yes	Yes	

### Rationale

**There is a strategy in place for the UoA for managing main and minor secondary species.**

The main secondary species for this fishery are peruvian pelican and sooty shearwater. Chub mackerel is the only minor secondary species of the fishery.

The "Plan for the Reduction of Discards and Incidental Catches in the Industrial Fishery of Jack Mackerel and its Bycatch between the Regions of Valparaíso to Los Lagos and International Waters under the Convention of the South Pacific Regional Fisheries Management Organisation (SPRFMO)" implements measures to minimize interactions and catches of both seabirds and non-seabird species. The Plan includes a robust monitoring program, training sessions, dissemination programs, and a code of good practices aimed at reducing bycatches and incidental catches. It also ensures compliance with best practices, such as changing fishing areas and communicating with the rest of the fleet when incidental catch occurs, and avoiding high bycatch zones.

A protocol for ensure the adequate record of images with the use of IRD in industrial purse seine fishery of south-central Chile has been approved (RES.EX. N°2738/2019) and currently all industrial vessels have implemented the device on the vessels (INPESCA, 2023).

Discards of all secondary species are strictly prohibited, and all catches must be logged. The LGPA mandates the return of marine mammals, reptiles, penguins, and other birds to the sea unless they are severely injured, in which case they are sent to rehabilitation centres.

In recent years, incidental catches of sooty shearwater and Peruvian pelican have been minimal, with only one sooty shearwater caught (resulting in death) and seven Peruvian pelicans caught (with only one death) over the past four years. As pointed in SI 2.2.1a. there is a high degree of certainty that Peruvian pelican is above biologically based limited and the abundance of the sooty shearwater is very high compared to the level of interaction with the fishery.

The observed catches of chub mackerel decreased from about 953 tons in 2019 to 140 in 2022 even with an increase of the scientific observer's coverage, from 4.4% in 2019 to 13.8% in 2022 (Vega *et al.*, 2020 and Ossa *et al.*, 2023).

**PI 2.2.2**

**There is a strategy in place for managing secondary species that is designed to maintain or to not hinder rebuilding of secondary species and the UoA regularly reviews and implements measures, as appropriate, to minimise the mortality of unwanted catch**

Therefore, as there is a Plan for reducing discards established, bycatch measures and IRD in place, monitoring, and recording all catches in logbooks, resulting in minimal incidental catches and maintaining species above biologically based limits, there is a strategy in place for the UoA for managing secondary species. **SG 100 is met.**

Management strategy evaluation			
<b>b</b>	Guide post	The measures are considered likely to work, based on plausible argument (e.g. general experience, theory or comparison with similar UoAs/species).	There is <b>some objective basis for confidence</b> that the measures/partial strategy will work, based on some information directly about the UoA and/or species involved.
	Met?	Yes	Yes

**Rationale**

**There is some objective basis for confidence that the measures/partial strategy will work, based on some information directly about the UoA and/or species involved.**

Since 2015, a research program focused on discards and incidental catches in the industrial jack mackerel fishery and its Bycatch has been operating along the central southern Chilean coast and in international waters. Scientific observers have been working onboard vessels to monitor bycatch levels and interactions with seabirds, marine mammals, and sea turtles, as well as associated non-target species. Fishermen have also contributed data through logbooks and workshops to discuss possible measures for reducing discards. The collected data from 2015-2018 were used to develop the “Plan for the Reduction of Discards and Incidental Catches in the Industrial Fishery of Jack Mackerel and Its Bycatch between the Regions of Valparaíso to Los Lagos and International Waters under the Convention of the South Pacific Regional Fisheries Management Organisation (SPRFMO).” An evaluation of the data obtained by the scientific observers from 2015-2018 identified the species associated with the fishing activity, based on their capture, mortality rates and the type of interaction with the fishery. This variability was linked to spatiotemporal and environmental patterns, considering the vulnerability or risk to the populations of the most frequently caught species. Following this, a bibliographic review of national and international fisheries strategies was conducted to find applicable measures for the purse seine fleet operating in the central - southern region of Chile.

The plan contained general measures for reducing the bycatch and incidental catches on the fishery, such as maintain scientific observers on boards, compulsory logbook records, establishing programs of monitoring, training and dissemination of measures, application of IRD for record and supervise all discarding, compliance with the rule of change of fishing area (*move on* technique) and communication to the rest of the fleet when there is presence of incidental fishing in fishing operations.

Vega *et al.* (2019) presented the results of the program and proposals that were made to the Management Committee for the mitigation of the discards on the jack mackerel fishery. One of the recommendations that were mentioned in Vegas *et al.* (2019) that would be applied to reduce chub mackerel discards were allowing vessels to safely transfer excess catch from the codend and implementing. This maneuver, named Transfer of Surplus Fishing Haul - TEL (*Traspaso de Excedentes del Lance de Pesca*), involves transferring surplus catch to another vessel with available storage capacity and it was regulated by Res. Ex. 862 25/03/21 Minecom Subpesca. According to INPESCA (2023), TEL has reportedly reduced jack mackerel discards during 2020-2022. INPESCA (2023) has also noticed a decrease in the number of registered accompanied fauna species from 2020 to 2022 and suggested that this might

## PI 2.2.2

**There is a strategy in place for managing secondary species that is designed to maintain or to not hinder rebuilding of secondary species and the UoA regularly reviews and implements measures, as appropriate, to minimise the mortality of unwanted catch**

be related with application of the rule of change of fishing area that has been incentivized through code of good practices, which consists in communicating to the rest of the fleet when there is presence of bycatch in fishing operations and search for another fishing zone.

Several measures and recommendations of good practices for reducing incidental catches of seabirds were included on the Plan, but they did not focus on any seabird species in particular, except one for *Ardenna* species. It was proposed to evaluate the feasibility of carrying out spatio-temporal management for *Ardenna* species based on indicators considering certain delimited areas, for specific periods and/or times. Later on, Decree 21/2020 approved a plan for the recovery, conservation and management of the *Ardenna creatopus* - pink-footed shearwater, but it did not include the sooty shearwater, which is a main secondary species of this fishery. The measures for seabirds in the plan included preparation and compliance with mandatory protocols to deter seabirds retained in the purse seine, preparation and formalization of protocols of identification of species, safe handling on board, registration and release the animals seeking their survival.

Studies have shown that the dissemination programs of good practices on discards have been effective. INPESCA (2023) monitored the jack mackerel industrial purse seine fleets of south-central Chile from 2020-2022 and concluded that efforts have made to implement actions to mitigate discard and reduce bycatch. ATF-Chile in collaboration between the companies subscribed to Association of Fishing Industries - PESCADORES INDUSTRIALES DEL BIOBÍO and SONAPESCA, carried out in 2022 an external review process of the development of local protocols of good practices applied to the jack mackerel fishery and verified that between 18.2-22.2% of the people of the crews were aware of good practice for reducing the discards (ATF- Chile, 2022).

IFOP has been publishing reports annually providing data of the programs that have been carrying out in compliance with the Plan and the results have showed that the strategy is working. Logbooks of the discards program from this fishery reported a reduction of catches of chub mackerel over the last years, from 952,945 tons in 2019 to 140,349 tons in 2022. The average catch of chub mackerel from 2016-2019 was 18,5335t (Vega *et al.*, 2020) and decreased to 10.9564t for the 2016-2022 period (Ossa *et al.*, 2023). Scientific observers recorded 112 Peruvian pelican catches and 47 sooty shearwater catches in 863 fishing hauls over three years (2015-2017). Over the next five years (2018-2022), with the implementation of the Plan, they observed only 7 Peruvian pelican catches and 1 sooty shearwater catch in 1,939 fishing hauls (Vega *et al.*, 2024).

There is some objective basis for confidence that the partial strategy will work, based on information directly about the fishery and species involved, as a Plan for reducing discards and incidental catches for the fishery is implemented, leading to reductions in bycatch and discards and increase of awareness of the best practices, thus **SG 60 and 80 is met**. However, testing does not support high confidence that the strategy will work because there is a lack of specific, controlled tests for each measure and a general correlation data is available rather than causal evidence. **Thus, SG 100 is not met.**

Management strategy implementation			
<b>C</b>	Guide post	There is <b>some evidence</b> that the measures/partial strategy is being <b>implemented successfully</b> .	There is <b>clear evidence</b> that the partial strategy/strategy is being <b>implemented successfully</b> and is achieving its objective as set out in scoring issue (a).
	Met?	Yes	Yes

### Rationale

**PI 2.2.2**

**There is a strategy in place for managing secondary species that is designed to maintain or to not hinder rebuilding of secondary species and the UoA regularly reviews and implements measures, as appropriate, to minimise the mortality of unwanted catch**

There is **clear evidence** that the partial strategy/strategy is being **implemented successfully and is achieving its objective as set out in scoring issue (a)**.

The “Plan for the Reduction of Discards and Incidental Catches in the Industrial Fishery of Jack Mackerel and Its Bycatch between the Regions of Valparaíso to Los Lagos and International Waters under the Convention of the South Pacific Regional Fisheries Management Organisation (SPRFMO)” has been implemented and research programs focused on discards and incidental catches in the industrial jack mackerel fishery and its Bycatch has been operating since 2015. Coverage of discards monitored trips for industrial vessels increased from an average of 5.7% in 2015-2016 to 8.45% in the last 4 years (IFOP, 2017 and Vega *et al.*, 2020, 2021, 2022 and Ossa *et al.*, 2023). A system of licences and VSM is in place. Landings data (port sampling) have been collected. The reasons for discards have been monitored and observer data have been produced and this information has been published on IFOP reports. IRD has been implemented by SERNAPESCA since 2020. Several vessels have been using the TEL maneuver to avoid discards (IFOP, 2023). INPESCA (2023) has noticed a decrease in the number of registered accompanied fauna species from 2020 to 2022 and suggested that this might be related with application of the rule of change of fishing area that has been incentivized through code of good practices. Studies have shown that the dissemination programs of good practices on discards have been effective (INPESCA, 2023 and ATF- Chile, 2022). A reduction of catches of the secondary species has been verified. There is clear evidence that the partial strategy/strategy is being implemented successfully and is achieving its overall objective as set out in scoring issue (a), thus **SG 100 is met**.

<b>Shark finning</b>				
<b>d</b>	Guide post	It is <b>likely</b> that shark finning is not taking place.	It is <b>highly likely</b> that shark finning is not taking place.	There is a <b>high degree of certainty</b> that shark finning is not taking place.
	Met?	<b>NA</b>	<b>NA</b>	<b>NA</b>

**Rationale**

Shark species are very infrequently caught and there is no evidence of shark finning taking place, thus this scoring issue is not applicable. The “article 5 bis” of the general law (LGPA n. 20.525) includes a modification in which is told that any finning activity is illegal and vessels practicing any illegal activity in relation with this article will be prosecute and enforcement regulations will be applied. Different types of fines are stipulated for any suspicious illegal activity regarding finning. Monitoring is carried out by the obligation to comply with the logbook reported to IFOP and SERNAPESCA. Scientific observers have been on board of the fishery and did not report any shark finning being carried out.

<b>Review of alternative measures to minimise mortality of unwanted catch</b>				
<b>e</b>	Guide post	There is a review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of <b>unwanted</b> catch of main secondary species.	There is a <b>regular</b> review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of <b>unwanted</b> catch of main secondary species and they are implemented as appropriate.	There is a <b>biennial</b> review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of <b>unwanted</b> catch of all secondary species, and they are implemented, as appropriate.
	Met?	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>

**Rationale**

## PI 2.2.2

**There is a strategy in place for managing secondary species that is designed to maintain or to not hinder rebuilding of secondary species and the UoA regularly reviews and implements measures, as appropriate, to minimise the mortality of unwanted catch**

There is a **biennial** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of **unwanted** catch of all secondary species, and they are implemented, as appropriate.

Since 2015, a research program focused on discards and incidental catches in the industrial jack mackerel fishery and its Bycatch has been operating along the central southern Chilean coast and in international waters. Data collected by scientific observers and fishermen logbooks from 2015-2018 within the research program context were used to develop the “Plan for the Reduction of Discards and Incidental Catches in the Industrial Fishery of Jack Mackerel and its Bycatch between the Regions of Valparaíso to Los Lagos and International Waters under the Convention of the South Pacific Regional Fisheries Management Organisation (SPRFMO)”, which was authorized in 2019. The plan also incorporated information from other national fisheries and a bibliographic review regarding effectiveness and practicality of alternative measures to minimise unwanted catch.

The 2019 IFOP report presented the results of the program and proposals that were made to the Management Committee for the mitigation of the discards on the jack mackerel fishery (Vega *et al.*, 2019). One of the proposals that it was pointed that would have an influence on reducing discards of Humboldt squid and chub mackerel was the regulation of TEL, which was implemented later and proved to be efficient to reduce discards of jack mackerel (INPESCA, 2023). Through the following years of the research program, IFOPs reports have reviewed and recommended measures for reducing bycatches for other fisheries in Chile (artisanal sardine fishery operating in southern part of the Los Lagos region and the artisanal anchovy and jack mackerel fishery that operates in the north central area of Chile).

From 2014-2021 a program for dissemination of the results of the discard and bycatch research program and the contents of the reduction plan was developed with the fishermen. Users received timely and updated information on the research program and discussion of proposals for mitigation measures were held, elements that were incorporated in the documents that were subsequently sent to SUBPESCA. This allowed the exchange opinions and experiences about the fishing operation, implication of the program and finally contributions or fishermen's apprehensions about the proposed measures.

INPESCA and CIAM have both prepared Manual of Good Practices for pelagic Chilean fishery in 2020 and 2021, respectively (INPESCA, 2020 and CIAM, 2021), being the INPESCA manual specific tailored to the fishery of this assessment. For elaborating these manuals, reviews were required and information was adapted to fit the specific conditions of the Chilean pelagic fishery, while incorporating observations from the stakeholders. As a part of the practices, there were protocols for the mitigation, handling and release of seabirds, as well as descriptions of the TEL maneuver and the rule of change of fishing area, which can be also applied to non-seabirds specimens.

An external review process of the development of local protocols of good practices applied to the jack mackerel purse seine fishery, such as the manual of good practices produced by INPESCA, was carried out in 2022 by ATF-Chile and a report was handled to the assessment team during the second surveillance. The objective of the work was to identify gaps in crew performance related to non-target species identification, rescue techniques, and safe handling, as well as to pinpoint suitable onboard sites for installing infrastructure to facilitate the release or care of injured marine fauna. Safety equipment onboard was also reviewed for these purposes, followed by recommendations aimed at reinforcing the good practices (ATF-Chile, 2022).

INPESCA in collaboration between the companies subscribed to PESCADORES INDUSTRIALES DEL BIOBÍO and SONAPESCA, released a report in 2023 aiming to establish the level of progress that has been made in the application of the good practices manuals in the mitigation of discards and bycatch in the jack mackerel fishery by analysing data collected between 2020-2022.

## PI 2.2.2

There is a strategy in place for managing secondary species that is designed to maintain or to not hinder rebuilding of secondary species and the UoA regularly reviews and implements measures, as appropriate, to minimise the mortality of unwanted catch

During the 4<sup>th</sup> surveillance, it was told to the assessment team that ATF-birds and INPESCA plan to have annual workshops with the fishermen for dissemination and improvements of good practices to reduce bycatches and discards.

There have been a regular review of the potential effectiveness and practicality of alternative measures to minimize discards, through discussions in dissemination programs, bibliographic reviews, preparation of good practice manuals and reports analysing the results of the program, and annual workshops are predicted covering the discards and incidental catches practices, thus, there is a biennial review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of all secondary species, and they are implemented, as appropriate. **SG 100 is met.**

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**PI 2.2.2**

**There is a strategy in place for managing secondary species that is designed to maintain or to not hinder rebuilding of secondary species and the UoA regularly reviews and implements measures, as appropriate, to minimise the mortality of unwanted catch**

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**Draft scoring range and information gap indicator added at Announcement Comment Draft Report**

Individual scoring elements (add rows as required; delete if not scoring by elements)	Applicable SGs <u>likely</u> met per individual scoring element			<u>Likely</u> scoring element scores
	SG60	SG80	SG100	
	4 of 4	4 of 4	3 of 4	95
Draft scoring range	Applicable SGs/elements <u>likely</u> met			<u>Likely</u> overall PI score
	SG60	SG80	SG100	
	X of x	X of x	X of x	<60/60 – 79/≥80
Information gap indicator	More information sought/Information sufficient to score PI			

**Overall Performance Indicator scores added from Client and Peer Review Draft Report**

Overall Performance Indicator score	Applicable SGs/elements met			Overall score
	SG60	SG80	SG100	
	X of x	X of x	X of x	
Condition number (if relevant)				

### PI 2.2.3 – Secondary species information

PI 2.2.3		Information on the nature and amount of secondary species taken is adequate to determine the risk posed by the UoA and the effectiveness of the strategy to manage secondary species			
Scoring Issue		SG 60	SG 80	SG 100	
		<b>Information adequacy for assessment of impacts on main secondary species</b>			
<b>a</b>	Guide post	<p>Qualitative information is <b>adequate to estimate</b> the impact of the UoA on the main secondary species with respect to status.</p> <p>OR</p> <p>If RBF is used to score PI 2.2.1 for the UoA:</p> <p>Qualitative information is adequate to estimate productivity and susceptibility attributes for main secondary species.</p>	<p>Some quantitative information is available and <b>adequate to assess</b> the impact of the UoA on main secondary species with respect to status.</p> <p>OR</p> <p>If RBF is used to score PI 2.2.1 for the UoA:</p> <p>Some quantitative information is adequate to assess productivity and susceptibility attributes for main secondary species.</p>	<p>Quantitative information is available and <b>adequate to assess with a high degree of certainty</b> the impact of the UoA on main secondary species with respect to status.</p>	
	Met?	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	

#### Rationale

Logbooks of the fishery register all catches during the fishing trips. Since 2015, when the “Plan for the Reduction of Discards and Incidental Catches in the Industrial Fishery of Jack Mackerel and Its Bycatch between the Regions of Valparaíso to Los Lagos and International Waters under the Convention of the South Pacific Regional Fisheries Management Organisation (SPRFMO)” has still been elaborated, discard and bycatch research programs and monitoring have been performed, with reports of quantitative data of the species been published by IFOP annually. These programs provide quantified incidental catches, total mortality and type of interactions of birds, mammals, and sea turtles with the fishery and analyse the spatial and temporal variations of these indicators. During 2019-2022 period, an average of 11.15% of the fishing trips had scientific observers on board registering the incidental catches of seabirds. There were only 7 catches of Peruvian pelican and 1 death and only one catch of sooty shearwater, which resulted in death, in 4 years registered by scientific observers in 1,226 hauls (Vega *et al.*, 2024). The status of the secondary seabirds species are “Near Threatened”. Although the current size of the population of seabirds in Chile are unknown, it is possible to assess with a high degree of certainty the impact of the UoA on main secondary species with respect to status is low, considering the low catches and mortality of the main secondary species, thus, **SG100 is met**.

		<b>Information adequacy for assessment of impacts on minor secondary species</b>		
<b>b</b>		Guide post		Some quantitative information is adequate to estimate the impact of the UoA on minor secondary species with respect to status.
	Met?			<b>Yes</b>

#### Rationale

Since 2015, when the “Plan for the Reduction of Discards and Incidental Catches in the Industrial Fishery of Jack Mackerel and Its Bycatch between the Regions of Valparaíso to Los Lagos and International Waters under the Convention of the South Pacific Regional Fisheries Management Organisation (SPRFMO)” has still been elaborated, discard and bycatch research programs and monitoring have been performed, with reports of quantitative data of the species been published by IFOP annually. These programs provide data of total catches and discards, describe

**PI 2.2.3**
**Information on the nature and amount of secondary species taken is adequate to determine the risk posed by the UoA and the effectiveness of the strategy to manage secondary species**

species compositions, record and analyse biological indicators of target species and Bycatch, determine and describe discard practices and their causes and analyse the spatial and temporal variations of these indicators. Logbooks of the fishery also register all catches during the fishing trips.

The primary responsibility for the collection of fishery dependent information from commercial fishery operations is with IFOP. In addition, the IFOP has responsibility for establishing quality standards for fisheries dependent data collections that are managed by the SERNAPESCA Office, improving the quality of fishery dependent data, and the collection of biological information from commercial catches.

Chub mackerel was not identified in any binding international agreements and it has a “Least Concern” status in Chile (DS 23/2019 MMA) and in IUCN Red list (Collette *et al.*, 2023). The population is stable (Collette *et al.*, 2023). According to stock assessment of chub mackerel in Peru, the spawning biomass is above the maximum sustainable yield. In four years, catches of chub mackerel represented only 1.33% in weight of the total catch of the fishery. Thus, quantitative information is adequate to estimate the impact of the UoA on minor secondary species with respect to status, as there is data from the programs, the status of the species is known and the catches are low, indicating a minimum impact. **SG 100 is met.**

Information adequacy for management strategy				
<b>C</b>	Guide post	Information is adequate to support measures to manage main secondary species.	Information is adequate to support a partial strategy to manage main secondary species.	Information is adequate to support a strategy to manage all secondary species, and evaluate with a high degree of certainty whether the strategy is achieving its objective.
	Met?	Yes	Yes	No

**Rationale**

Since 2015, when the “Plan for the Reduction of Discards and Incidental Catches in the Industrial Fishery of Jack Mackerel and its Bycatch between the Regions of Valparaíso to Los Lagos and International Waters under the Convention of the South Pacific Regional Fisheries Management Organisation (SPRFMO)” has still been elaborated, discard and bycatch research programs and monitoring have been performed, with reports with quantitative data of target and Bycatch been published by IFOP annually. Data of catches, mortality rates, reasons for discards and type of interaction of seabirds and mammals with the fishery has been provided and spatiotemporal and environmental patterns have been analysed. Discards of species are forbidden and all catches must be recorded on the logbooks. The regulation of TEL, was proved to be efficient to reduce discards of jack mackerel (INPESCA, 2023). A reduction of catches of the main secondary birds was observed over the years. Information is adequate to support a partial strategy to manage main secondary species.

Therefore, information is adequate to support a partial strategy to manage all secondary species, as discard and bycatch research programs, along with annual IFOP reports, provide comprehensive data on catches, mortality rates, reasons for discards, and interactions with the fishery since 2015, leading to effective measures like the regulation of TEL. **SG 60 and 80 are met.** However, as direct correlations between the implementation of all the measures and good practices of the Plan and the reductions of each species were not analysed, it is not possible to evaluate with a high degree of certainty whether the strategy is achieving its objective. **SG 100 is not met.**

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**PI 2.2.3**
**Information on the nature and amount of secondary species taken is adequate to determine the risk posed by the UoA and the effectiveness of the strategy to manage secondary species**

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**Draft scoring range and information gap indicator added at Announcement Comment Draft Report**

Draft scoring range	Applicable SGs/elements <u>likely</u> met			<u>Likely</u> overall PI score
	SG60	SG80	SG100	
	2 of 2	2 of 2	2 of 3	
Information gap indicator	Information sufficient to score PI			

**Overall Performance Indicator scores added from Client and Peer Review Draft Report**

Overall Performance Indicator score	Applicable SGs/elements met			Overall score
	SG60	SG80	SG100	
	X of x	X of x	X of x	
Condition number (if relevant)				

### PI 2.3.1 – ETP species outcome

PI 2.3.1		The UoA meets national and international requirements for the protection of ETP species The UoA does not hinder recovery of ETP species			
Scoring Issue		SG 60	SG 80	SG 100	
		<b>Effects of the UoA on population/stock within national or international limits, where applicable</b>			
<b>a</b>	Guide post	Where national and/or international requirements set limits for ETP species, the <b>effects of the UoA</b> on the population/stock are known and <b>likely</b> to be within these limits.	Where national and/or international requirements set limits for ETP species, the <b>combined effects of the MSC UoAs</b> on the population /stock are known and <b>highly likely</b> to be within these limits.	Where national and/or international requirements set limits for ETP species, there is a <b>high degree of certainty</b> that the <b>combined effects of the MSC UoAs</b> are within these limits.	
	Met?	NA	NA	NA	

#### Rationale

This SI is not scored as there are no national or international requirements that set limits for ETP species.

<b>Direct effects</b>				
<b>b</b>	Guide post	Known direct effects of the UoA are likely to not <b>hinder recovery</b> of ETP species.	Direct effects of the UoA are <b>highly likely</b> to not <b>hinder recovery</b> of ETP species.	There is a <b>high degree of confidence</b> that there are no <b>significant detrimental direct effects</b> of the UoA on ETP species.
	Met?	Yes all scoring elements	Yes all scoring elements	Yes all scoring elements

#### Rationale

There is a **high degree of confidence** that there are no **significant detrimental direct effects** of the UoA on ETP species.

Marine mammals had no catches reported by the fleet except for South American sea lion, *Otaria byronia*. It has a “Least Concern” status by the National Regulation and IUCN (Cárdenas-Alayza *et al.*, 2016). The last census in Chile performed in 2019 estimated a population of  $22,696 \pm 325$  in the central zone of Chile (regions of Valparaíso, O’Higgins, Maule, Ñuble, Biobio y Araucanía),  $65,135 \pm 2,913$  in the southern zone (regions of Los Ríos, Los Lagos and Aysén) and it was observed that the number of colonies in the southern zone increased from 2 in 1998 to 19 in 2019 [FIPA 2018-54]. A study performed in the most important breeding colony in central Chile, Cobquecura, over a twelve-year period (2008 to 2020), identified an increase in the population size in the colony (Sepúlveda *et al.*, 2021). It was observed 266 catches of the species in the fishery in the last 4 years, but with zero mortality.

The following ETPs birds were caught by the jack mackerel industrial purse seine fishery in the period between 2018-2022 in 1,226 observed fishing hauls: Kelp gull, pink-footed shearwater, Humboldt penguin and Magellanic penguin (Vega *et al.*, 2024)

Kelp gull has a “Least Concern” status by IUCN (BirdLife International, 2018b), but it is one of the species under the AEWA. The population is estimated to number 3,300,000 - 4,300,000 individuals and the overall population trend is increasing (BirdLife International, 2018b). In the last four years there only two catches of this species, with zero mortality (Vega *et al.*, 2020, 2021, 2022 and Ossa *et al.*, 2023).

Pink-footed shearwater is considered endangered in Chile and vulnerable by IUCN (BirdLife International, 2018a).

PI 2.3.1		The UoA meets national and international requirements for the protection of ETP species The UoA does not hinder recovery of ETP species					
There were only two catches of this species, which resulted in death in the last four years (Vega <i>et al.</i> , 2020, 2021, 2022 and Ossa <i>et al.</i> , 2023).							
Humboldt penguin is considered a protected species in Chile (DS N°225/19910) and it has a “Vulnerable” status in Chile and IUCN (DS 50/2008 MINSEGPRES, BirdLife International, 2020a). The estimated global population of this species is 23,800 mature individuals, and the last census carried out in 2017 in Chile estimates that the country holds a population of 5,100 breeding pairs, equating to 10,200 mature individuals (BirdLife International, 2020a). There was only one caught of this species in the last four years, in 2022, and the individual did not die (Vega <i>et al.</i> , 2020, 2021, 2022 and Ossa <i>et al.</i> , 2023).							
Magellanic penguin is a protected species under DS N°225/1991, although it has a “Least Concern” status in Chile and in IUCN (BirdLife International, 2020a). The world population is estimated at between 1.1 and 1.6 million pairs, which equates to 2.2-3.2 million mature individuals, a maximum guess of 500,000 pairs breed in Chile. The population trend in Chile remains unclear though on Magdalena Island, the significant population has declined by 85.4% over the past 15 years, and the colony in Seno Otway has decreased by 89% over the past 11 years (BirdLife International, 2020a). From 2015-2022, only one catch of this species was reported by scientific observers in the fishery, in 2022.							
<b>C</b>	<b>Indirect effects</b>						
	Guide post	Indirect effects have been considered for the UoA and are thought to be <b>highly likely</b> to not create unacceptable impacts.	There is a high degree of confidence that there are no significant detrimental indirect effects of the UoA on ETP species.				
Met?		Yes	No				
<b>Rationale</b>							
Indirect effects have been considered for the UoA and are thought to be <b>highly likely</b> to not create unacceptable impacts.							
Possible indirect effects of the fishery on the ETP species observed could arise through stress on the animals released alive, loss of gear or through the depletion of the jack mackerel stock to the extent that the availability of food is reduced.							
Interaction of the fishery with sea lions is high, as there were about 266 catches over the last 4 years. Although, deaths are not common, this causes an stress on the animal.							
The loss of fishing gear from purse seine vessels is reported to be very rare both in this fishery and globally.							
Jack mackerel is a generalist feeder capable of utilising a wide range of prey species and may be acting as an energy flow channeler from primary producers to top predators (Konchina, 1979, SPRFMO, 2014). The consequences of the removal of jack mackerel can be inferred from existing information such as the food web and trophic interactions in the Humboldt Current System (Espinosa <i>et al.</i> , 2017, Thiel <i>et al.</i> , 2007). These studies indicate that jack mackerel is not the main, nor the only prey item available to ETP species, so the removal of jack mackerel is not considered likely to have an indirect effect upon them. The current management regime for the jack mackerel stock ensures							

**PI 2.3.1**

**The UoA meets national and international requirements for the protection of ETP species  
 The UoA does not hinder recovery of ETP species**

that the stock is recovering, with an increasing trend in biomass in the last decade. The fishery is therefore currently highly unlikely to be having unacceptable impacts on any of the ETP species identified. Moreover, the removal potential prey species in the bycatch is not considered to cause an indirect impact on ETPs, as the bycatch levels are extremely low.

In the lack of any evidence of ETPs' dependency on jack mackerel as a food source and the unlikelihood of ghost fishing of ETPs by abandonment gears, indirect effects of the fishery are thought to be highly likely to not create unacceptable impacts, thus **SG 60 and 80 are met**. Considering the lack of studies of trophic interactions with the specific ETP of the fishery and the high level of interaction with sea lions, **SG 100 is not met**.

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**Draft scoring range and information gap indicator added at Announcement Comment Draft Report**

Draft scoring range	Applicable SGs/elements <u>likely</u> met			<u>Likely</u> overall PI score
	SG60	SG80	SG100	
	2 of 2	2 of 2	1 of 2	
Information gap indicator	Information sufficient to score PI			

**Overall Performance Indicator scores added from Client and Peer Review Draft Report**

Individual scoring elements (add rows as required; delete if not scoring by elements)	Applicable SGs met per individual scoring element			Scoring element scores
	SG60	SG80	SG100	
Overall Performance Indicator score	Applicable SGs/elements met			
	SG60	SG80	SG100	Overall score
	X of x	X of x	X of x	
Condition number (if relevant)				

### PI 2.3.2 – ETP species management strategy

PI 2.3.2		<p>The UoA has in place precautionary management strategies designed to:</p> <ul style="list-style-type: none"> <li>- meet national and international requirements;</li> <li>- ensure the UoA does not hinder recovery of ETP species.</li> </ul> <p>Also, the UoA regularly reviews and implements measures, as appropriate, to minimise the mortality of ETP species</p>		
Scoring Issue		SG 60	SG 80	SG 100
		<b>Management strategy in place (national and international requirements)</b>		
<b>a</b>	Guide post	<p>There are <b>measures</b> in place that minimise the UoA-related mortality of ETP species, and are expected to be <b>highly likely to achieve</b> national and international requirements for the protection of ETP species.</p>	<p>There is a <b>strategy</b> in place for managing the UoA's impact on ETP species, including measures to minimise mortality, which is designed to be <b>highly likely to achieve</b> national and international requirements for the protection of ETP species.</p>	<p>There is a <b>comprehensive strategy</b> in place for managing the UoA's impact on ETP species, including measures to minimise mortality, which is designed to <b>achieve above</b> national and international requirements for the protection of ETP species.</p>
	Met?	<b>Yes</b>	<b>Yes</b>	<b>No</b>

#### Rationale

There is a **strategy** in place for managing the UoA's impact on ETP species, including measures to minimise mortality, which is designed to be **highly likely to achieve** national and international requirements for the protection of ETP species.

MSC definitions of “measures”, “partial strategy” and “strategy” which are outlined in MSC Fisheries Standard v2.01 §Table SA8: Principle 2 Phrases as follows:

“Measures” are actions or tools in place that either explicitly manage impacts on the component or indirectly contribute to management of the component under assessment having been designed to manage impacts elsewhere.

A “strategy” represents a cohesive and strategic arrangement which may comprise one or more measures, an understanding of how it/they work to achieve an outcome and which should be designed to manage impact on that component specifically. A strategy needs to be appropriate to the scale, intensity and cultural context of the fishery and should contain mechanisms for the modification fishing practices in the light of the identification of unacceptable impacts.

A “comprehensive strategy” (applicable only for ETP component) is a complete and tested strategy made up of linked monitoring, analyses, and management measures and responses.

Chile is a member country of several agreements for the conservation of ETP species such as Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), Convention on Biological Diversity (CBD), Convention on Migratory Species (CMS), Agreement on the Conservation of Albatrosses and Petrels (ACAP), International Convention for the Regulation of Whaling (ICRW), Ramsar Convention on Wetlands, Agreement on Measures for the Conservation of Sharks in the South Pacific (SPIMA), Western and Central Pacific Fisheries Commission, CODEFF BirdLife international, Convención de las Naciones Unidas por los Derechos del Mar (CONVEMAR) and different international agreements with countries around the world to preserve the marine life as “Chile - United States Memorandum of Understanding on Cooperation for the Conservation and Management of Terrestrial and Marine Protected Areas” under which the sea lion is also protected.

### PI 2.3.2

The UoA has in place precautionary management strategies designed to:

- meet national and international requirements;
- ensure the UoA does not hinder recovery of ETP species.

Also, the UoA regularly reviews and implements measures, as appropriate, to minimise the mortality of ETP species

The LGPA establishes the obligation to return marine mammals, reptiles, penguins, and other sea birds to the sea, unless they are severely hurt or injured, in which case they should be retained on board in order to be sent to a rehabilitation centre for hydrobiological species.

There are 70 protected species in Chile, according to the Decree N° 225 of 1995, amended by Decree N° 135 of 2005 and N°434 of 2007, all from Ministry of Economy. The species are protected by a total ban for a period of 30 years, from November 11th, 1995, and until November 10th, 2025.

The "Plan for the Reduction of Discards and Incidental Catches in the Industrial Fishery of Jack Mackerel and its Bycatch between the Regions of Valparaíso to Los Lagos and International Waters under the Convention of the South Pacific Regional Fisheries Management Organisation (SPRFMO)" covers measures to minimize interactions and catches of seabirds, mammals and reptiles. The Plan includes a robust monitoring program, training sessions, dissemination programs, and a code of good practices aimed at reducing incidental catches. It also ensures compliance with best practices, such as changing fishing areas and communicating with the rest of the fleet when incidental catch occurs, and avoiding high bycatch zones. The measures applied for seabirds, mammals and reptiles included preparation and compliance with mandatory protocols to deter these animals retained in the purse seine; preparation and formalization of protocols of identification of species, safe handling on board, registration and release the animals seeking their survival and suspend fishing hauls for discarding catches to release/return cetaceans and reptiles. The measures did not focus on any species in particular, except one for *Ardenna* species. It was proposed to evaluate the feasibility of carrying out spatio-temporal management for *Ardenna* species based on indicators considering certain delimited areas, for specific periods and/or times. It was not identified the implementation of this measure, nevertheless, Decree 21/2020 approved a plan for the recovery, conservation and management of the pink-footed shearwater (*Ardenna creatopus*). The plan duration is 20 years, but several actions planned for the first years does not seem to be implemented and it was not found online any information of the progress of the Plan.

A protocol for ensure the adequate record of images with the use of IRD in industrial purse seine fishery of south-central Chile has been approved (RES.EX. N°2738/2019) and currently all industrial vessels have implemented the device on the vessels (INPESCA, 2023).

In the last four years, incidental catches of the ETP birds have been minimal, with only two Kelps gull caught (no death), two Pink-footed shearwater (resulting in death) and one Humboldt penguin caught (no death). From 2015-2022, only one catch of Magellanic penguin was reported by scientific observers in the fishery, in 2022.

Based on the comprehensive measures implemented in the "Plan for the Reduction of Discards and Incidental Catches in the Industrial Fishery of Jack Mackerel and its Bycatch," and the low catches of ETP in recent years, there is a strategy in place for managing the UoA's impact on ETP species, thus **SG 60 and 80 is met**. However, as it was not identified the implementation of the actions predicted by the pink-footed shearwater Plan and the strategy in place does not meet the MSC definition of a "comprehensive strategy" (i.e. a complete and tested strategy made up of linked monitoring, analyses, and management measures and responses), **SG 100 is not met**.

Management strategy in place (alternative)				
b	Guide post	There are measures in place that are expected to ensure the UoA	There is a strategy in place that is expected to ensure the UoA does	There is a comprehensive strategy in place for managing ETP species, to ensure the UoA

PI 2.3.2	<p><b>The UoA has in place precautionary management strategies designed to:</b></p> <ul style="list-style-type: none"> <li>- meet national and international requirements;</li> <li>- ensure the UoA does not hinder recovery of ETP species.</li> </ul> <p><b>Also, the UoA regularly reviews and implements measures, as appropriate, to minimise the mortality of ETP species</b></p>		
	does not hinder the recovery of ETP species.	not hinder the recovery of ETP species.	does not hinder the recovery of ETP species.
Met?	NA	NA	NA

#### Rationale

According to SA3.11.2.1 of MSC Fisheries Standard v2.01, where there are requirements for protection and rebuilding provided through national ETP legislation or international agreements, the team shall score scoring only issue a. Thus, this issue b is not applicable.

<b>Management strategy evaluation</b>				
C	Guide post	The measures are <b>considered likely to work</b> , based on <b>plausible argument</b> (e.g., general experience, theory or comparison with similar fisheries/species).	There is an <b>objective basis for confidence</b> that the measures/strategy will work, based on <b>information</b> directly about the fishery and/or the species involved.	The strategy/comprehensive strategy is mainly based on information directly about the fishery and/or species involved, and a <b>quantitative analysis</b> supports <b>high confidence</b> that the strategy will work.
	Met?	Yes	Yes	No

#### Rationale

There is an **objective basis for confidence** that the measures/strategy will work, based on **information** directly about the fishery and/or the species involved.

Since 2015, a research program focused on discards and incidental catches in the industrial jack mackerel fishery and its Bycatch has been operating along the central southern Chilean coast and in international waters. Scientific observers have been working onboard vessels to monitor bycatch levels and interactions with seabirds, marine mammals, and sea turtles, as well as associated non-target species. Fishermen have also contributed data through logbooks and workshops to discuss possible measures for reducing discards. The collected data from 2015-2018 were used to develop the "Plan for the Reduction of Discards and Incidental Catches in the Industrial Fishery of Jack Mackerel and Its Bycatch between the Regions of Valparaíso to Los Lagos and International Waters under the Convention of the South Pacific Regional Fisheries Management Organisation (SPRFMO)." An evaluation of the data obtained by the scientific observers from 2015-2018 identified the species associated with the fishing activity, based on their capture, mortality rates and the type of interaction with the fishery. This variability was linked to spatiotemporal and environmental patterns, considering the vulnerability or risk to the populations of the most frequently caught species. Following this, a bibliographic review of national and international fisheries strategies was conducted to find applicable measures for the purse seine fleet operating in the central-southern region.

The plan contained general measures for reducing the incidental catches on the fishery, such as establishing programs of monitoring, training and dissemination of measures, application of IRD for record and supervise all discardings, compliance with the rule of change of fishing area (*move on* technique) and communication to the rest of the fleet when there is presence of incidental fishing in fishing operations, maintain scientific observers on boards, compulsory logbook records. Several measures and recommendations of good practices for reducing incidental catches of birds were included on the Plan, but they did not focus on any bird species in particular, except one for *Ardenna* species.

PI 2.3.2	<p><b>The UoA has in place precautionary management strategies designed to:</b></p> <ul style="list-style-type: none"> <li>- meet national and international requirements;</li> <li>- ensure the UoA does not hinder recovery of ETP species.</li> </ul> <p><b>Also, the UoA regularly reviews and implements measures, as appropriate, to minimise the mortality of ETP species</b></p>
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Studies have shown that the dissemination programs of good practices on discards have been effective. INPESCA (2023) monitored the jack mackerel industrial purse seine fleets of south-central Chile from 2020-2022 and noticed a low level of incidental catches. It was also reported an increase of the release of sea lions alive from 44.9% in 2020 to 98.3% in 2022. ATF-Chile in collaboration between the companies subscribed to PESCADORES INDUSTRIALES DEL BIOBÍO and SONAPESCA, carried out in 2022 an external review process of the development of local protocols of good practices applied to the jack mackerel fishery and verified that between 18.2-22.2% of the people of the crews were aware of good practice for reducing the incidental catches of birds (ATF- Chile, 2022).

IFOP has been publishing reports annually providing data of the programs that have been carrying out in compliance with the Plan and the results have showed that the strategy is working. Scientific observers recorded 1,484 sea lions, 242 Kelps gulls, 46 Pink-footed shearwaters and 13 Humboldt penguins catches in 863 fishing hauls over three years (2015-2017). Over the next five years (2018-2022), they observed 533 sea lions and only 2 Kelps gull, 2 Pink-footed shearwater and 1 Humboldt penguin caught. In the whole period 2015-2022 only one Magellanic penguin was caught in 1,226 observed fishing hauls.

There is some objective basis for confidence that the partial strategy will work, based on quantitative information directly about the fishery and species involved, as a Plan for reducing discards and incidental catches for the fishery is implemented, leading to reductions in bycatch and discards and increase of awareness of the best practices, thus **SG 60 and 80 is met**. However, testing does not support high confidence that the strategy will work because there is a lack of specific, controlled tests for each measure and a general correlation data is available rather than causal evidence. Thus, **SG 100 is not met**.

Management strategy implementation			
<b>d</b>	Guide post	There is some <b>evidence</b> that the measures/strategy is being implemented successfully.	There is <b>clear evidence</b> that the strategy/comprehensive strategy is being implemented successfully and is achieving its <b>objective as set out in scoring issue (a) or (b)</b> .
	Met?	<b>Yes</b>	<b>No</b>

#### Rationale

There is some **evidence** that the measures/strategy is being implemented successfully

The “Plan for the Reduction of Discards and Incidental Catches in the Industrial Fishery of Jack Mackerel and Its Bycatch between the Regions of Valparaíso to Los Lagos and International Waters under the Convention of the South Pacific Regional Fisheries Management Organisation (SPRFMO)” has been implemented and research programs focused on discards and incidental catches in the industrial jack mackerel fishery and its Bycatch has been operating since 2015. VMS is in place. Landings data (port sampling) have been collected. The reasons for discards have been monitored, observer data and logbooks have been produced and this information has been published on IFOP reports. IRD has been implemented by SERNAPESCA since 2020. Several vessels have been using the TEL maneuver to avoid discards (IFOP, 2023). INPESCA (2023) has noticed a decrease in the number of registered accompanied fauna species from 2020 to 2022 and suggested that this might be related with application of the rule of change of fishing area that has been incentivized through code of good practices, which consists in

<b>PI 2.3.2</b>	<p><b>The UoA has in place precautionary management strategies designed to:</b></p> <ul style="list-style-type: none"> <li>- meet national and international requirements;</li> <li>- ensure the UoA does not hinder recovery of ETP species.</li> </ul> <p><b>Also, the UoA regularly reviews and implements measures, as appropriate, to minimise the mortality of ETP species</b></p>
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communicating to the rest of the fleet when there is presence of bycatch in fishing operations and search for another fishing zone. Studies have shown that the dissemination programs of good practices on discards have been effective (INPESCA, 2023 and ATF- Chile, 2022). A reduction of mortalities of the ETP species and mortality of sea lions have been verified. However, several actions predicted for conservation of pink-footed shearwater does not seem to be implemented.

There is some evidence that the measures and good practices recommendations of the "Plan for the Reduction of Discards and Incidental Catches in the Industrial Fishery of Jack Mackerel and Its Bycatch between the Regions of Valparaíso to Los Lagos and International Waters under the Convention of the South Pacific Regional Fisheries Management Organisation (SPRFMO)" are being implemented successfully, as indicated by increased discard monitoring, IRD implementation and effective good practice dissemination programs that have reduced catches of ETP species and mortalities of sea lions. **Thus, SG 60 and 80 is met.** However, the full implementation and success of conservation actions for the pink-footed shearwater remain uncertain, indicating that while some progress is evident, clear evidence of comprehensive strategy success is lacking. **SG 100 is not met.**

Review of alternative measures to minimize mortality of ETP species				
e	Guide post	There is a review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of ETP species.	There is a <b>regular</b> review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of ETP species and they are implemented as appropriate.	There is a <b>biennial</b> review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality ETP species, and they are implemented, as appropriate.
	Met?	Yes	Yes	Yes

#### Rationale

There is a **biennial** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality ETP species, and they are implemented, as appropriate.

Since 2015, a research program focused on discards and incidental catches in the industrial jack mackerel fishery and its Bycatch has been operating along the central southern Chilean coast and in international waters. Data collected by scientific observers from 2015-2018 within the research program context were used to develop the "Plan for the Reduction of Discards and Incidental Catches in the Industrial Fishery of Jack Mackerel and its Bycatch between the Regions of Valparaíso to Los Lagos and International Waters under the Convention of the South Pacific Regional Fisheries Management Organisation (SPRFMO)", which was authorized in 2019. The plan also incorporated information from other national fisheries and a bibliographic review regarding effectiveness and practicality of alternative measures to minimise unwanted catch.

The 2019 IFOP report presented the results of the program and proposals that were made to the Management Committee for the mitigation of incidental catches of mammals, reptiles and seabirds on the jack mackerel fishery (Vega *et al.*, 2019). Through the following years of the research program, IFOPs reports have reviewed and recommended measures for reducing bycatches for other fisheries in Chile (artisanal sardine fishery operating in southern part of the Los Lagos region and the artisanal anchovy and jack mackerel fishery that operates in the north central area of Chile).

### PI 2.3.2

The UoA has in place precautionary management strategies designed to:

- meet national and international requirements;
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Also, the UoA regularly reviews and implements measures, as appropriate, to minimise the mortality of ETP species

From 2014-2021 a program for dissemination of the results of the discard and bycatch research program and the contents of the reduction plan was developed with the fishermen. Users received timely and updated information on the research program and discussion of proposals for mitigation measures were held, elements that were incorporated in the documents that were subsequently sent to SUBPESCA. This allowed the exchange opinions and experiences about the fishing operation, implication of the program and finally contributions or fishermen's apprehensions about the proposed measures.

INPESCA and CIAM have both prepared Manual of Good Practices for pelagic Chilean fishery in 2020 and 2021, respectively (INPESCA, 2020 and CIAM, 2021), being the INPESCA manual specific tailored to the fishery of this assessment. For elaborating these manuals, reviews were required and information was adapted to fit the specific conditions of the Chilean pelagic fishery, while incorporating observations from the stakeholders. As a part of the practices, there were protocols for the mitigation, handling and release of birds, marine mammals and reptiles, as well as descriptions of the TEL maneuver and the rule of change of fishing area.

An external review process of the development of local protocols of good practices applied to the jack mackerel purse seine fishery, such as the manual of good practices produced by INPESCA, was carried out in 2022 by ATF-Chile in collaboration between the companies subscribed to PESCADORES INDUSTRIALES DEL BIOBÍO and SONAPESCA and a report was handled to the assessment team during the second surveillance. The objective of the work was to identify gaps in crew performance related to non-target species identification, rescue techniques, and safe handling, as well as to pinpoint suitable onboard sites for installing infrastructure to facilitate the release or care of injured marine fauna. Safety equipment onboard was also reviewed for these purposes, followed by recommendations aimed at reinforcing the good practices (ATF-Chile, 2022).

INPESCA in collaboration between the companies subscribed to PESCADORES INDUSTRIALES DEL BIOBÍO and SONAPESCA, released a report in 2023 aiming to establish the level of progress that has been made in the application of the good practices manuals in the mitigation of discards and bycatch in the jack mackerel fishery by analysing data collected between 2020-2022.

During the 4<sup>th</sup> surveillance, it was told to the assessment team that ATF-birds and INPESCA plan to have annual workshops with the fishermen for dissemination and improvements of good practices to reduce bycatches and discards.

There have been a regular review of the potential effectiveness and practicality of alternative measures to minimize discards, through discussions in dissemination programs, bibliographic reviews, preparation of good practice manuals and reports analysing the results of the program, and annual workshops are predicted covering the incidental catches of ETP, thus, there is a biennial review of potential effectiveness and practicality of alternative measures to minimise UoA-related mortality ETP species, and they are implemented, as appropriate. **SG 100 is met.**

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**PI 2.3.2**

The UoA has in place precautionary management strategies designed to:

- meet national and international requirements;
- ensure the UoA does not hinder recovery of ETP species.

Also, the UoA regularly reviews and implements measures, as appropriate, to minimise the mortality of ETP species

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**Draft scoring range and information gap indicator added at Announcement Comment Draft Report**

Draft scoring range

Applicable SGs/elements likely met

<b>PI 2.3.2</b>	<p><b>The UoA has in place precautionary management strategies designed to:</b></p> <ul style="list-style-type: none"> <li>- meet national and international requirements;</li> <li>- ensure the UoA does not hinder recovery of ETP species.</li> </ul> <p>Also, the UoA regularly reviews and implements measures, as appropriate, to minimise the mortality of ETP species</p>			
	SG60	SG80	SG100	<u>Likely</u> overall PI score
	4 of 4	4 of 4	1 of 4	>80
Information gap indicator	Information sufficient to score PI			

**Overall Performance Indicator scores added from Client and Peer Review Draft Report**

Individual scoring elements (add rows as required; delete if not scoring by elements)	Applicable SGs met per individual scoring element			Scoring element scores
	SG60	SG80	SG100	
Overall Performance Indicator score	Applicable SGs/elements met			Overall score
	SG60	SG80	SG100	
Condition number (if relevant)	X of x	X of x	X of x	

### PI 2.3.3 – ETP species information

<b>PI 2.3.3</b>		Relevant information is collected to support the management of UoA impacts on ETP species, including: - Information for the development of the management strategy; - Information to assess the effectiveness of the management strategy; and - Information to determine the outcome status of ETP species		
Scoring Issue		SG 60	SG 80	SG 100
		<b>Information adequacy for assessment of impacts</b>		
<b>a</b>	Guide post	<p>Qualitative information is <b>adequate to estimate</b> the UoA related mortality on ETP species.</p> <p>OR</p> <p>If RBF is used to score PI 2.3.1 for the UoA:</p> <p>Qualitative information is <b>adequate to estimate productivity and susceptibility</b> attributes for ETP species.</p>	<p>Some quantitative information is <b>adequate to assess</b> the UoA related mortality and impact and to determine whether the UoA may be a threat to protection and recovery of the ETP species.</p> <p>OR</p> <p>If RBF is used to score PI 2.3.1 for the UoA:</p> <p>Some quantitative information is <b>adequate to assess productivity and susceptibility</b> attributes for ETP species.</p>	Quantitative information is available to assess with a high degree of certainty the <b>magnitude</b> of UoA-related impacts, mortalities and injuries and the consequences for the status of ETP species.
Met?		Yes	Yes	No
<b>Rationale</b>				
Some quantitative information is adequate to assess the UoA related mortality and impact and to determine whether the UoA may be a threat to protection and recovery of the ETP species.				
<p>The status of pink-footed shearwater and Magellanic penguin was last evaluated in 2023 by Chile (DS 10/2023 MMA), while Humboldt penguin and kelp gull was in 2008 (DS 50/2008 MINSEGPRES) and sea lion in 2013 (DS 13/2013 MMA), but IUCN has recently assessed these two species (BirdLife International, 2020a, 2018b, Cárdenas-Alayza <i>et al.</i>, 2016, respectively). The incidental catches of sea lion is high (266), although zero mortalities happened in the last four years. Data of ETPs catches is collected through observers programs, VMS, research programs, logbooks and IRD. Since 2015, when the “Plan for the Reduction of Discards and Incidental Catches in the Industrial Fishery of Jack Mackerel and Its Bycatch between the Regions of Valparaíso to Los Lagos and International Waters under the Convention of the South Pacific Regional Fisheries Management Organisation (SPRFMO)” has still been elaborated, discard and incidental catches research programs and monitoring have been performed, with reports with quantitative data of seabirds and marine mammals being published by IFOP annually. Scientific observers covered an average of 11.15% of the fishing trip and 1,226 of the fishing hauls (Vega <i>et al.</i>, 2024) in the period between 2019-2022.</p> <p>With this quantitative information of the incidental catches for the fishery is possible to conclude that the interactions of the fleet with ETP species are low and <b>SG60 and SG80 are met</b>. However, considering the high catch of sea lion on the fishery and lack of studies of the magnitude of UoA-related injuries and the consequences for the status of this ETP species, <b>SG 100 is not met</b>.</p>				
<b>b</b>	<b>Information adequacy for management strategy</b>			

PI 2.3.3	<b>Relevant information is collected to support the management of UoA impacts on ETP species, including:</b> <ul style="list-style-type: none"> <li>- <b>Information for the development of the management strategy;</b></li> <li>- <b>Information to assess the effectiveness of the management strategy; and</b></li> <li>- <b>Information to determine the outcome status of ETP species</b></li> </ul>		
Guide post	Information is adequate to support <b>measures</b> to manage the impacts on ETP species.	Information is adequate to measure trends and support a <b>strategy</b> to manage impacts on ETP species.	Information is adequate to support a <b>comprehensive strategy</b> to manage impacts, minimize mortality and injury of ETP species, and evaluate with a <b>high degree of certainty</b> whether a strategy is achieving its objectives.
Met?	<b>Yes</b>	<b>Yes</b>	<b>No</b>

#### Rationale

Information is adequate to measure trends and support a strategy to manage impacts on ETP species.

Since 2015, when the “Plan for the Reduction of Discards and Incidental Catches in the Industrial Fishery of Jack Mackerel and Its Bycatch between the Regions of Valparaíso to Los Lagos and International Waters under the Convention of the South Pacific Regional Fisheries Management Organisation (SPRFMO)” has still been elaborated, discard and bycatch research programs and monitoring have been performed, with reports published by IFOP annually. These programs have continued with the formalization of the Plan in order to evaluate the application of the Plan. They have provided quantified data of incidental catches, total mortality and interaction levels of seabirds and mammals with the fishery and analysed the spatial and temporal variations of these indicators. Studies have been performed to evaluate the effectiveness of the recommended good practices (INPESCA 2023 and ATF-Chile, 2022) and the reduction of ETPs bycatches over the years with the implementation of these measures have been well documented. Information of ETP species is available from IUCN and ACAP and is also kept under review by Government bodies in Chile. Therefore, information is adequate to measure trends and support a strategy to manage impacts on ETP species and **SG80 is met**. However, as discussed under SI 2.3.2a, the team considered that the international and national strategy in place do not deem this to be a “comprehensive strategy”, thus **SG 100 is not met for any scoring element**.

#### References

ATF-Chile. 2022. Revisión de Manual de Buenas Prácticas y Plan de Acción Jurel. Auditoria de vigilancia MSC: Interacción con Aves Marinas.

BirdLife International. 2018b. *Larus dominicanus*. The IUCN Red List of Threatened Species 2018: e.T22694329A132542863. <https://dx.doi.org/10.2305/IUCN.UK.2018-2.RLTS.T22694329A132542863.en> Accessed on 06 July 2024.

BirdLife International. 2020a. *Spheniscus humboldti*. The IUCN Red List of Threatened Species 2020: e.T22697817A182714418. <https://dx.doi.org/10.2305/IUCN.UK.2020-3.RLTS.T22697817A182714418.en> Accessed on 06 July 2024.

Cárdenas-Alayza, S., Crespo, E. & Oliveira, L. 2016. *Otaria byronia*. The IUCN Red List of Threatened Species 2016: e.T41665A61948292. <https://dx.doi.org/10.2305/IUCN.UK.2016-1.RLTS.T41665A61948292.en> Accessed on 09 July 2024.

Decreto 50/2008 del Ministerio del Medio Ambiente. Aprueba y oficializa clasificación de especies según estado de conservación, segundo proceso  
[https://concursolbn.conaf.cl/ayuda/2018/DS\\_50\\_Clasicacion\\_Especies\\_2\\_Proceso.pdf](https://concursolbn.conaf.cl/ayuda/2018/DS_50_Clasicacion_Especies_2_Proceso.pdf)

PI 2.3.3	<p><b>Relevant information is collected to support the management of UoA impacts on ETP species, including:</b></p> <ul style="list-style-type: none"> <li>- <b>Information for the development of the management strategy;</b></li> <li>- <b>Information to assess the effectiveness of the management strategy; and</b></li> <li>- <b>Information to determine the outcome status of ETP species</b></li> </ul>																
<p>Decreto 10/2023 del Ministerio del Medio Ambiente. Aprueba y oficializa clasificación de especies según estado de conservación, decimoctavo proceso <a href="https://www.bcn.cl/leychile/navegar?idNorma=1196654&amp;idVersion=2023-10-06">https://www.bcn.cl/leychile/navegar?idNorma=1196654&amp;idVersion=2023-10-06</a></p> <p>Decreto 13/2013 del Ministerio del Medio Ambiente. Aprueba y oficializa clasificación de especies según su estado de conservación, noveno proceso. <a href="https://www.bcn.cl/leychile/navegar?idNorma=1053125">https://www.bcn.cl/leychile/navegar?idNorma=1053125</a></p> <p>INPESCA. 2023. Informe Técnico. Descripción del descarte de jurel y especies secundarias; y captura y tratamiento de especies en peligro, amenazadas y protegidas (ETP) en la unidad de certificación MSC (pesquería industrial de cerco de jurel centro-sur de chile). <a href="https://www.corpesca.cl/wp-content/uploads/2014/08/Manual-de-bunash-pr%C3%A1cticas-y-normas-pesqueras-para-la-sustentabilidad-de-los-recursos.pdf">https://www.corpesca.cl/wp-content/uploads/2014/08/Manual-de-bunash-pr%C3%A1cticas-y-normas-pesqueras-para-la-sustentabilidad-de-los-recursos.pdf</a></p> <p>Ossa L., Suárez B., Jiménez M.F., Henríquez S., González A., Ojeda R. 2023. Informe Final. Convenio de Desempeño 2022. Programa de investigación y monitoreo del descarte y la captura de pesca incidental en pesquerías pelágicas, año 2022-2023. Subsecretaría de Economía Y EMT/Agosto 2023. <a href="https://www.ifop.cl/en/busqueda-de-informes/">https://www.ifop.cl/en/busqueda-de-informes/</a></p>																	
<p><b>Draft scoring range and information gap indicator added at Announcement Comment Draft Report</b></p>																	
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th rowspan="3" style="width: 30%;">Draft scoring range</th> <th colspan="3" style="text-align: center; padding: 5px;">Applicable SGs/elements <u>likely</u> met</th> <th rowspan="3" style="width: 10%; text-align: center; vertical-align: middle;"><u>Likely</u> overall PI score</th> </tr> <tr> <th style="text-align: center; padding: 5px;">SG60</th> <th style="text-align: center; padding: 5px;">SG80</th> <th style="text-align: center; padding: 5px;">SG100</th> </tr> <tr> <th style="text-align: center; padding: 5px;">2 of 2</th> <th style="text-align: center; padding: 5px;">2 of 2</th> <th style="text-align: center; padding: 5px;">0 of 2</th> </tr> </thead> <tbody> <tr> <td style="width: 30%; vertical-align: top;">Information gap indicator</td> <td colspan="4" style="text-align: center; padding: 5px;">Information sufficient to score PI</td></tr> </tbody> </table>		Draft scoring range	Applicable SGs/elements <u>likely</u> met			<u>Likely</u> overall PI score	SG60	SG80	SG100	2 of 2	2 of 2	0 of 2	Information gap indicator	Information sufficient to score PI			
Draft scoring range	Applicable SGs/elements <u>likely</u> met			<u>Likely</u> overall PI score													
	SG60		SG80		SG100												
	2 of 2	2 of 2	0 of 2														
Information gap indicator	Information sufficient to score PI																

<b>Overall Performance Indicator scores added from Client and Peer Review Draft Report</b>	<b>Overall score</b>
Overall Performance Indicator score	Applicable SGs/elements met
	Overall score

## PI 2.4.1 – Habitats outcome

PI 2.4.1	<b>The UoA does not cause serious or irreversible harm to habitat structure and function, considered on the basis of the area covered by the governance body(s) responsible for fisheries management in the area(s) where the UoA operates</b>		
Scoring Issue	SG 60	SG 80	SG 100
<b>Commonly encountered habitat status</b>			
<b>a</b>	Guide post	The UoA is <b>unlikely</b> to reduce structure and function of the commonly encountered habitats to a point where there would be serious or irreversible harm.	The UoA is <b>highly unlikely</b> to reduce structure and function of the commonly encountered habitats to a point where there would be serious or irreversible harm.
	Met?	<b>Yes</b>	<b>Yes</b>

### Rationale

**There is evidence that the UoA is highly unlikely to reduce structure and function of the commonly encountered habitats to a point where there would be serious or irreversible harm.**

Commonly encountered habitat for UoA is the column water. The fishery for jack mackerel is done using pelagic purse seine nets, which operate in the water column without touching the seabed. These nets can reach depths of up to 200 meters and are typically used in waters between 50 - 200 meters. Therefore, the epipelagic habitat, which is the uppermost layer of the ocean, is considered the primary habitat encountered during fishing.

Studies indicate that purse seine nets have no physical impact on pelagic habitats. The primary human impact on Pacific oceanographic processes is climate change. Purse seine nets are a type of fishing gear specifically designed to catch schooling fish near the ocean's surface. They work by surrounding a school of fish and then closing at the bottom, creating a "purse" that traps the fish inside. Since these nets are deployed near the surface and do not come into contact with the sea floor, their impact on the marine environment is minimal. This makes them a relatively environmentally friendly option compared to other fishing methods that may harm the sea floor and benthic habitats. Based on the effort distribution described earlier in the background section, the fishery under assessment does not impact the sea floor, and it can be considered that it has no significant effect on the key elements of the main habitats. SG 80 is met.

In summary, the epipelagic habitat is the main habitat encountered in this fishery, and it is well studied and understood. The habitat's key functions are physico-chemical, and there is no evidence or plausible mechanism by which pelagic purse seines could significantly impact these characteristics therefore SG 100 is met.

<b>VME habitat status</b>			
<b>b</b>	Guide post	The UoA is <b>unlikely</b> to reduce structure and function of the VME habitats to a point where there would be serious or irreversible harm.	The UoA is <b>highly unlikely</b> to reduce structure and function of the VME habitats to a point where there would be serious or irreversible harm.
	Met?	<b>NA</b>	<b>NA</b>

### Rationale

Although Vulnerable Marine Ecosystems (VMEs) are identified in Chile EEZ and there are measures in place both in Chilean legislation and SPRFMO regulations, impact studies on purse seine fishing reveal that this fishery does not interact with the VMEs identified in Chile. However, a SPRFMO habitat working group determines the macroorganisms that define these ecosystems, establishes the conditions for move-on rules, and studies the impact of bottom fisheries that could affect these

**PI 2.4.1**

The UoA does not cause serious or irreversible harm to habitat structure and function, considered on the basis of the area covered by the governance body(s) responsible for fisheries management in the area(s) where the UoA operates

habitats. Since this does not apply to jack mackerel and no risks have been identified for this fishery, this indicator is assessed as Not Applicable (NA).

Minor habitat status			
<b>C</b>	Guide post		
	Met?		Yes

**Rationale**

**There is evidence that the UoA is highly unlikely to reduce structure and function of the minor habitats to a point where there would be serious or irreversible harm.**

The fishing grounds are well-defined, and the fishing footprint shown in the background section clearly indicates that the vessels operate in the same areas year after year without moving to new positions. Consequently, the habitats typically affected are those that recover easily, allowing the fishing activity to continue in the same grounds year after year. Since the habitats primarily consist of coarse sands and small rocks and are not negatively impacted by the UoAs, SG 100 is achieved.

**References**

Melo, T., N. Silva, P. Muñoz, J. Díaz-Naveas, J. Sellanes, A. Bravo, J. Lamilla, J. Sepúlveda, R. Vogler, Y. Guerrero, C. Bustamante, M. Alarcón, D. Queirolo, F. Hurtado, E. Gaete, P. Rojas, I. Montenegro, R. Escobar, and V. Zamora. 2007. Caracterización del fondo marino entre la III y X Regiones. Informe Final Proyecto FIP No 2005-61. Estud. Doc. No 22/2007. 287 pp.  
 Transparency for a Sustainable Ocean | Global Fishing Watch

**Draft scoring range and information gap indicator added at Announcement Comment Draft Report**

Individual scoring elements (add rows as required; delete if not scoring by elements)	Applicable SGs <u>likely</u> met per individual scoring element			<u>Likely</u> scoring element scores
	SG60	SG80	SG100	
1 UoAs	2 of 2	2 of 2	2 of 2	≥80
Draft scoring range	Applicable SGs/elements <u>likely</u> met			<u>Likely</u> overall PI score
	SG60	SG80	SG100	
	2 of 2	2 of 2	2 of 2	≥80
Information gap indicator	Information sufficient to score PI			

**Overall Performance Indicator scores added from Client and Peer Review Draft Report**

Individual scoring elements (add rows as required; delete if not scoring by elements)	Applicable SGs met per individual scoring element			Scoring element scores
	SG60	SG80	SG100	
1 Scoring element 1	X of x	X of x	X of x	
2 Scoring element 2	X of x	X of x	X of x	

<b>PI 2.4.1</b>		The UoA does not cause serious or irreversible harm to habitat structure and function, considered on the basis of the area covered by the governance body(s) responsible for fisheries management in the area(s) where the UoA operates		
3	Scoring element 3	X of x	X of x	X of x
4	Scoring element 4	X of x	X of x	X of x
Overall Performance Indicator score		Applicable SGs/elements met		
		SG60	SG80	SG100
		X of x	X of x	X of x
Condition number (if relevant)				

## PI 2.4.2 – Habitats management strategy

PI 2.4.2		There is a strategy in place that is designed to ensure the UoA does not pose a risk of serious or irreversible harm to the habitats		
Scoring Issue		SG 60	SG 80	SG 100
<b>Management strategy in place</b>				
<b>a</b>	Guide post	There are <b>measures</b> in place, if necessary, that are expected to achieve the Habitat Outcome 80 level of performance.	There is a <b>partial strategy</b> in place, if necessary, that is expected to achieve the Habitat Outcome 80 level of performance or above.	There is a <b>strategy</b> in place for managing the impact of all MSC UoAs/non-MSC fisheries on habitats.
	Met?	Yes	Yes	No

### Rationale

**There is a partial strategy in place, if necessary, that is expected to achieve the Habitat Outcome 80 level of performance or above.**

In the context of this Performance Indicator, it is important to understand the MSC definitions of “measures”, “partial strategy” and “strategy” which are outlined in MSC FCP v2.3 Principle 2 Phrases as follows:

“Measures”	Actions/tools in place that either explicitly manage impacts on the component or indirectly contribute to management of the component under assessment having been designed to manage impacts elsewhere.
“Partial strategy”	A cohesive arrangement which may comprise one or more measures, an understanding of how it/they work to achieve an outcome and an awareness of the need to change the measures should they cease to be effective. It may not have been designed to manage the impact on that component specifically.
“Strategy”	A cohesive and strategic arrangement which may comprise one or more measures, an understanding of how it/they work to achieve an outcome, and which should be designed to manage impact on that component specifically. A strategy needs to be appropriate to the scale, intensity and cultural context of the fishery and should contain mechanisms for the modification fishing practices in the light of the identification of unacceptable impacts.

In Chile, marine areas are managed based on social, economic, and environmental factors by SUBPESCA and SERNAPESCA, with different management approaches depending on the area's characteristics. Marine Protected Areas (MPAs) are established to meet specific conservation objectives and are regulated by both general laws and specific management plans. These MPAs are categorized into four types: marine parks, marine reserves, nature sanctuaries, and protected marine and coastal areas of multiple uses.

- Marine Parks: These are designated to preserve ecological units of scientific interest and protect areas critical for maintaining hydrobiological diversity. All activities are restricted except those authorized for observation, research, or study.
- Marine Reserves: These protect hydrobiological resources by safeguarding breeding grounds, fishing areas, and repopulation zones. Extractive activities are allowed only temporarily, based on resolutions from the Secretariat of Fisheries and Aquaculture.

The Ministry of the Environment decrees all MPAs, but for marine parks and reserves, SUBPESCA provides the necessary background information, with management oversight from the National Fisheries and Aquaculture Service. These areas are regulated to ensure the conservation and sustainable management of marine biodiversity, and measures are in place to prevent negative impacts on ecosystems, as outlined in the General Administration Plan and the LGPA.

Additionally, amendments to the Fisheries Law aimed to address impacts on fish habitats by providing clear guidelines and regulations. SERNAPESCA has introduced policies to manage the impacts on these areas, assigning exclusive exploitation rights to artisanal fishermen or limiting activities through management plans. These measures are designed to mitigate fishing impacts on sensitive habitats and ensure the conservation of marine resources.

## PI 2.4.2

**There is a strategy in place that is designed to ensure the UoA does not pose a risk of serious or irreversible harm to the habitats**

Resolution No. 451 of 2015 by SUBPESCA amended the fishing law to include a number of seamounts classified as vulnerable ecosystems and protected them from bottom fishing activities due to their fragility. Such activities are not permitted in these areas, and a list with the names and coordinates can be found in the resolution.

In addition, this regulation, D.S. N° 238-04, the Regulation on Marine Parks and Marine Reserves of the General Fisheries and Aquaculture Law (Updated), establishes the general regulations applicable to parks and reserves, as well as their administrative and recreational uses.<sup>8</sup>

Therefore, it can be stated that due to the species distribution and the habitat impacted by the fishery, combined with Chile's general regulations for protecting its marine environment, the UoA reaches a score of 80. However, despite the unknown impact on minor habitats, the team is not confident in asserting that Chile has a comprehensive strategy for managing the impact on all its habitats, both for MSC-certified and non-certified fisheries, which means SG 100 is not met.

Management strategy evaluation				
<b>b</b>			<b>There is some objective basis for confidence that the measures/partial strategy will work, based on information directly about the UoA and/or habitats involved.</b>	<b>Testing supports high confidence that the partial strategy/strategy will work, based on information directly about the UoA and/or habitats involved.</b>
	Guide post	The measures are considered likely to work, based on plausible argument (e.g. general experience, theory or comparison with similar UoAs/habitats).		
	Met?	Yes	Yes	Yes

### Rationale

**Testing supports high confidence** that the partial strategy/strategy will work, based on **information directly about the UoA and/or habitats involved**.

The assessment team has thoroughly reviewed the vessel's operational footprint, confirming that it consistently operates within well-defined fishing grounds with no unusual activities visible on the monitoring maps. The Vessel Monitoring System (VMS), regulated by law, plays a crucial role in effectively monitoring and surveillance fishing activities. Starting in 2018, a video camera system has also been implemented to monitor fleet activities, documenting any bycatch of sensitive organisms and assessing impacts on sensitive areas by recording potential disturbances.

The team believes there is sufficient information about the fishery and the habitats involved to have reasonable confidence that the current measures will be effective. This confidence is bolstered by several factors: numerous area closures, some aimed at protecting juvenile fish and preventing seafloor damage, while others focus on safeguarding cold-water corals and associated communities found in seamounts; the limited geographic scope of fishing activities; and the robust enforcement system managed by the Army in collaboration with SERNAPESCA, which ensures real-time monitoring of all vessels. These factors lead the team to conclude that there is an objective basis for confidence that the measures or partial strategies will work, based on information directly related to the UoA and/or habitats involved, thereby meeting SG 80. However, as some information might need updating, SG 100 is not met at the ACDR stage.

Outside the Chilean EEZ, Article 20 of the SPRFMO Convention establishes the foundation for Contracting Parties to protect marine habitats and ecosystems. Article 2 outlines a strategic objective to safeguard marine ecosystems, while Article 3 further defines these objectives. Article 20 provides a clear basis for SPRFMO to implement Conservation and Management Measures (CMMs) aimed at protecting habitats and marine ecosystems from the impacts of fishing, including measures to prevent significant impacts on vulnerable marine ecosystems (VMEs).

In 2018, SPRFMO agreed on a Conservation Management Measure (CMM 03-2018) that specifically addresses the impacts of fishing on the seabed. This measure requires SPRFMO Members and CNCPs to define their bottom fishing footprint, prohibits all bottom fishing that does not comply with the CMM. The third SPRFMO SC Habitat Monitoring Working Group, took place in

<sup>8</sup> Microsoft Word - DS 238-04 (subpesca.cl) & Reservas marinas y parques marinos - SUBPESCA Normativa

**PI 2.4.2**

**There is a strategy in place that is designed to ensure the UoA does not pose a risk of serious or irreversible harm to the habitats**

September 2021 and work is still under progress to better understand the bottom fishing and the mapping for the spatial-temporal population density distribution of jack mackerel which also helps to understand the preferable habitats for the species.

Hence, testing is in place, both within the Chilean EEZ and in the SPRFMO area, and the UoA meets the SG 100.

Management strategy implementation			
<b>C</b>	Guide post	There is some quantitative evidence that the measures/partial strategy is being implemented successfully.	There is clear quantitative evidence that the partial strategy/strategy is being implemented successfully and is achieving its objective, as outlined in scoring issue (a).
	Met?	Yes	Yes

**Rationale**

**There is clear quantitative evidence that the partial strategy/strategy is being implemented successfully and is achieving its objective, as outlined in scoring issue (a).**

Progress has been made in the implementation of Ecologically or Biologically Significant Areas (EBSA) and protected areas in Chile, with several habitat conservation measures already in place. These include two types of year-round closures: habitat closure areas that restrict mobile bottom-tending gears, and groundfish closures that restrict all gears capable of catching groundfish. Additionally, seasonal area closures are used to protect spawning habitats.

In 2012, Chile took a significant step by passing the “Fisheries Act,” aimed at reforming the fishing industry to promote sustainable practices. This legislation made Chile the first country in the world to prohibit bottom trawling in areas with seamounts, protecting 117 seamounts from this destructive practice. Currently, 19 of these protected seamounts are located in regions X-XII.

The footprint mapping for the three gear types under evaluation has been well-documented, and the distribution of fishing grounds is now well known. SERNAPESCA, through the Vessel Monitoring System (VMS), enforces compliance with these regulations, providing quantitative evidence that the measures or partial strategies are being implemented successfully, thus meeting the SG 80.

The regulation on discard bans, which reports results annually, primarily focuses on the control and monitoring of discards of non-target species and ETP (Endangered, Threatened, and Protected) species. This regulation also contributes valuable information about fishing grounds and potential shifts in fishing areas due to changes in stock distribution. Despite these shifts, there is no significant evidence to suggest that other habitats are being impacted, providing indirect information about habitat conditions.

Outside the Chilean EEZ, the SPRFMO continues to work through its Habitat Monitoring Working Group. While this group primarily focuses on bottom fishing, acoustic surveys provide additional data on jack mackerel distribution, which, as noted earlier, offers insight into the fishing grounds.

Given this, there is quantitative evidence that the strategies in place are achieving their objectives, meeting the SG 100.

Compliance with management requirements and other MSC UoAs'/non-MSC fisheries' measures to protect VMEs			
<b>d</b>	Guide post	There is qualitative evidence that the UoA complies with its management requirements to protect VMEs.	There is some quantitative evidence that the UoA complies with both its management requirements and with protection measures afforded to
		There is clear quantitative evidence that the UoA complies with both its management requirements and with protection measures afforded to VMEs by	

<b>PI 2.4.2</b>		There is a strategy in place that is designed to ensure the UoA does not pose a risk of serious or irreversible harm to the habitats			
		VMEs by other MSC UoAs/non-MSC fisheries, where relevant.	other MSC fisheries, where relevant.	UoAs/non-MSC	
Met?	NA	NA		NA	

#### Rationale

There are measures in place to protect and identify Vulnerable Marine Ecosystems (VMEs) both in Chile and through the international commission. However, due to the nature of the fishing activities, VMEs are not impacted by the UoA, and therefore, no further details are included in this reassessment.

#### References

SUBPESCA- <http://www.subpesca.cl/portal/617/w3-article-99167.html>  
 SPFMO 2021. Report of the Habitat Monitoring Workshop SCW12 20/21 September 2021

#### Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Individual scoring elements (add rows as required; delete if not scoring by elements)	Applicable SGs <u>likely</u> met per individual scoring element			<u>Likely</u> scoring element scores
	SG60	SG80	SG100	
1 UoA	3 of 3	3 of 3	2 of 3	>80
Draft scoring range	Applicable SGs/elements <u>likely</u> met			<u>Likely</u> overall PI score
	SG60	SG80	SG100	
	3 of 3	3 of 3	2 of 3	>80
Information gap indicator	Information sufficient to score PI			

#### Overall Performance Indicator scores added from Client and Peer Review Draft Report

Individual scoring elements (add rows as required; delete if not scoring by elements)	Applicable SGs met per individual scoring element			Scoring element scores
	SG60	SG80	SG100	
1 Scoring element 1	X of x	X of x	X of x	
2 Scoring element 2	X of x	X of x	X of x	
3 Scoring element 3	X of x	X of x	X of x	
4 Scoring element 4	X of x	X of x	X of x	
Overall Performance Indicator score	Applicable SGs/elements met			Overall score
	SG60	SG80	SG100	
	X of x	X of x	X of x	
Condition number (if relevant)				

### PI 2.4.3 – Habitats information

PI 2.4.3		Information is adequate to determine the risk posed to the habitat by the UoA and the effectiveness of the strategy to manage impacts on the habitat		
Scoring Issue		SG 60	SG 80	SG 100
<b>Information quality</b>				
<b>a</b>	Guide post	<p>The types and distribution of the main habitats are <b>broadly understood</b>.</p> <p>OR</p> <p><b>If CSA is used to score PI 2.4.1 for the UoA:</b> Qualitative information is adequate to estimate the types and distribution of the main habitats.</p>	<p>The nature, distribution and <b>vulnerability</b> of the main habitats in the UoA area are known at a level of detail relevant to the scale and intensity of the UoA.</p> <p>OR</p> <p><b>If CSA is used to score PI 2.4.1 for the UoA:</b> Some quantitative information is available and is adequate to estimate the types and distribution of the main habitats.</p>	<p>The distribution of all habitats is known over their range, with particular attention to the occurrence of vulnerable habitats.</p>
	Met?	Yes	Yes	Yes

#### Rationale

**The distribution of all habitats is known over their range, with particular attention to the occurrence of vulnerable habitats.**

The fishing footprint of the vessels is well-documented, with consistent data from both the client, IFOP and INPESCA showing similar fishing grounds across all fishing seasons.

Projects related to habitats, ecosystems, and data collection are indirectly conducted by IFOP for the acoustic surveys presented in the international commission and outside Chile by the SFP{RMO for the bottom fishing and VMEs.

Therefore, efforts by the SPRFMO are ongoing to improve data on Vulnerable Marine Ecosystems (VMEs) and to determine which species qualify these areas for designation. In Chile, efforts are also being made to protect habitats, although these efforts are not directly related to this fishery, as the impacts on habitats from jack mackerel fishing are minimal. Consequently, no additional measures are needed for habitat impacts concerning the jack mackerel fishery.

The Biodiversity and Protected Areas Service is responsible for improving biodiversity monitoring through a systematic approach, including updating management plans, monitoring project impacts, and integrating biodiversity with climate change considerations. As a result, the assessment concludes that SG 80 is met. Moreover, collaboration with academic institutions and public policy is crucial for enhancing these efforts. The assessment team will monitor the effectiveness of these collaborations, leading to the conclusion that SG 100 is also met.

		Information adequacy for assessment of impacts		
		Information is adequate to broadly understand the nature of the main impacts of gear use on the main habitats, including spatial overlap of habitat with fishing gear.	Information is adequate to allow for identification of the main impacts of the UoA on the main habitats, and there is reliable information on the spatial extent of interaction and on the timing and location of use of the fishing gear.	The physical impacts of the gear on all habitats have been quantified fully.
<b>b</b>	Guide post			

PI 2.4.3		Information is adequate to determine the risk posed to the habitat by the UoA and the effectiveness of the strategy to manage impacts on the habitat		
		If CSA is used to score PI 2.4.1 for the UoA:  Qualitative information is adequate to estimate the consequence and spatial attributes of the main habitats.	OR  If CSA is used to score PI 2.4.1 for the UoA:  Some quantitative information is available and is adequate to estimate the consequence and spatial attributes of the main habitats.	
Met?	Yes	Yes		No

#### Rationale

**Information is adequate to allow for identification of the main impacts of the UoA on the main habitats, and there is reliable information on the spatial extent of interaction and on the timing and location of use of the fishing gear.**

As detailed in the habitat outcome Performance Indicators (PIs), there is a substantial literature available that identifies the major impacts of fishing gears on key habitats. Additionally, precise data on the spatial coverage, as well as the timing and locations of fishing gear usage, is accessible through VMS/AIS systems and logbooks. Further outside Chilean waters the SPFRMO also conducts studies to keep monitoring the habitats and getting more updated information.

The assessment team has determined that the available information is sufficient to identify the primary impacts of the UoA on the major habitats. **Therefore SG 60 and SG 80 are met.**

However, achieving SG100 requires a comprehensive quantification of the physical impacts of fishing gear on all habitats, which has not been fully accomplished. **Consequently, SG100 is not met.**

Monitoring				
C	Guide post	Adequate information continues to be collected to detect any increase in risk to the main habitats.	Changes in all habitat distributions over time are measured.	
	Met?	Yes	No	

#### Rationale

**Adequate information continues to be collected to detect any increase in risk to the main habitats**

Information on the impacts of these fisheries, including their severity, duration, and spatial extent, is recorded through logbooks, VMS/AIS systems, and onboard inspectors/observers. The direct consequences of these impacts are well-understood, with scientific studies providing insight into the ecosystem roles of most species, allowing for inferences about key ecosystem consequences.

Comprehensive information is available for species primarily targeted by the UoA, and while the data do not directly focus on habitat impacts, they provide a good estimation of water column conditions and, consequently, the associated habitats. This is primarily achieved through acoustic surveys conducted by IFOP. Given this, the assessment team believes that the information on the fishery's impact on critical habitat elements is sufficient to meet SG 80.

However, to achieve SG 100, the team would need to be aware of all changes in habitat distribution. Due to ongoing studies and uncertainties regarding species distribution changes, the team is not confident that SG 100 can be met at this time.

#### References

Report of the Habitat Monitoring Workshop SCW12 20/21 September 2021

<b>PI 2.4.3</b>	Information is adequate to determine the risk posed to the habitat by the UoA and the effectiveness of the strategy to manage impacts on the habitat
INFORME TÉCNICO Nº1 Sesión N° 05/2023 Comité Científico Técnico Pesquería Pelágica de Jurel Estatus del recurso, rango de captura biológicamente aceptable (CBA) para el año 2024 y estimación de Puntos Biológicos de Referencia (PBR)	
INFORME FINAL TÉCNICO Convenio de Desempeño 2023. Estatus y posibilidades de explotación biológicamente sustentable de jurel nacional entre la Región de Arica y Parinacota a la Región de los Lagos, año 2024 Jurel, 2024. SUBSECRETARÍA DE ECONOMÍA Y EMT / Abril 2024	

**Draft scoring range and information gap indicator added at Announcement Comment Draft Report**

Individual scoring elements (add rows as required; delete if not scoring by elements)	Applicable SGs <u>likely</u> met per individual scoring element			<u>Likely</u> scoring element scores
	SG60	SG80	SG100	
1 Scoring element 1	3 of 3	3 of 3	1 of 3	>80
Draft scoring range	Applicable SGs/elements <u>likely</u> met			<u>Likely</u> overall PI score
	SG60	SG80	SG100	
	3 of 3	3 of 3	1 of 3	≥80
Information gap indicator	Information sufficient to score PI			

**Overall Performance Indicator scores added from Client and Peer Review Draft Report**

Individual scoring elements (add rows as required; delete if not scoring by elements)	Applicable SGs met per individual scoring element			Scoring element scores
	SG60	SG80	SG100	
1 Scoring element 1	X of x	X of x	X of x	
2 Scoring element 2	X of x	X of x	X of x	
3 Scoring element 3	X of x	X of x	X of x	
4 Scoring element 4	X of x	X of x	X of x	
Overall Performance Indicator score	Applicable SGs/elements met			Overall score
	SG60	SG80	SG100	
	X of x	X of x	X of x	
Condition number (if relevant)				

## PI 2.5.1 – Ecosystem outcome

PI 2.5.1		The UoA does not cause serious or irreversible harm to the key elements of ecosystem structure and function		
Scoring Issue		SG 60	SG 80	SG 100
<b>Ecosystem status</b>				
<b>a</b>	Guide post	The UoA is <b>unlikely</b> to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm.	The UoA is <b>highly unlikely</b> to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm.	There is <b>evidence</b> that the UoA is highly unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm.
	Met?	<b>Yes</b>	<b>Yes</b>	<b>No</b>

### Rationale

The UoA is **highly unlikely** to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm.

To better understand the key elements that the jack mackerel fishery could affect in its ecosystem the assessment team has split the rationale into the main areas that could play a role in this assessment of the ecosystem role.

#### Trophic Position

The jack mackerel occupies a significant trophic position within the marine food web as a generalist predator. It preys on a diverse range of organisms, including krill (*Euphausiidae*), small fish, and zooplankton. This varied diet underscores its role in transferring energy from primary producers, such as phytoplankton, through to higher trophic levels, including predatory fish and marine mammals.

#### Energy Flow

As an intermediary in the marine food web, jack mackerel plays a crucial role in the flow of energy. By consuming primary producers and lower trophic level organisms, it facilitates the transfer of energy up the food chain. This function supports the health and productivity of both predator and prey species, linking primary production with higher trophic consumers.

#### Predation Dynamics

Jack mackerel is also a key prey species for larger marine predators, including tuna species such as *Thunnus alalunga*, swordfish (*Xiphias gladius*), and various shark species. Its substantial size and position within the food web make it both a significant predator and prey, establishing it as a critical node in marine ecosystems.

#### Diet Shifts

Dietary studies reveal that the jack mackerel's feeding behavior exhibits considerable flexibility in response to environmental changes. From 1977 to 2000, the diet was predominantly composed of krill. Recent studies, however, indicate a broader dietary range including small fish and mollusks, particularly among larger individuals. This shift reflects adaptive responses to changes in prey availability and environmental conditions.

#### Ecosystem Impact and Management

The jack mackerel fishery in Chile is a major ecological component, influencing predator-prey dynamics within the marine ecosystem. Effective management practices and ongoing research are essential for sustaining its ecological role and mitigating environmental impacts. Current data from acoustic surveys and recent reports by institutions such as the Instituto de Fomento Pesquero (IFOP) and the international commission SPRFMO highlight changes in jack mackerel distribution, influenced by phenomena such as El Niño and La Niña. Therefore, the stock assessment and the developing studies conducting in the harvest control rules to keep the stock fluctuation around reference limits, indirectly help to preserve the ecosystem as a whole.

**PI 2.5.1**
**The UoA does not cause serious or irreversible harm to the key elements of ecosystem structure and function**

Based on comprehensive data from the entire stock and ongoing studies, the assessment team is confident that the fishery meets SG 60 and SG 80. These criteria relate to the understanding of the fishery's impact on the ecosystem and the implementation of effective management measures.

However, there are some challenges and Future Direction for the jack mackerel stock. Climate change poses a significant challenge by affecting oceanographic conditions and prey availability, which in turn impacts jack mackerel distribution and abundance. Despite substantial information on the fishery and its target species, there remain gaps in understanding long-term ecological impacts. Ongoing research and continuous data collection are necessary to ensure sustainable management practices and to address these gaps.

Given the current limitations in data and the influence of climate variability on distribution patterns, it is not possible to conclusively assert that SG 100 is not met. Further research and more comprehensive data are required to fully understand and manage the fishery's ecological impacts.

**References**

Report of the Habitat Monitoring Workshop SCW12 20/21 September 2021

INFORME TÉCNICO Nº1 Sesión N° 05/2023 Comité Científico Técnico Pesquería Pelágica de Jurel Estatus del recurso, rango de captura biológicamente aceptable (CBA) para el año 2024 y estimación de Puntos Biológicos de Referencia (PBR)

INFORME FINAL TÉCNICO Convenio de Desempeño 2023. Estatus y posibilidades de explotación biológicamente sustentable de jurel nacional entre la Región de Arica y Parinacota a la Región de los Lagos, año 2024 Jurel, 2024. SUBSECRETARÍA DE ECONOMÍA Y EMT / Abril 2024

**Draft scoring range and information gap indicator added at Announcement Comment Draft Report**

Individual scoring elements (add rows as required; delete if not scoring by elements)	Applicable SGs <u>likely</u> met per individual scoring element			<u>Likely</u> scoring element scores
	SG60	SG80	SG100	
1 Scoring element 1	1 of 1	1 of 1	0 of 1	
Applicable SGs/elements <u>likely</u> met			<u>Likely</u> overall PI score	
Draft scoring range	SG60	SG80	SG100	
	1 of 1	1 of 1	0 of 1	≥80
Information gap indicator	Information sufficient to score PI			

**Overall Performance Indicator scores added from Client and Peer Review Draft Report**

Individual scoring elements (add rows as required; delete if not scoring by elements)	Applicable SGs met per individual scoring element			Scoring element scores
	SG60	SG80	SG100	
1 Scoring element 1	X of x	X of x	X of x	
2 Scoring element 2	X of x	X of x	X of x	
3 Scoring element 3	X of x	X of x	X of x	
4 Scoring element 4	X of x	X of x	X of x	

<b>PI 2.5.1</b>	The UoA does not cause serious or irreversible harm to the key elements of ecosystem structure and function		
Overall Performance Indicator score		Applicable SGs/elements met	
	SG60	SG80	SG100
	X of x	X of x	X of x
Condition number (if relevant)			

## PI 2.5.2 – Ecosystem management strategy

PI 2.5.2		There are measures in place to ensure the UoA does not pose a risk of serious or irreversible harm to ecosystem structure and function		
Scoring Issue		SG 60	SG 80	SG 100
<b>Management strategy in place</b>				
<b>a</b>	Guide post	There are <b>measures</b> in place, if necessary which take into account the <b>potential impacts</b> of the UoA on key elements of the ecosystem.	There is a <b>partial strategy</b> in place, if necessary, which takes into account <b>available information and is expected to restrain impacts</b> of the UoA on the ecosystem so as to achieve the Ecosystem Outcome 80 level of performance.	There is a <b>strategy</b> that consists of a <b>plan</b> , in place which contains measures to <b>address all main impacts of the UoA</b> on the ecosystem, and at least some of these measures are in place.
	Met?	Yes	Yes	No

### Rationale

There is a **partial strategy** in place, if necessary, which takes into account **available information and is expected to restrain impacts** of the UoA on the ecosystem so as to achieve the Ecosystem Outcome 80 level of performance.

Chile has implemented a comprehensive set of regulations to manage the jack mackerel fishery that in some cases even indirectly safeguard marine ecosystems. Key measures include:

-Seasonal and Spatial Closures: To protect spawning grounds and prevent overfishing.

- Marine Protected Areas (MPAs): Chile has designated several marine protected areas and habitat closures. These MPAs focus on preserving critical habitats, including seamounts and other sensitive marine ecosystems. The aim is to reduce the impact of fishing activities on these important areas and to ensure the long-term health of marine ecosystems.

The jack mackerel fishery is closely monitored through the use of Vessel Monitoring Systems (VMS) and onboard observers. These tools provide real-time data on fishing activities, helping to ensure compliance with regulations and assess the impact of fishing operations.

Research institutions, particularly the Instituto de Fomento Pesquero (IFOP), conduct regular acoustic surveys to evaluate fish stock distribution and habitat conditions. These surveys are critical for understanding the spatial dynamics of jack mackerel populations and their interaction with marine habitats.

Indirect studies have been conducted to develop well-understood harvest control rules for the jack mackerel stock. These studies help inform management practices and ensure that fishing activities are regulated based on scientific data. The annual evaluations performed by the scientific committee of the international commission contribute to the development and refinement of management strategies. These evaluations provide valuable insights into the effectiveness of existing measures and guide future research and management actions.

The current regulatory framework, combined with ongoing monitoring and research efforts, meets the requirements for AG 60 and SG 80. This is due to the effective implementation of harvest control rules and the valuable contributions from annual scientific evaluations. However, despite these efforts, the assessment team lacks confidence that all potential impacts on the ecosystem are thoroughly studied and addressed. Consequently, while SG 80 requirements are met, there are concerns that SG 100 is not fully achieved. Addressing these concerns requires further comprehensive studies and the development of robust plans to mitigate any identified impacts on the marine ecosystem. SG 100 is not met.

Management strategy evaluation			
Guide post	The <b>measures</b> are considered likely to work, based on plausible	There is <b>some objective basis for confidence</b> that the measures/	Testing supports <b>high confidence</b> that the partial strategy/ strategy

PI 2.5.2		There are measures in place to ensure the UoA does not pose a risk of serious or irreversible harm to ecosystem structure and function		
		argument (e.g., general experience, theory or comparison with similar UoAs/ ecosystems).	partial strategy will work, based on some information directly about the UoA and/or the ecosystem involved.	will work, based on information directly about the UoA and/or ecosystem involved.
Met?	Yes	Yes		No

#### Rationale

There is **some objective basis for confidence** that the measures/ partial strategy will work, based on some information directly about the UoA and/or the ecosystem involved.

Over 94% of the catch in the Unit of Assessment (UoA) is jack mackerel, with non-target species being represented by minimum percentages and no relevant interactions with ETPs identified over the last five years. The habitat impact of the fishing gear is minimal, so the primary ecological concern is the removal of the target species itself.

In the SPRFMO area, measures are in place to address the potential impacts of fishing. Specifically, the focus is on managing the removal of jack mackerel. The assessment by the Scientific Working Group (SWG) indicates that the biomass of jack mackerel in the eastern and central South Pacific has been increasing since its lowest level in 2010, though it has not yet reached its maximum sustainable yield (BMSY) level. Recruitment has been improving since 2011, and fishing mortality rates have been below the maximum sustainable yield (FMSY) threshold since 2012.

The recovery of the jack mackerel stock supports confidence in the effectiveness of the strategy implemented by SPRFMO members and therefore by the country members. There is currently no evidence suggesting that additional management strategies are required for non-target or ETP species, as observer data show minimal interaction with these species. Additionally, there is no indication of significant habitat impact from this fishery. At the SPRFMO level, appropriate measures have been taken to address impacts on ETP species and habitats in other fisheries. Therefore, SG 60 and SG 80 are met.

Recent reports from IFOP indicate that the jack mackerel stock is shifting its distribution towards more coastal areas or different locations compared to previous years. This shift is attributed primarily to the effects of El Niño and La Niña currents, with climate change potentially also playing a significant role. Acoustic surveys conducted by IFOP and presented to the SPRFMO aim to provide a better understanding of the stock's temporal distribution. Despite these ongoing studies, the assessment team is not yet confident in asserting that the strategies in place will cover potential changes derived of these studies and therefore, SG 100 is met.

Management strategy implementation				
C	Guide post	There is <b>some evidence</b> that the measures/partial strategy is being implemented successfully.	There is <b>clear evidence</b> that the partial strategy/strategy is being implemented successfully and is achieving its objective as set out in scoring issue (a).	
	Met?	Yes	No	

#### Rationale

**There is some evidence that the measures/partial strategy is being implemented successfully.**

The evaluation of stock status and the effects of the Unit of Assessment (UoA), as outlined in Sla and Slb, indicates that the partial strategy is effective, thereby meeting SG80.

In contrast, the evidence for SG100 is less definitive. Currently, management strategies are in place for certain key ecosystem components, including non-target species, bottom fishing habitats, and ETPs. Although VMEs are thoroughly researched under

PI 2.5.2	There are measures in place to ensure the UoA does not pose a risk of serious or irreversible harm to ecosystem structure and function
the SPRFMO, the team is not confident that there are specific measures targeting the protection of all crucial ecosystem elements. Therefore, SG100 is not met.	
<b>References</b>	
Report of the Habitat Monitoring Workshop SCW12 20/21 September 2021 INFORME TÉCNICO Nº1 Sesión N° 05/2023 Comité Científico Técnico Pesquería Pelágica de Jurel Estatus del recurso, rango de captura biológicamente aceptable (CBA) para el año 2024 y estimación de Puntos Biológicos de Referencia (PBR) INFORME FINAL TÉCNICO Convenio de Desempeño 2023. Estatus y posibilidades de explotación biológicamente sustentable de jurel nacional entre la Región de Arica y Parinacota a la Región de los Lagos, año 2024 Jurel, 2024. SUBSECRETARÍA DE ECONOMÍA Y EMT / Abril 2024 11th Scientific Committee Meeting report 11 to 16 September 2023.	

#### Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Individual scoring elements (add rows as required; delete if not scoring by elements)	Applicable SGs <u>likely</u> met per individual scoring element			<u>Likely</u> scoring element scores
	SG60	SG80	SG100	
1 UoA	3 of 3	3 of 3	0 of 3	≥80
Draft scoring range	Applicable SGs/elements <u>likely</u> met			<u>Likely</u> overall PI score
	SG60	SG80	SG100	
	3 of 3	3 of 3	0 of 3	
Information gap indicator	Information sufficient to score PI			

#### Overall Performance Indicator scores added from Client and Peer Review Draft Report

Individual scoring elements (add rows as required; delete if not scoring by elements)	Applicable SGs met per individual scoring element			Scoring element scores
	SG60	SG80	SG100	
1 Scoring element 1	X of x	X of x	X of x	
2 Scoring element 2	X of x	X of x	X of x	
3 Scoring element 3	X of x	X of x	X of x	
4 Scoring element 4	X of x	X of x	X of x	
Overall Performance Indicator score	Applicable SGs/elements met			Overall score
	SG60	SG80	SG100	
	X of x	X of x	X of x	
Condition number (if relevant)				

### PI 2.5.3 – Ecosystem information

PI 2.5.3		There is adequate knowledge of the impacts of the UoA on the ecosystem		
Scoring Issue		SG 60	SG 80	SG 100
<b>Information quality</b>				
<b>a</b>	Guide post	Information is adequate to identify the key elements of the ecosystem.	Information is adequate to broadly understand the key elements of the ecosystem.	
	Met?	Yes	Yes	

#### Rationale

##### Information is adequate to broadly understand the key elements of the ecosystem

The latest report on jack mackerel from the South Pacific Regional Fisheries Management Organisation (SPRFMO) for 2023 highlights several key points about the stock and management measures. Here's a summary based on the most recent available information:

**Key Points from SPRFMO 2023 Report on Jack Mackerel related to the Stock** Status showed that jack mackerel stock in the South Pacific remains under assessment. According to the 2023 report, the stock is showing signs of recovery from historically low levels observed in previous decades. Recent assessments indicate that the biomass of jack mackerel has been increasing since the low point in 2010. Although the stock has not yet reached its maximum sustainable yield (BMSY), the trend is positive. The 2023 report notes that there have been shifts in the distribution of jack mackerel. These shifts are attributed to environmental factors such as the El Niño Southern Oscillation (ENSO) and the Pacific Decadal Oscillation (PDO), which influence oceanographic conditions and prey availability. Acoustic surveys conducted by the Instituto de Fomento Pesquero (IFOP) are helping to map these changes and provide updated information on the spatial distribution of the stock. Therefore SG 60 is met.

The SPRFMO has implemented various conservation and management measures (CMMs) aimed at ensuring sustainable fishing practices. These include measures for controlling catches and monitoring impacts on marine ecosystems. Specific measures relevant to jack mackerel include monitoring of fishing activities, seasonal closures, and efforts to reduce bycatch and protect critical habitats. Having said that and together with the information provided in 2.5.1, the assessment team is confident to say that SG 80 is met.

<b>Investigation of UoA impacts</b>				
<b>b</b>		Main impacts of the UoA on these key ecosystem elements can be inferred from existing information, but <b>have not been investigated in detail</b> .	Main impacts of the UoA on these key ecosystem elements can be inferred from existing information, and <b>some have been investigated in detail</b> .	Main interactions between the UoA and these ecosystem elements can be inferred from existing information, and <b>have been investigated in detail</b> .
Met?	Yes	Yes	Yes	No

#### Rationale

Main impacts of the UoA on these key ecosystem elements can be inferred from existing information, and **some have been investigated in detail**.

The primary interaction between the Unit of Assessment (UoA) and ecosystem elements is the removal of jack mackerel biomass. The fishery does not significantly impact other species or marine habitats. The 2023 report indicates shifts in jack mackerel distribution due to environmental factors such as the El Niño Southern Oscillation (ENSO) and the Pacific Decadal Oscillation (PDO), which affect oceanographic conditions and prey availability. Acoustic surveys by the Instituto de Fomento Pesquero (IFOP) are providing updated data on these distribution changes.

The fishery's main interaction, the removal of jack mackerel, has been extensively investigated. It affects multiple trophic levels within the pelagic food web. Observations off central Chile show a decrease in the trophic level of principal fisheries resources. However, these studies are limited to specific parts of the UoA. Therefore, SG 60 and SG 80 are met.

## PI 2.5.3

### There is adequate knowledge of the impacts of the UoA on the ecosystem

Ongoing research and monitoring are essential for a comprehensive understanding of jack mackerel population dynamics and ecosystem impacts. The SPRFMO supports this with scientific research, including acoustic surveys and stock assessments. The SPRFMO Scientific Committee provides annual updates and recommendations based on current data. Nevertheless, SG 100 is not met, as investigations do not cover all ecosystem interactions throughout the UoA.

Understanding of component functions			
<b>C</b>	Guide post	The main functions of the components (i.e., P1 target species, primary, secondary and ETP species and Habitats) in the ecosystem are <b>known</b> .	The impacts of the UoA on P1 target species, primary, secondary and ETP species and Habitats are identified and the main functions of these components in the ecosystem are <b>understood</b> .
	Met?	Yes	Yes

#### Rationale

**The impacts of the UoA on P1 target species, primary, secondary and ETP species and Habitats are identified and the main functions of these components in the ecosystem are understood.**

In the context of the SPRFMO, the jack mackerel fishery plays a significant role in the marine ecosystem due to its interactions with various ecosystem components as mentioned already in 2.5.1 and 2.5.2.

Jack mackerel is a pivotal species within the pelagic food web, functioning as a generalist predator that consumes a range of prey, including krill, small fish, and zooplankton. This predatory role is crucial for energy transfer from primary producers, such as phytoplankton, to higher trophic levels, including larger predatory fish and marine mammals. Additionally, jack mackerel serves as an important prey item for larger predators, such as some tuna species, swordfish and various shark species. Thus, jack mackerel significantly influences both the predator-prey dynamics and the overall energy flow within the marine ecosystem.

The ecosystem components associated with the jack mackerel fishery include its prey species and its predators. The health and distribution of jack mackerel populations directly affect the abundance and distribution of these associated species. Furthermore, the management of marine habitats, such as seamounts and cold-water corals, is critical for maintaining biodiversity and supporting the life cycles of various marine organisms. In the SPRFMO area, seasonal and spatial closures are implemented to protect key spawning grounds, which are vital for the sustainability of jack mackerel populations.

Environmental factors, such as the El Niño Southern Oscillation (ENSO) and the Pacific Decadal Oscillation (PDO), play a significant role in influencing the distribution and abundance of jack mackerel. These oceanographic conditions affect prey availability and, consequently, the spatial distribution of jack mackerel.

Regulatory measures established by the SPRFMO, including Conservation and Management Measures (CMMs) such as CMM 03-2019 and CMM 09-2017, are designed to manage the impacts of the jack mackerel fishery on marine habitats and protect seabirds from bycatch. These measures aim to mitigate negative effects and ensure the sustainable management of the fishery and are also implemented at the national level.

Overall, the jack mackerel fishery interacts with several key components of the marine ecosystem, influencing both predator-prey relationships and habitat conditions and therefore SG 60 and Sg 80 are met.

Ongoing research, such as acoustic surveys conducted by the Instituto de Fomento Pesquero (IFOP), supports the understanding of these interactions and informs effective management practices. This comprehensive approach helps maintain the health of the marine environment and the sustainability of the jack mackerel fishery within the SPRFMO framework and therefore SG 100 is met.

## d

### Information relevance

PI 2.5.3		There is adequate knowledge of the impacts of the UoA on the ecosystem	
	Guide post	Adequate information is available on the impacts of the UoA on these components to allow some of the main consequences for the ecosystem to be inferred.	Adequate information is available on the impacts of the UoA on the components and elements to allow the main consequences for the ecosystem to be inferred.
	Met?	Yes	Yes

#### Rationale

**Adequate information is available on the impacts of the UoA on the components and elements to allow the main consequences for the ecosystem to be inferred.**

As noted in the scoring comments the SIs above, information is gathered about target stock removals; the extent and magnitude of interactions with non-target and ETP species; and the spatial location of fishing activity (and hence the risk of impacts on marine habitats). In the SPRFMO context, the jack mackerel fishery interacts with several key ecosystem components, impacting both predator and prey dynamics. The fishery's management involves protecting critical habitats and regulating fishing practices to mitigate negative effects on the ecosystem. Ongoing research, including acoustic surveys, supports the understanding of these interactions and informs management decisions to ensure the sustainability of the fishery and the health of the marine environment.

Therefore, with the information provided in the relevant sections of this report and the scoring tables for ecosystems components, the assessment team is confident that the information available meets the SG80 and SG 100 requirements for this SI.

<b>Monitoring</b>				
e	Guide post	Adequate data continue to be collected to detect any increase in risk level.	Information is adequate to support the development of strategies to manage ecosystem impacts.	
	Met?	Yes	No	

#### Rationale

**Adequate data continue to be collected to detect any increase in risk level.**

The current data on the jack mackerel fishery provides a solid foundation for managing the species and its interactions within the marine ecosystem. The ongoing collection of data on target species removals at the stock level informs the management strategy for jack mackerel, aligning with the objectives of the SPRFMO Convention. This strategy ensures that fishery removals are managed in accordance with ecosystem-based fisheries management principles.

For non-target and ETP (Endangered, Threatened, and Protected) species, Chilean vessels are monitored, and data is used to develop a "Discard Plan" that will be implemented by the Chilean Government. This plan aims to mitigate risks to non-target and ETP species by monitoring interactions and detecting any increases in risk levels. SPRFMO is also working on establishing data collection procedures to develop similar strategies across its area.

In Chile, there is sufficient information about marine habitats to support the establishment of a network of Marine Parks, Reserves, and Marine Protected Areas (MPAs). The positioning of Chilean fishing vessels is tracked using the Vessel Monitoring System (VMS), ensuring compliance with these protected areas and detecting any potential increases in risk levels.

Overall, the evidence suggests that data is being effectively gathered on the interactions between the fishery and target, non-target, and ETP species, as well as on marine habitats and ecosystems. This supports the conclusion that SG 80 requirements are met.

**PI 2.5.3**
**There is adequate knowledge of the impacts of the UoA on the ecosystem**

However, while strategies are in place for managing impacts on target species and habitats, strategies directly focusing on ecosystems component are still in developing for change in distribution and associated impacts on the stock. Hence, SG 100 is not met.

**References**

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- Instituto de Fomento Pesquero (IFOP). (2023). Acoustic Surveys and Habitat Impact Assessments.

**Draft scoring range and information gap indicator added at Announcement Comment Draft Report**

Individual scoring elements (add rows as required; delete if not scoring by elements)		Applicable SGs <u>likely</u> met per individual scoring element			<u>Likely</u> scoring element scores
		SG60	SG80	SG100	
1	UoAs	5 of 5	5 of 5	2 of 4	≥80
Draft scoring range		Applicable SGs/elements <u>likely</u> met			<u>Likely</u> overall PI score
		SG60	SG80	SG100	
		5 of 5	5 of 5	2 of 4	
Information gap indicator		Information sufficient to score PI			

**Overall Performance Indicator scores added from Client and Peer Review Draft Report**

Individual scoring elements (add rows as required; delete if not scoring by elements)		Applicable SGs met per individual scoring element			Scoring element scores
		SG60	SG80	SG100	
1	Scoring element 1	X of x	X of x	X of x	
2	Scoring element 2	X of x	X of x	X of x	
3	Scoring element 3	X of x	X of x	X of x	
4	Scoring element 4	X of x	X of x	X of x	
Overall Performance Indicator score		Applicable SGs/elements met			Overall score
		SG60	SG80	SG100	
		X of x	X of x	X of x	
Condition number (if relevant)					

## 12 Principle 3

### 12.1 Principle 3 background

#### 12.1.1.1 Management System

In 2012, the Convention on the Conservation and Management of Fishery Resources in the High Seas of the South Pacific Ocean (SPRFMO) was signed, which manages, among other fisheries, jack mackerel in the Convention area. As of 2014, Chile gave its consent to apply the conservation and management measures established by the SPRFMO, within its national jurisdiction, a situation that remains in place to date.

The jack mackerel fishery is classified as a straddling species, meaning that it is distributed both within and outside the Chilean EEZ, so that Chile, having given its consent to apply the conservation and management measures established by the SPRFMO, has jurisdiction over this fishery under shared actions.

The management of the jack mackerel fishery carried out by Chile both inside and outside the EEZ for the national industrial fishing fleet since 2013, is administered under the regime of Tradable Fishing Licenses (LTP), which correspond to a system of individual quotas that are transferable and subject to any legal transaction, with an annual quota allocation per shipowner, which will depend on the participation coefficient of the shipowner and the quota established for the calendar year, which has not been modified to date.

In accordance with the above, the global catch quota is established annually during the year prior to the quota becoming effective and the LTP is allocated according to the participation coefficient corresponding to each vessel owner. This quota, in accordance with Article 7°E and following of the LGPA, must be modified if necessary to make it coincide with the quota established by the Commission for Chile.

#### 12.1.1.1.1 Particulars of the recognized groups with interests in the UoA.

##### SPRFMO

SPRFMO is a regional, intergovernmental fisheries management organization. The Convention was adopted in 2009 and entered into force on 24 August 2012. The first meeting of the Commission was held in early 2013. New Zealand is the depositary of the Convention and its Secretariat is located in Wellington. According to Article 6 of the Convention, the organization shall consist of the following bodies:

- The Commission

According to Article 7 of the Convention, the Commission is composed of each of the contracting members, who serve for a period of two years and may be re-elected. The President and Vice-President of the Commission represent the Contracting Parties. The President is the one who calls the meeting once a year.

The main functions of the Commission are:

- a) Adopt conservation and management measures to achieve the objective of the Convention.
- b) Determine the nature and extent of participation in the capture of fishery resources.
- c) Establish standards for data collection, verification, reporting, storage and dissemination.
- d) Promote scientific research to improve knowledge of fishery resources and marine ecosystems in the Convention area and of the same fishery resources in adjacent waters under national jurisdiction and, in collaboration with the Scientific Committee, establish procedures for the capture of fishery resources for scientific purposes in the Convention area.
- e) Cooperate and exchange data with members of the Commission and with relevant organizations, States, possessions, and coastal territories.
- f) Promote the compatibility of conservation and management measures in the Convention area, adjacent areas of national jurisdiction or adjacent high seas areas.
- g) Develop and establish effective procedures for supervision, control and monitoring, compliance and enforcement.

- h) Develop processes in accordance with international law to assess the compliance of Flag States with respect to the implementation of their obligations under this Convention
- i) To review the effectiveness of the provisions of this Convention and the conservation and management measures adopted by the Commission in relation to the fulfilment of the objective of the Convention.

The Commission may establish other subsidiary bodies in addition to the Scientific Committee.

- Scientific Committee:

Each member of the Commission has the right to appoint a representative to the Scientific Committee, who may be accompanied by an alternate and advisors. The main functions of the Scientific Committee are as follows:

- b) Plan, conduct and review scientific assessments of the status of fishery resources, including in cooperation with the relevant Contracting Party(ies) that are coastal States, straddling fishery resources in the Convention Area and in areas of national jurisdiction.

- c) Provide advice and recommendations to the Commission and its subsidiary bodies on the basis of such evaluations, including where appropriate:

i. Reference points

ii. Strategies and plans for the management of fishery resources.

iii. Analysis of conservation and management alternatives - such as establishing total allowable catch or total allowable fishing effort at different levels -

- d) Provide advice and recommendations to the Commission and its subsidiary bodies on the impact of fisheries on marine ecosystems in the Convention area.

- e) To foster and promote cooperation in scientific research in order to improve knowledge of the status of fishery resources and marine ecosystems in the Convention area.

- f) Provide the Commission and its subsidiary bodies with any other advice it deems appropriate or that the Commission may request.

- Technical and Compliance Committee, the composition and functions of this committee are described in article 11 of the Convention

- Eastern Subregional Management Committee and Western Subregional Management Committee, the composition and functions of these committees are established in Article 12 of the Convention.

- Administration and Finance Committee, the composition and functions of these committees are established in Article 13 of the Convention.

- Secretariat, which will carry out the functions delegated to it by the Commission and will be headed by an executive secretary, who will be appointed with the agreement of the Contracting Parties.

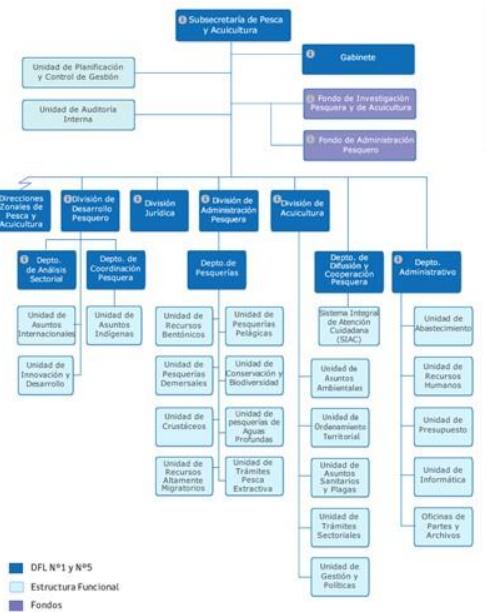
## CHILE

The interest groups that, according to the LGPA, participate in the fisheries management process at the different stages of the management process are the following:

Ministry of Economy, Development and Tourism (MINECON): It is responsible, among other matters, for establishing the basic policies to direct and coordinate the activities of the State in relation to the fishing sector in accordance with Legislative Decree No. 2,442/1978. Its action is to promote the development of the fishing sector, the protection, conservation and integral use of resources and the aquatic environment. The Ministry establishes both the regulations of the Law, as well as some of the administration measures, following a report from the Undersecretariat of Fisheries. The current Minister of Economy, Development and Tourism is Mr. Nicolás Grau.

Undersecretariat of Fisheries and Aquaculture (SUBPESCA): regulatory body dependent on the Ministry of Economy, Development and Tourism. It is responsible for designing and implementing management policies and measures aimed at the conservation and sustainability of hydrobiological resources, in coordination with the economic agents of the sector through the participation bodies established by law. The adoption of administrative and management measures must be supported by a technical report and comply, as appropriate, with the requirements for consultations, approvals or communications established by the LGPA for each of them. The current Undersecretary of Fisheries is Mr. Julio Salas Gutiérrez.

The organic structure of SUBPESCA is as follows:



**Figure 34.** Diagram of the organic structure of the Undersecretariat of Fisheries (Source: Website of the Undersecretariat of Fisheries).

National Fisheries Service (SERNAPESCA): Agency dependent on the Ministry of Economy, created by Legislative Decree No. 2,442 of 1978. It supervises fishing activities, ensuring compliance with the established legal and regulatory standards. It also manages the fishing records, whose registration enables the development of extractive activities by artisanal fishermen, as well as the industrial fishing sector, and collects and processes information on landing, capture and processing of hydrobiological resources. The current director of the National Fisheries Service is Mrs. Soledad Tapia Almonacid.

Fisheries Development Institute (IFOP): Created in 1964, it is the technical body specialized in scientific research on fisheries and aquaculture. It collaborates with and permanently advises SUBPESCA in decision-making regarding the sustainable use of fishery resources and the conservation of the marine environment, in accordance with the amendment to the LGPA (Law No. 20,657 of 2013). IFOP develops ongoing research as defined in the research program that the Undersecretariat of Fisheries must prepare annually, and manages the databases generated from fisheries research and monitoring activities.

The research databases are owned by the State and are publicly accessible. The standards regarding the statistical quality, form and content of the data obtained from the research programmes must be established in consultation with the Scientific Technical Committee (CCT). The current director of the Fisheries Development Institute is Mr. Gonzalo Pereira Puchy.

Management Committee (CM): advisory body created by Law No. 20,657 of 2013. One of its main functions is to prepare the proposed Management Plan for the fisheries under its jurisdiction, including its implementation, evaluation and adaptation, if applicable. It is made up of representatives from artisanal fishing, industrial fishing, processing plants, the National Fisheries Service and the Undersecretariat of Fisheries.

The management committee for the common hake fishery was established in September 2014 and its members have been nominated by different resolutions of the Undersecretariat of Fisheries, which are available on the website of the Undersecretariat of Fisheries. According to the law, the members representing the private sector remain in office for 4 years. The current members of the Management Committee, as well as their minutes, are published on the website of the Undersecretariat of Fisheries.

Scientific Technical Committees (CCT): advisory and/or consulting body of SUBPESCA, created by Law No. 20,657 of 2013 (Paragraph 3, Title XII, LGPA), for scientific matters relevant to the administration and management of fisheries that have closed access, as well as environmental and conservation matters in which the Undersecretariat of Fisheries considers its opinion necessary. The members of the CCT are published on the website of the Undersecretariat of Fisheries.

The Scientific Technical Committees are generally made up of between 3 and 5 members. To participate, applicants must prove that they have a professional degree and specialization in marine sciences related to the management and conservation of fishery resources. Members are appointed through a public competition and serve four years in their positions and are subject to various causes of incompatibility. In addition, two representatives of the IFOP and the Undersecretariat of Fisheries participate. Up to two members with causes of ineligibility may participate, but without the right to vote. The causes of incompatibility are related to conflict of interest/impartiality.

According to Article 153 of the LGPA, the CCT is responsible for determining: (i) the status of the fishery, (ii) the biological reference points, and (iii) the range within which the authority can establish the catch quota. In addition, they may be consulted by the Undersecretariat of Fisheries on other matters such as: design of management and conservation measures, and formulation of management plans.

The Technical Scientific Committee for the common hake fishery is part of the Scientific Committee for Demersal Resources in the Central South Zone, which, in addition to common hake, deals with other demersal fisheries in the area. It was established in November 2013. Its current composition and minutes of its meetings are available on the website of the Undersecretariat of Fisheries.

National Fisheries Council (CNP): This is an auxiliary body of the State administration with a consultative and decisive nature, as appropriate, and its objective is to contribute to making effective the participation of the agents of the fishing sector at a national level in matters related to fishing activity. (paragraph 1, Title XII, LGPA).

The Council is made up of 28 members representing the public, business (industrial), labor, artisanal, processing plants and shipping sectors, and members nominated by the President of the Republic and approved by the Senate. The members of the National Fisheries Council are identified on the website of the Undersecretariat of Fisheries.

In addition to the matters in which the Law establishes the participation of the Council, the Undersecretariat of Fisheries must consult it regarding the following matters: (i) National Fisheries Development Plan; (ii) International fisheries policy; (iii) Amendments to the General Law on Fisheries and Aquaculture; (iv) Measures to promote artisanal fishing, and (v) National Fisheries Research Plan.

The Council may also refer to other sectoral matters that it deems pertinent and may request the necessary technical background information from public or private bodies in the sector. The councillors may also inform the sectoral authorities of the facts that, in their opinion, affect fishing activities, hydrobiological resources and their environment and request initiatives from the Undersecretary in any matter within his competence, a request that the Undersecretary may deny by reasoned resolution.

The National Fisheries Council has been in operation since 1993. Its current composition and minutes are available on the website of the Undersecretariat of Fisheries.

Zonal Fishing Councils (CZP): are auxiliary bodies of the State administration with a consultative or decisive nature, as appropriate, with the objective of contributing to decentralizing the administrative measures adopted by the authority and making effective the participation of the agents of the fishing sector at the zonal level, in matters related to fishing activity. (Paragraph 2, Title XII, LGPA).

At the national level, there are 8 Zonal Fishing Councils, each made up of 18 members, representing the regional or zonal public sector, universities related to marine sciences, industrial organizations, fleet and processing plant workers, the artisanal sector and non-profit organizations whose objective is to protect the environment or preserve natural resources or research natural resources. The members of the Zonal Fishing Councils and the minutes of their meetings are published on the website of the Undersecretariat of Fisheries.

The Zonal Fishing Councils must issue their opinion in response to consultations, as well as prepare technical reports on various matters related to the management of fishing resources established by law.

Fisheries and Aquaculture Research Fund (FIPA): Fund dependent on the Ministry of Economy, intended to finance research projects necessary to support the adoption of management measures adopted by the fisheries authority. (Paragraph 2, Title VII, LGPA).

National Institute for Sustainable Development of Artisanal Fishing and Small-Scale Aquaculture (INDESPA): This Institute aims to encourage and promote the development of artisanal fishing, small-scale aquaculture and its beneficiaries. Created by Law 21,069. The main functions of INDESPA are the following:

- Contribute to improving the productive or commercial capacity of the artisanal fishing and small-scale aquaculture sectors.
- Promote productive diversification in the artisanal fishing and small-scale aquaculture sectors.
- Contribute to strengthening the integral and harmonious development, as well as the natural and economic heritage of the coves and surrounding areas.
- Develop infrastructure works for artisanal fishing and small-scale aquaculture, which should preferably be carried out through agreements with the competent State Administration bodies.
- To coordinate and execute, preferably through existing State Administration bodies, or finance as appropriate, State action aimed at these objectives.

#### Other interest groups

Holders of Tradable Fishing Licenses (TFL) for anchovy purse seine fisheries from Regions III to X; sardine fisheries from Regions III and IV; common sardine fisheries from Regions V to X and hoki fisheries from Region VX, given that they can also catch jack mackerel, as associated species or by-catch, when they catch their target species. It should be noted that according to the law, TFL holders for these fisheries, prior to the start of their operations, must prove that they have a jack mackerel quota in which to allocate their catches. (Article 33 LGPA)

#### **12.1.1.1.2 Details of consultations leading to the formulation of the management plan.**

## CHILE

The Jack mackerel Management Committee is responsible for preparing the fishery management plan. Once prepared, it must be submitted to the corresponding Scientific Technical Committee for evaluation. Subsequently, the Management Plan must be approved and made official through a Resolution of the Undersecretariat of Fisheries.

The current Management Plan for the jack mackerel fishery was made official by the Undersecretariat of Fisheries, by Resolution No. 4,344 of 2017.

### 12.1.1.1.3 Arrangements for on-going consultations with interest groups.

#### SPRFMO

The Convention Commission, as a general rule, adopts decisions by consensus, except when the President considers that efforts to reach a consensus decision have been exhausted, the following may be done:

- If the Commission's decision is on a procedural matter, it will be adopted by majority.
- If the decision is on matters of substance, it will be adopted by a majority of three-quarters of the members.
- If doubts arise as to whether the matter is substantive or not, it will be treated as a substantive matter.

All decisions taken by the Commission shall be based on the recommendation of a Subsidiary Body, which shall submit reports on the matter, which shall be discussed and agreed upon within the relevant committee.

## CHILE

In the decision-making process, the Undersecretariat of Fisheries or the Ministry of Economy, in accordance with the provisions of the LGPA, must consult the various agencies involved in management to establish the various administration measures.

The involvement of interest groups in establishing prohibitions or management measures is explained below:

For conservation or management measures, such as: establishment of closed seasons, temporary or permanent prohibition of capture of species protected by international conventions, quantification of catch, determination of marine parks and reserves, and setting landing percentages for by-catch fauna: the measure must be communicated in advance to the corresponding CCT, in addition to having a technical report from the Undersecretariat of Fisheries. Some of these measures must be reported to the National Fisheries Council, such as the quota reserved for research.

Regarding the establishment of global catch quotas, the corresponding CCT must make a proposal of the range, always considering that the fishery must be brought to or maintained at the MSY; within this range, the Ministry of Economy may determine the quota.

For conservation or management measures such as establishing minimum extraction sizes, setting dimensions and characteristics of fishing gear and tackle, requiring the use and carrying of devices to minimize the capture of bycatch, requiring the use and carrying of utensils to release incidental catches: the Fisheries Undersecretariat must establish these measures after previously consulting the relevant Zonal Fisheries Council and communicating the measure to the respective CCT.

For the regulation of Vulnerable Marine Ecosystems: the minister may establish it following a technical report from the Undersecretariat of Fisheries and prior communication to the competent Zonal Fisheries Council. The corresponding CCT determines which fisheries qualify as bottom fishing and which may affect vulnerable marine ecosystems.

#### **12.1.1.1.4 Details of other non-MSC fishery users or activities, which could affect the UoA, and arrangements for liaison and coordination**

##### **CHILE**

In the area of the III to X region where the extractive activity of the industrial sector on jack mackerel is carried out, no other type of activity is carried out other than the extractive activity on other fishing resources of fish and crustaceans. Activities related to aquaculture and Benthic resource management areas are developed in the coastal zone within the five-mile nautical strip measured from the coast, where no extractive activities are carried out by the industrial sector.

#### **12.1.1.1.5 Details of the decision-making process or processes, including the recognized participants.**

##### **SPRFMO**

The Commission participates in the decision-making process of the Convention, advised by the subsidiary bodies responsible for the issue to be decided.

##### **CHILE**

The Ministry of Economy, the Undersecretariat of Fisheries, the IFOP, the Fisheries Research Fund, the Scientific Technical Committee, the National and Zonal Fisheries Councils and the Management Committee participate in the decision-making process for management measures.

The Fisheries Undersecretariat is always responsible for preparing the technical reports on which management measures are based. To this end, it considers, as appropriate, the scientific information provided by research conducted by the IFOP or the Fisheries Research Fund.

The Authority then consults the opinion of the relevant Scientific and Technical Committee on the design of the management measure and informs the Fisheries Councils and the Management Committee. This procedure does not include the establishment of catch quotas and biological reference points, which must be established by the Authority at the proposal of the relevant Scientific and Technical Committee.

By Resolution of the Undersecretariat of Fisheries, the following management measures are established: establishment of minimum sizes or weights, characteristics of fishing gear and equipment, use and carrying of devices to minimize incidental catch, use and carrying of utensils to release incidental catch, biological reference points, definition of target species and associated species or Bycatch that constitute a fishery according to their fishing gear, and closures of access to fisheries.

In addition, the following management measures are established by Decree of the Ministry of Economy: establishment of annual catch quotas (CBA), establishment of the Artisanal Extraction Regime (RAE), establishment of closed seasons, establishment of capture percentages of Bycatch, and areas corresponding to Vulnerable Marine Ecosystems.

Regarding the establishment of the jack mackerel catch quota, according to the Fisheries Law, it must be established during the calendar year prior to its application, therefore, the initial quota that is established is done in accordance with the procedure indicated above, however, according to Article 7°E and following, this quota must be equal to that established by the South Pacific Regional Fisheries Organization, which establishes it during the year of application.

#### **12.1.1.1.6 Objectives for the fishery (referring to any or all of the following if relevant):**

##### **SPRFMO**

The objective of the 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 doing so, to safeguard the marine ecosystems in which these resources exist (Article 2 of the Convention), taking into account the principles set out in Article 3.

##### **CHILE**

Fishing activity in Chile is regulated by the Ministry of Economy, Development and Tourism and the Undersecretariat of Fisheries, within the framework of the following regulations:

General Law on Fisheries and Aquaculture, LGPA, contained in Supreme Decree No. 430 of 1991, of the Ministry of Economy, which establishes the consolidated text, the 1991 Fisheries Law and all its subsequent amendments. The objective of the LGPA according to its article 1ºB, is the conservation and sustainable use of hydrobiological resources, through the application of the precautionary and ecosystemic approach, safeguarding marine ecosystems, and the effectiveness of the measures adopted must be evaluated at least every five years.

In order to achieve the objective of sustainability referred to in Article 1º B, the authority must take into consideration the following when establishing management measures and interpreting the law:

##### **Regarding Resources:**

- Establish long-term objectives for the conservation and management of fisheries and the protection of their ecosystems. (Article 1º C, letter a), LGPA), these specific objectives for each fishery must be established through the Fishery Management Plan.
  - Periodically evaluate the effectiveness of the measures adopted. (Article 1º C, letter a), LGPA)
  - Apply the precautionary principle, being cautious when scientific information is uncertain, unreliable or incomplete, and lack of information should not be used as a reason for postponing or failing to take conservation and management measures. (Article 1º C, letter b, LGPA)
  - Monitor the effective compliance with conservation and administration measures (Article 1ºC, letter h), LGPA).

##### **Regarding the Environment:**

- Apply the ecosystem approach to the conservation and management of fishery resources and the protection of their ecosystems, considering the interrelationship of the predominant species in a given area. (Article 1ºC, letter c), LGPA)

##### **Regarding Biodiversity and Ecology:**

- Consider the impact of fishing on associated or dependent species and the preservation of the aquatic environment. (Article 1ºC, letter f), LGPA)
  - Minimize the discarding of both the target species and the Bycatch and the catch of incidental fishing. (Article 1ºC, letter i), LGPA)

##### **Regarding the Social:**

- Endeavour to prevent or eliminate overexploitation and excessive fishing capacity (Article 1ºC, letter g), LGPA).
- Manage fisheries resources in a transparent, responsible and inclusive manner. (Article 1ºC, letter d), LGPA)

- Collect, verify, report and share in a systematic, timely, correct and public manner data on hydrobiological resources and their ecosystems. (Article 1ºC, letter e), LGPA)

#### 12.1.1.1.7 Outline the fleet types or fishing categories participating in the fishery.

##### SPRFMO

According to the information that Chile annually reports to the Commission, through the Undersecretariat of Fisheries, the national vessels that have carried out extractive activities on the Jurel fishery are presented according to their storage capacity, in the following Table

**Table 32. Chilean vessels that have carried out activities in the jack mackerel fishery. 2016-2023. Source: Doc. SC 11-Doc 25, 11 Meeting of the Scientific Committee, Annual Report of the Republic of Chile to SC11\_ jack Mackerel. (\*) info. Preliminary**

Vessels that carried out activities in jack mackerel in Chilean EEZ reported to SPRFMO								
Holding Capacity (m³)	2016	2017	2018	2019	2020	2021	2022	2023*
0-300	3	0	0	0	0	0	0	0
300-600	57	57	46	42	42	27	23	18
600-900	7	5	5	7	6	5	4	3
900-1200	1	2	1	1	1	1	1	1
1200-1500	6	8	7	8	8	8	8	8
1500-1800	9	9	9	10	10	10	10	10
1800-2100	4	4	4	4	4	4	4	4
<b>Total</b>	<b>87</b>	<b>85</b>	<b>72</b>	<b>72</b>	<b>71</b>	<b>55</b>	<b>50</b>	<b>44</b>

As can be seen in the following table, since 2020, Chilean vessels have carried out their extractive activities exclusively within the Chilean EEZ.

**Table 33. Chilean vessels that have carried out activities in the Jack Mackerel outside Chilean EEZ. 2016-2023**  
**Source:** Doc. SC 11-Doc 25, 11 Meeting of the Scientific Committee, Annual Report of the Republic of Chile to SC11\_ jack Mackerel. (\*) info. Preliminary

Vessels that carried out activities in Jack Mackerel outside Chilean EEZ reported to SPRFMO								
Holding Capacity (m³)	2016	2017	2018	2019	2020	2021	2022	2023*
0-300	0	0	0	0	0	0	0	0
300-600	0	0	0	0	0	0	0	0
600-900	1	0	0	0	0	0	0	0
900-1200	0	1	0	0	0	0	0	0
1200-1500	0	0	1	0	0	0	0	0
1500-1800	2	2	0	2	0	0	0	0
1800-2100	2	0	1	0	0	0	0	0
<b>Total</b>	<b>5</b>	<b>3</b>	<b>2</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

## CHILE

The industrial jack mackerel fishery from Region III to Region X is managed for the industrial sector with Tradable Fishing Licenses, a system that corresponds to individual quotas per shipowner, independent of the vessels.

In accordance with the above, in order to exercise their rights, the holders must register the vessel(s) in a Registry kept by the National Fisheries Service, prior to the start of the fishing season. Vessels to be registered must have a Chilean flag and may be owned by the holder of the LTP, or prove another right of use.

The vessels used in 2024 to catch jack mackerel correspond to 25 purse seiners, according to the information provided by the Client, which belong to the fishing companies: Alimentos Marinos, Blumar, Camanchaca Pesca Sur, Foodcorp Chile, Orizón and Landes

**Table 34. List of vessels and shipowners belonging to the Client Group**

Purse seine boats for jack mackerel III-X region	
Customer	Name of the vessel
Marine Foods SA	Querelema
Marine Foods SA	Vichuquen
Marine Foods SA	Panilonco
Blumar SA	Don Edmund
Blumar SA	Rapa Nui
Blumar SA	Cobra
Blumar SA	Don Alfonso
Blumar SA	Yelcho I
Camanchaca Fishing South SA	Buccaneer I
Camanchaca Fishing South SA	Corsair I
Camanchaca Fishing South SA	Maria Jose
Camanchaca Fishing South SA	Pehuénco
Camanchaca Fishing South SA	Pelican
Foodcorp Chile S.A.	Hunter
Foodcorp Chile S.A.	Mr. Manuel
Foodcorp Chile S.A.	Ruth
Orizon SA	Mr. Julio
Orizon SA	Lonco
Orizon SA	Saint Joseph
Orizon SA	Snowdrift
Orizon SA	Leader
Orizon SA	Vesterveg
Landes Fisheries SA	Don Tito
Landes Fisheries SA	Mr. Boris
Landes Fisheries SA	Coral I
Panilonco	Alimar S.A
Coral	Pesquera Landes

**12.1.1.1.8 Details of those individuals or groups granted rights of access to the fishery and particulars of the nature of those rights.**

The rights with which extractive fishing activities are carried out on Jurel, both within and outside the Chilean EEZ, correspond to the Tradable Fishing Licenses, whose characteristics are detailed below:

Tradable Fishing Licenses, LTP.

They correspond to individual quota permits, are not associated with a vessel, are transferable, transmissible, divisible, and subject to any legal transaction, for a defined period of 20 years. 85% of the assignments were made through historical rights and 15% through public auction. The Tradable Fishing Licenses, class A, come from historical rights and are valid for 20 years, extendable depending on the compliance of their holder. The Tradable Fishing Licenses, class B, correspond to those acquired through auction and are valid for 20 years. Both types of licenses have causes for total or partial expiration, associated with compliance and payments required by law, Specific Tax for LTP class A and payment of what was committed in the auction for LTP class B and payment of the fishing Patent for the vessels that register to carry out the activity.

According to the final quota control report for the year 2023, from the National Fisheries Service, the holders of Tradable Fishing Licenses for jack mackerel, as well as their assigned quotas, such as the transferred quotas, either by another LTP holder or by transfers from the artisanal sector, as well as the catch corresponding to the year 2023, are presented in the following Table for each of the three fishery units:

Considering that in the industrial sector the entire quota is managed with individual quota allocations and that in the artisanal sector a significant part of the quota is also managed with allocations, either individual or group, in accordance with Article 55 N of the LGPA, these assigned quotas can be transferred for annual periods, between the industrial and artisanal sectors, and within each of the sectors. This is reflected in the column of movements.

**Table 35.** Assigned quotas and effective quotas and catches of jack mackerel LTP holders, of the fishing unit of region III-IV, during 2023. **Source:** Final Quota Control Report for 2023, from the National Fisheries and Aquaculture Service, available on the Sernapesca website.

LTP holders, from Jurel III-IV Region with their respective quotas and catch for the year 2023				
Shipowner or Company	Assigned Quota Ton.	Motion Ton.	Share Effective Ton.	Capture Ton.
Seafood	1,770,038	-1,769,000	1,038	0
Arica Seafood Producer SA	5,459	0	5,459	0
Caldera Bay SA	79,540	0	79,540	0
Blumar SA	4,818,222	4,791,000	27,222	0
Camanchaca Fishing South SA	1,568,629	1,566,000	1,900	0
Foodcorp Chile S.A.	1,008,846	-1,008,256	0.587	0
Damas Island SA	20,173	0	20,173	0
Landes SA	148,636	147,997	0.639	0
Litoral SpA.	94,995	0	94,995	0
Novamar SpA	204,932	-204,932	0	0
Orizon SA	10,567,035	-9,807,075	759,960	0

LTP holders, from Jurel III-IV Region with their respective quotas and catch for the year 2023				
Shipowner or Company	Assigned Quota Ton.	Motion Ton.	Share Effective Ton.	Capture Ton.
Proc. BioBio Technologies	569,970	-528,564	41,406	0
San Lorenzo Ltda.	252,320	-253,320	0	0
Thor Fisheries Chile SpA.	0.211	0.207	0.418	0
<b>TOTAL</b>	<b>21.110.003</b>	<b>20,076,666</b>	<b>1,033,337</b>	<b>0</b>

**Table 36.** Assigned quotas and effective quotas and catches of jack mackerel LTP holders, from the Fishery Unit of Regions V to IX, during 2023. Source: Final Quota Control Report for 2023, from the National Fisheries and Aquaculture Service, available on the Sernapesca website.

LTP holders, from Jurel V-IX Region with their respective quotas and catch for the year 2023				
Shipowner or Company	Assigned Quota Ton.	Motion Ton.	Share Effective Ton.	Capture Ton.
Seafood	54,334,614	8,810,000	63,144,614	63,076,376
Antonio Cruz Cordova EIRL	4,528	0	4,528	3,922
Blumar SA	93,687,331	12,830,269	106,517,600	106,011,223
Camanchaca Fishing South SA	78,293,669	18,706,110	96,999,779	96,824,679
San Lazaro Commercial Ltd.	2,037,762	-2.037,762	0	0
Foodcorp Chile S.A.	46,448,068	13,205,218	59,653,386	59,587,718
Inostroza Shell Pelentaro	67,925	0	67,925	0
Quihua Island SA	3,849	0	3,849	0
Landes SA	35,672,246	15,315,910	50,988,156	50,934,572
MJF Fishing Ltd.	4,528	0	4,528	0.857
Novamar SpA.	24,484,027	873,343	25,357,370	25,285,980
Orizon SA	117,494,646	32,945,646	150,440,603	152,910,609
Pacificblu SpA.	76,982	-4,528	72,454	3,755
Genmar Ltda	45,284	0	45,284	0
Southern Austral SA	148,576	0	148,576	0
Thor Fisheries Chile SpA.	9,057	4,446	13,503	0
Soc. Nordiomar SpA.	0	4,528	4,528	1,985
WQ Energy SpA	22,642	-14,650	7,992	0
<b>TOTAL</b>	<b>452,836,047</b>	<b>100,638,530</b>	<b>553,474,577</b>	<b>554,641,676</b>

**Table 37.** Assigned quotas and effective quotas and catches of jack mackerel LTP holders, from the fishing unit of Region XIV to X, during 2023. Source: Final Quota Control Report for 2023, from the National Fisheries and Aquaculture Service, available on the Sernapesca website.

LTP holders, from Jurel XIV - X Region with their respective quotas and catch for the year 2023				
Shipowner or Company	Assigned Quota Ton.	Motion Ton.	Share Effective Ton.	Capture Ton.
Seafood	6,160,047	-6.159,000	1,047	0
Caldera Bay SA	54,471	0	54,471	0
Blumar SA	13,089,957	-13,039,269	50,688	0
Camanchaca Fishing South SA	9,016,968	-9.013,409	3,559	0
Foodcorp Chile S.A.	6,290,077	-6.290,042	0.035	0
Genmar Ltda.	14,504	0	14,504	0
Landes SA	6,051,395	-6.047,090	4,305	0
Proc. Tech. BioBio SpA	1,135,080	-1,135,080	0	0
Novamar SpA.	2,864,753	-2.847,056	17,697	0
Orizon SA	18,254,003	-18.233,440	20,563	0
Pacificblu SpA.	2,144	0	2,144	0
Inostroza Shell Pelentaro	15,765	0	15,765	0
Southern Austral SA	105,878	0	105,878	0.775
Thor Fisheries Chile SpA.	0	5,033	5,033	0
Lota Protein	4,414	-4,414	0	0
Saint Lazarus Ltd.	0	-20,520	-20,520	0
Expired due to non-payment	0.536	0	0.536	0
<b>TOTAL</b>	<b>63,059,993</b>	<b>62,784,287</b>	<b>275,706</b>	<b>0.775</b>

According to the above, it can be noted that practically the entire quota established by Chile for the three fishing units, that is, from the III-IV region; V-IX region and XIV-X region, was landed in the VIII region, in the fishing unit from the V to IX region.

#### Artisanal Extraction Regime, RAE

The Artisanal Extraction Regime corresponds to a quota allocation mechanism for artisanal fishermen, which consists of the allocation of the quota of a certain region, either by area, fleet, size of the vessels, cove, organization of fishermen or individually. Artisanal rights are of an indefinite nature, transferable, associated with the vessel, which can be replaced by one of an equal or lower level of effort.

#### **12.1.1.1.9 Description of the measures agreed upon for the regulation of fishing in order to meet the objectives within a specified period.**

These may include general and specific measures, precautionary measures, contingency plans, mechanisms for emergency decisions, etc.

##### **SPRFMO**

One of the most important management measures in the jack mackerel fishery is the establishment of the global catch quota, which is set by the Commission and distributed among the members and the non-Contracting Cooperating Parties.

The Management and Administration Measures for the Jack mackerel Fishery established by the Convention Commission, effective for 2024, are as follows:

- CMM 01-2024 Jack mackerel
- CMM 02-2022 Data Standards
- CMM 05-2023 Ship registration
- CMM 06-2023 Satellite monitoring system
- CMM 07-2023 Port Inspection
- CMM 09-2017 Seabirds
- CMM 10-2020 Compliance and Monitoring Program
- CMM 11-2023 Visit and Inspection
- CMM 12 -2024 Transshipment
- CMM 16-2024 Observation Program
- CMM 19-2021 Ship Marking

Without a doubt, the establishment of the total allowable quota and its allocation by Member is one of the most relevant measures for the management of the Jack Mackerel fishery. CMM 01 of 2024 was established by the Commission for 2024 in the following terms (Table 38).

**Table 38.** Allocated TAC by countries by the SPRFMO. Source: CMM 01-2024 of the Convention Commission

Asignación de Jurel a los Miembros Contratantes y a las PCNC de la SPRFMO 2022 a 2024							
Año	2022		2023		2024		
Cuota Máxima	900.000		1.080.000		1.242.000		
Member/PCNC		CMM 01-2022		CMM 01-2023		CMM 01-2024	
	Percentage	Tonnege	Percentage	Tonnege	Percentage	Tonnege	
Belice			0,1019	1.100	0,1060	1.317	
Chile	64,5638	581.074	66,3665	716.758	66,0000	819.720	
China	6,3477	57.129	5,8459	63.136	5,9700	74.147	
Cook Island	0	-	0,1019	1.100	0,1010	1.266	
Cuba	0,2231	2.008	0,2055	2.219	0,2055	2.552	
Ecuador	1,2638	11.374	1,1639	12.570	1,1639	14.456	
European Union	6,1086	54.977	5,6257	60.758	5,9619	74.047	
Faroe Island	1,1087	9.978	1,0211	11.027	1,0211	12.682	
Korea	1,2822	11.540	1,1808	12.753	1,1920	14.805	
Panamá			0,1019	1.100	0,1019	1.266	
Perú	2,0284	18.256	1,8681	20.175	2,0400	25.337	
Russian Fed.	3,2825	29.543	3,023	32.649	3,2400	40.241	
Vanuatu	4,6738	42.064	4,3044	46.487	4,3044	53.461	
Total		<b>817.943</b>		<b>981.832</b>		<b>1.135.297</b>	

It should be noted that according to paragraph 8 of management measure CMM 01-2024, also established in the rules of previous years, Members or CNCPs of the Convention are authorized to transfer part of their fishing rights to another member or CNCP by December 31 of each year, up to the allocated quota. Before the transfer is carried out, the Member or CNCP must notify the Executive Secretary so that it can be transmitted to the members and CNCPs without delay.

Consistent with the above, the quotas transferred to Chile by Members or PCNC are presented in the following table (Table 39).

**Table 39.** Transfer of Members' or PCNC's quota of Jack Mackerel to Chile 2020-2023. Source: Processed from information published on the website of the Undersecretariat of Fisheries.

Transfer of Members' or PCNC's quota of Jack Mackerel to Chile 2020-2023	
Year	Tons
2020	127,727
2021	132,581
2022	150,238
2023	145,371

Consistent with the above, the total Catch and Quota of jack mackerel corresponding to the clients, that is, Alimentos Marinos, Blumar, Camachaca Pesca Sur, Foodcorp, Orizón and Landes, and their vessels, for the last two years, which considers both the national quota and the quotas transferred by any of the members of the South Pacific Regional Fisheries Organization to any of these companies, is presented in the following table (Table 40).

**Table 40.** TAC and catches from Jack Mackerel III-X Region. Source: SPRFMO

<b>TAC and catches from Jack Mackerel III-X Region</b>					
<b>Year</b>	<b>TAC</b>	<b>Transfer SPRFMO To UoC Chile</b>	<b>Transfer inside EEZ</b>	<b>Available TAC for the UoC</b>	<b>Total catch UoC</b>
2019	285.886	69.687	49.459	405.032	403.367
2020	328.195	127.727	25.873	481.795	480.836
2021	378.232	107.581	23.217	509.030	507.030
2022	435.325	105.238	30.933	571.496	570.126
2023	537.006	108.112	17.778	662.896	662.704

## CHILE

The jack mackerel fishery, in accordance with the LGPA, is managed with various management and management measures, which are indicated below:

**Catch quota:** According to the sixth transitory article of Law 20.657, letter b), the global quota for the jack mackerel fishery, corresponding to the area from the XV to the X region, must be divided, assigning 10% to the artisanal sector and 90% to the industrial sector, after deducting the quotas destined for research and unforeseen events, human consumption, and handline fishing.

### 2023 Fee:

- Decree No. 69 of 2022, of the Ministry of Economy, establishes the total quota of Jack mackerel for the year 2023, at 703,800 tons, which was modified by Decree No. 30 of 2023, increasing it to 716,758 tons in accordance with the provisions of the Regional Fisheries Organization.
- Resolution No. 2,830 of 2022, of the Undersecretariat of Fisheries, establishes the distribution of the artisanal jack mackerel quota for the year 2023 by Region, modified by Resolution No. 1,155 of 2023.

### 2024 fee

- Decree No. 164 of 2023, of the Ministry of Economy, establishes the total quota of Jack mackerel for the year 2024 at 824,272 t. The quota established to date has not been modified to make it consistent with that established by the Regional Fisheries Organization.
- Resolution No. 23 of 2024, of the Undersecretariat of Fisheries, establishes the distribution of the artisanal jack mackerel quota for the year 2024 by Region.

#### Allocation of individual LTP quotas

##### Year 2023

- Resolution No. 2,851 of 2022, of the Undersecretariat of Fisheries, establishes the tons for each of the holders of Class A Tradable Fishing Licenses, for the year 2023, and sets the list of lessee holders and mere holders.
- Resolution No. 2,852 of 2022, of the Undersecretariat of Fisheries, establishes the tons for each of the holders of Class B Tradable Fishing Licenses, for the year 2023.

##### Year 2024

- Resolution No. 03 of 2024, of the Undersecretariat of Fisheries, establishes the tons for each of the holders of Class B Tradable Fishing Licenses, for the year 2024, and sets the list of lessee holders and mere holders.
- Resolution No. 04 of 2024, of the Undersecretariat of Fisheries, establishes the tons for each of the holders of Tradable Fishing Licenses, Class A for the year 2024.

The following table shows the global jack mackerel catch quotas for the period 2021 to 2014 and their distribution.

**Table 41.** Jack mackerel quotas and their distribution. Source: Decree No. 129 of 2020; No. 240 of 2021, No. 69 of 2022 and No. 164 of 2023, all from the Ministry of Economy.

<b>Distribution of the Total Quota of Jack Mackerel, Regions I to X. Years 2021 to 2014</b>				
<b>Type of Quota</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>
Industrial Quota	448,687	516.415	637.036	732.615
Artisanal Quota	45.734	52.637	64.932	74.674
Research Share	150	150	150	150
Unforeseen Fee	5.048	5.810	7.167	8.242
Human Consumption Share	5.048	5.810	7.167	8.242
Handline Fee	202	232	286	329
Bycatch XI-XII	20	20	20	20
<b>Total Share</b>	<b>504.889</b>	<b>581.074</b>	<b>716.738</b>	<b>824.272</b>

Consistent with the transfers of jack mackerel quota that, in accordance with MMC 01-2024, have been made by Members and PCNC of the South Pacific Regional Fisheries Organization to Chile, in addition to the quotas that have been transferred either from other industrialists of the fishing unit of the XIV-II region and from artisanal fishing, the quotas and catches in the certification unit, that is, from III to X region, are presented in the following Table.

**Table 42. TAC and Catches UoC of Jack mackerel - III-X Region. Source: SPFRMO**

<b>TAC and Catches UoC of Jack mackerel - III-X Region</b>					
<b>YEAR</b>	<b>TAC UoC Assigned</b>	<b>transfer to UoC Chile</b>	<b>Transfers within Chile</b>	<b>CT scan available UoC</b>	<b>UoC Capture</b>
2019	285.886	69.687	49.459	405.032	403.367
2020	328.195	127,727	25.873	481.795	480.836
2021	378.232	107,581	23.217	509.030	507.030
2022	435.325	105.238	30.933	571,496	570.126
2023	537.006	108.112	17,778	662.896	662.704

**Definition of Fishery:**

Pursuant to Article 33 of the LGPA, holders of tradable fishing licenses, in order to make their permit effective, must have licenses or permits for the species they capture as associated species or Bycatch of their fishery. It also establishes that the Undersecretariat must establish the species that they can capture as species associated with the fishing gear.

Resolution No. 3,200 of 2013, amended by Resolution No. 3,986 of 2019, both of the Undersecretariat of Fisheries, establishes the species associated with the jack mackerel fishery. The species associated with the purse seine gear that can be captured, in fishing directed at jack mackerel as target species, are presented in the following Table (Table 43):

**Table 43. Associated species or Bycatch that may be caught by jack mackerel LTP holders. Source: Resolution No. 3,200 of 2013, amended by Resolution No. 3,986 of 2019, both from the Undersecretariat of Fisheries.**

Common name	Scientific name	III-IV	V-IX	XIV-X
Needle	<i>Scomberesox saurus</i>	x	x	x
Codfish or Mote	<i>Normanichthys crockeri</i>	x	x	x
Keg	<i>Katsuwonus pelamis</i>	x		
Pretty	<i>Sarda chilensis</i>	x	x	x
Mackerel	<i>Scomber Japnicus</i>	x	x	x
Northern Cojinoba	<i>Seriolella violacea</i>		x	x
Southern Cojinoba	<i>Seriolella caerulea</i>		x	x
Speckled Cojinoba	<i>Seriolella punctata</i>		x	x
High-altitude dorado	<i>Coryphaena hippurus</i>	x	x	x
Cuttlefish	<i>Dosidicus gigas</i>	x	x	x
Ecuadorian jack mackerel	<i>Decapterus macrosoma</i>	x		
Machuelo	<i>Etmnidium maculatum</i>	x	x	x
Panpanito	<i>Stromateus stellatus</i>		x	x
Vinciguerria	<i>Vinciguerria lucetia</i>	x		
Round Sardine	<i>Etrumeus teres</i>	x		

Resolution No. 3,200 also establishes the proportion of associated species managed with LTP or PEP, which each holder must prove to have available before the National Fisheries Service, at the time of registering his or her vessel(s) for the capture of common hake, expressed in percentages associated with the tons of common hake that he or she has available.

Jack mackerel III- IV

0.001% of Anchovy III-IV region

0.001% Spanish sardine III-IV region

VX jack mackerel

0.001% of Anchovy V to X region.

0.001% of common sardine V to X region

0.001% of VX region hake

#### Discarding regulation:

Every year, the Undersecretariat of Fisheries, in accordance with the provisions of articles 7º A, 7º B and 7º C of the LGPA, establishes by resolution the list of target species, Bycatch, of the fisheries that are subject to the plan to reduce discards and incidental catches that must be returned to the sea.

- Resolution No. 119 of 2023, of the Undersecretariat of Fisheries, establishes for the jack mackerel fishery, the target species, Bycatch and incidental fishing that may or may not be discarded, or whose return is mandatory, for the year 2023.
- Resolution No. 164 of 2024, of the Undersecretariat of Fisheries, establishes for the jack mackerel fishery, the target species, Bycatch and incidental fishing that may or may not be discarded or whose return is mandatory, for the year 2024.

#### Bycatch species:

- Decree No. 05 of 2023, amended by Decree No. 27 of 2023, both from the Ministry of Economy, establishes the landing percentages of species as Bycatch, for the year 2023, for the different fisheries managed with catch quotas, including jack mackerel.
- Decree No. 012 of 2024 of the Ministry of Economy, establishes the landing percentages of species as Bycatch, for the year 2024, for the different fisheries managed with catch quotas, including jack mackerel.

#### Minimum Size

- Decree No. 458 of 1981 of the Ministry of Economy, establishes the minimum legal size of the jack mackerel, at 26 cm fork length, allowing the extraction of a smaller size when it is Bycatch in the capture of other resources of 20% of the total landing of the target catch.
- Resolution No. 2,203 of 1996, of the Undersecretariat of Fisheries, establishes that the tolerance margin for small specimens of jack mackerel is 35% measured in number per landing.
- Resolution No. 903 of 2020, of the Undersecretariat of Fisheries, modifies Res. 2023 of 1996, in the sense of indicating that the maximum percentage allowed under size is 25%, measured in monthly number per vessel.

#### Mandatory return of Chondrichthyes

- Resolution No. 2063 of 2020, of the Undersecretariat of Fisheries, establishes the mandatory return of Chondrichthyans in purse seine, trawl, longline or longline and gillnet fisheries.

#### Management Plan for the Jack Mackerel Fishery

The management plan for the jack mackerel fishery was made official by Resolution No. 4,344 of 2017, of the Undersecretariat of Fisheries, which establishes the Purposes, Goals and Objectives of the Management Plan, where the Purpose is "To recover and maintain the jack mackerel fishery, biologically, economically, socially and ecologically at sustainable levels."

To achieve this purpose, the following Goals are established.

- Biological Goal: Maintain spawning biomass and catch levels that allow the fishery to recover to sustainable levels in the medium and long term.
- Ecological Goal: Incorporate an approach to adapting the fishery to environmental changes into jack mackerel management; Reduce discards and implement mitigation measures; and Minimize the impact of human activity on the jack mackerel fishery.
- Economic Goal: Optimize economic returns from the jack mackerel fishery.
- Social Goal: Achieve levels of fishery recovery that allow for job stability and increased employment and its benefits, with the full knowledge of the stakeholders.

To achieve the desired changes in the fishery for the different Goals, the management plan considers a series of operational objectives associated with management standards with which the progress of the different objectives will be measured.

**Discard Reduction Plan for jack mackerel and associated fauna fisheries:**

The Discard Reduction Plan considers aspects related to management and conservation measures; a monitoring program for the plan and evaluation of measures; a training and dissemination program; a code of good practices to reduce discards, and innovation and technological improvements in fishing gear that increase the selectivity of the fleet. It was established by:

- Resolution No. 1,826 of 2019 of the Undersecretariat of Fisheries established a Discard Reduction Plan for the area of the Valparaíso Region to the Los Lagos region and international waters.
- Resolution No. 1,468 of 2021 of the Undersecretariat of Fisheries established the Discard Reduction Plan for the jack mackerel and anchovy fisheries of the III-IV region.

The objective of the Plan is to reduce the discarding of target species, of bycatch of commercial value without catch quotas, of bycatch with catch quotas and of incidental fishing.

The Discard Reduction Plan was established by the Undersecretariat after having the results of the investigation carried out to determine the causes of the discards that were carried out in the fishery up to that date. According to the analysis of the information collected in the investigation during the years 2016, 2017, and 2018 (Technical Report R.Pesq. No. 106 of 2019) it was possible to identify the species and percentages of discarded catches. According to the report, the main causes associated with the sets with discards were the following: under minimum legal size; exceeding the capacity of the storage room, exceeding the permitted limit of Bycatch, capture of unauthorized species, capture of non-commercial species. According to the above, a review of the administration and management measures applicable to the jack mackerel fishery was carried out in order to modify those regulations that were responsible for discards.

In accordance with the above, the following management measures were reviewed and modified.

- Resolution No. 3,200 of 2013, which establishes the species associated with fishery units managed with LTP or PEP. Amended by Resolution No. 3,986 of 2019, incorporating species that were not permitted to be landed and were therefore discarded.
- Resolution No. 3,115 of 2013, which establishes the target species and their associated species by region for artisanal species. Amended by Resolution No. 2,747 of 2019, incorporating species that were not permitted to be landed and were therefore discarded.
- Decree No. 411 of 2000, which establishes landing percentages of species as bycatch, was replaced by Decree No. 45 of 2020, which defines the percentages of bycatch in industrial and artisanal fisheries using trawl gear, for southern hake, among others.

- Decree No. 458 of 1981, which establishes the minimum size of jack mackerel, was modified by Resolution No. 903 of 2000, which established that the percentage under the minimum size allowed was measured per month and not per fishing trip.
- Resolution No. 862 of 2021 establishes the regulation for transferring catch at sea from one vessel to another, so that, if the catch exceeds the hold, it can be transferred to another vessel and not discarded.

#### Transshipment of catches at sea

- Resolution No. 862 of 2021, of the Undersecretariat of Fisheries, establishes the regulation of the transfer maneuver of surplus hauls within the framework of the implementation of plans to reduce discards in national pelagic purse seine fisheries.

#### Protection of vulnerable marine ecosystems, EMV:

- Resolution No. 451 of 2015, amended by Resolution No. 687 of 2016, both from the Undersecretariat of Fisheries, establishes the areas associated with 100 seamounts, in which areas bottom fishing is prohibited.

#### Other Regulations established by the National Fisheries Service, relating to Compliance

- Resolution No. 2,952 of 2019, of the National Fisheries Service, establishes the requirements and conditions for landing certification.
- Resolution No. 3,913 of 2019, of the National Fisheries Service, establishes the start date of certification by Sernapesca in the south-central macrozone and Coquimbo, from the Coquimbo Region to the Araucanía Region.
- Resolution No. 4,533 of 2019, of the National Fisheries Service, authorizes points and ports of landing of hydrobiological resources.
- Resolution No. 5,930 of 2019, of the National Fisheries Service, establishes the start date for the entry into force of the discard control system, by the National Fisheries Service. (as of January 1, 2020).
- Resolution No. 267 of 2020, of the National Fisheries Service, establishes the electronic fishing log system (SIBE) and determines the opportunity and conditions for the delivery of catch information. It repeals Resolution 114 of 2015.
- Resolution No. 857 of 2021, of the National Fisheries Service, establishes a procedure for remote certification of landing.

#### **12.1.1.1.10 Particulars of arrangements and responsibilities for monitoring, control and surveillance and enforcement.**

##### **SPRFMO**

The control and surveillance tools established by the Commission are the following:

Satellite monitoring: CMM-06-2023, a conservation and management measure for the Vessel Monitoring System in the Convention Area, establishes the conditions for Members and CNCPs to submit VMS information to the Secretariat. This system has been operational since June 2018 and aims to continuously monitor the movements and activity of fishing vessels that are on the Commission's Vessel Register and that are authorized by Members or CNCPs to harvest fishery resources in the Convention Area. The Secretariat is responsible for storing the data collected from VMS.

Port Inspection: CMM 07-2022 Standard Conservation and Management Measure on Standards In accordance with the Minimum Port Inspection Measures, each Member and cooperating non-Contracting Party of the SPRFMO, in its capacity as port State, must implement an effective port inspection mechanism for foreign fishing vessels carrying species managed by the Convention and caught in the Convention area and/or

fishery products originating from such species. This measure sets out the conditions under which port State powers must be exercised.

**Boarding and Inspection in the Convention Area:** CMM 11-2023, Conservation and management measure on procedures for boarding and inspection in the SPRFMO Convention Area. Regulates the provisions of articles 8 and 27 of the Convention regarding boarding and inspection, which are intended to ensure compliance with the provisions of the Convention and the established conservation and management measures, for which each Contracting Party is empowered to carry out visits and inspections in the Convention area of fishing vessels that are participating or are reported to be participating in the capture of resources regulated by the Convention under the terms of this regulation.

**Observer Programme:** CMM 16-2024, Conservation and Management Measure to establish the SPRFMO observer programme. The purpose of the observer programme is to facilitate the collection of verified scientific data and additional information related to fishing activities in the Convention Area and their effects on the ecosystem, and also to support the functions of the Commission and its subsidiary bodies, including the CTC. All vessels flying the flag of a Member or cooperating non-Contracting Party operating in fisheries resources in the Convention Area shall apply a minimum level of observer coverage. Observers shall be provided by national observer programmes or by service providers accredited in accordance with the provisions of this Standard.

## CHILE

The LGPA requires the use of various technological tools to assist in monitoring, controlling and supervising the established standards, which are supervised by the National Fisheries Service, the Chilean Navy, and the Carabineros of Chile, both within the area of their territorial jurisdiction.

The main monitoring tools applicable to extractive fishing activities are the following:

**Satellite Positioner:** In force since August 2000, it is required for all industrial vessels, regardless of the management regime under which they are operating, and artisanal vessels with a length equal to or greater than 12 m. They must carry out their extractive activities by maintaining the automatic positioning system at sea (satellite positioner) operating from the time of departure until they arrive at an authorized port. (Law 19,521 that modified the LGPA)

The signal from the positioning system automatically reaches two institutions, the Directorate General of Maritime Territory (a department of the Chilean Navy) and the National Fishing Service. Both institutions are obliged to ensure compliance with the requirement and are authorized to make the corresponding complaints in the event of non-compliance they detect. In the case of the National Fishing Service, this signal also reaches its regional offices. After the modification of the Fishing Law by Law 21,132, the positioning information of the vessels is available on the National Fishing Service website and in accordance with an agreement signed between the National Fishing Service and Global Fishing Watch, with a delay of 3 or 4 days.

**Certification of catches at the time of landing:** since 2002, the law establishes the requirement for all industrial vessels and artisanal vessels with a length equal to or greater than 12 meters to certify catches at the time of landing. Until 2019, this was carried out by an auditing entity accredited by the National Fisheries Service. Currently, it is carried out by officials of the National Fisheries Service in accordance with Law 21,132.

**Scientific Observer:** Since 2002, the law has established the obligation to accept on board scientific observers designated by the Undersecretariat for all industrial and artisanal vessels, regardless of the management regime under which they are operating. (Title VIII, LGPA).

During the last days of the month, the Undersecretariat of Fisheries establishes through a resolution the vessels that must accept the scientific observer on board during the following month. The vessels that are nominated will not be authorized to set sail without the presence of the observer on board by the Maritime Authority.

Image recording cameras on board vessels: Industrial vessels are required to install and maintain in operation an image recording device on board their vessels to detect and record any discarding action that may occur on board (Law 20,625 amending the LGPA). This is required for the industrial fishing fleet as of January 1, 2020. In the case of artisanal vessels, this requirement was postponed to January 1, 2024 (Law 21,259), but is not yet in force.

Electronic catch log for each fishing set: Industrial fishing vessels are required to report the estimated catch in an electronic log after each fishing set. The current system does not allow the information for the next set to be filled in until the first set has been closed. The set information is automatically transmitted to Sernapesca when the vessel has access to the internet. This has been required since 2015. The latest regulation corresponds to Resolution No. 267 of 2020, of the National Fisheries Service.

Ports or landing points: According to article 63 quater of the LGPA, the National Fisheries Service must establish by Resolution the landing points or ports where this activity can be carried out. It has been enforceable since 2015, the latest regulation corresponds to Resolution No. 4,533 of 2019, of the National Fisheries Service.

Weighing of landings: according to article 64 E of the LGPA, landings to be certified must be weighed in a weighing system duly authorized by the National Fisheries Service. This has been mandatory since 2013, the latest regulation corresponds to Resolution No. 1,588 of 2014, of the National Fisheries Service.

#### **12.1.1.11      Compliance**

##### Oversight Actions and Sanctions

Every year, the National Fisheries Service establishes the National Inspection Plan, which consists of two parts, a public part that is approved through a resolution and a reserved part where the highest risk behaviors that must be controlled and the strategies that will be applied are detailed. Within the framework of the National Inspection Plan for the year 2023, approved by Resolution No. 736 of December 2022 of the National Fisheries Service, the following Inspection actions were carried out in the jack mackerel fishery.

According to the information provided by the National Fisheries Service, the inspection actions carried out to verify the faithful compliance with the general regulations and administration measures applicable to the jack mackerel fishery, during the year 2023 the National Fisheries Service carried out 2,812 inspection actions to ensure compliance with management measures such as, accreditation of the legal origin of the resources, Access, Quotas, Fishing Areas, which are presented in the following Table (Table 44).

Table 44. Inspection actions carried out by the National Fisheries Service during 2023. **Source:** Response to request for information to the National Fisheries Service No. AH010T0005186 of 2024.

Supervision Actions for the Jack mackerel Fishery, 2023			
Management Measure	Artisanal	Industrial	Total
Proof of origin	70	7	77
Inspection of Means of Transport	15		15
Inspection in Marketing Centers	52	2	54
Plant Inspection	3	5	8
Access	20	21	41
Inspection at disembarkation points	10		10
Fishing Zone Inspection	4		4
Plant Inspection	5	4	9

Supervision Actions for the Jack mackerel Fishery, 2023			
Management Measure	Artisanal	Industrial	Total
Inspection in Means of Transport	1		1
Sanitary qualification of industrial warehouse		17	17
Quotas	878	1647	2525
Inspection of Means of Transport	1	2	3
Inspection in Marketing Center	9	2	11
Plant Inspection	5	18	23
Landing Point Inspection	24	65	89
Inspection in Fishing Zone	22	0	22
Control of unloading in process	71	695	766
Supervision Certification landing	34	75	109
Weight Verification Landing	712	790	1502
Fishing Area	1	4	5
Inspection in Fishing Zone	1		1
Landing Point Inspection		4	4
VMS Device Monitoring		18	18
Inspection of foreign vessels		39	39
Sealing of wine cellars		107	107
<b>TOTAL</b>	<b>969</b>	<b>1,843</b>	<b>2.812</b>

### Certification of landing

According to information provided by the National Fisheries Service, during 2023, the landing of 5,548 jack mackerel landing declarations was certified, of which 63.6% did so in person and 36.4% remotely.

### Sanctions

#### Judicial Sanctions

According to the information provided by the National Fisheries Service, in response to transparency inquiry No. AH010T0005186 of June 2024, on non-compliance in the jack mackerel fishery during 2023, no non-compliance was recorded in the industrial sector; while in the artisanal sector, 8 non-compliances were reported, which meant the total seizure of 3.35 tons of jack mackerel; 4 related to accreditation of origin, 1 for access control, 1 for quota and 1 for statistics, as shown in the following table.

Table 45. Artisanal jack mackerel non-compliances 2023. Source: Response to query No. AH010T0005186 to the National Fisheries Service.

Non-compliance in Jurel 2023. Artisanal Fishing		
Accreditation of Origin	No.	Seizure (t.)
Inspection of means of transport	1	1.29
Inspection at disembarkation point	3	0.32
Document verification	1	0.54
Access		
Inspection at disembarkation point	1	0.00
Share		
Inspection at disembarkation point	1	1.20
Statistics		
Inspection of marketing centre	1	0.00
Total	8	3.35

#### Administrative sanctions

According to the information provided by the National Fisheries Service, through consultation No. AH010T0005186 of June 2024, as of 2023, there were no administrative sanctions.

According to the information collected for the 3rd follow-up audit, the National Fisheries Service reported through Ordinary Official Letter No. DN-01704/2023, that during 2022 the industrial fishing sector did not register any sanctions for non-compliance with any of the established requirements.

According to the information collected for the 2nd follow-up audit, according to transparency query No. AH010T0001697 of 2022, the National Fisheries Service reported that, during 2021, two notifications were sent to the courts of justice for non-compliance by Industrialists, in both cases for not proving the origin of the resources, which implied the seizure of 54.76 tons of jack mackerel.

#### Review of Image Recording Cameras

According to the information provided by the National Fisheries Service in Transparency Consultation No. AH010T0005186 of 2024, the review of the camera images corresponding to the jack mackerel fishery was just beginning with the review of the images corresponding to 2023.

#### **12.1.1.1.12 Details of any planned education and training for interest groups.**

The Fisheries Research Institute, in collaboration with the companies Alimentos Marinos, Blumar, Camanchaca, Foodcorp, Pesquera Litoral, Landes, Lota Protein and Orizón, developed and published a Manual of Good Practices for the Industrial Purse Seine Fishery for Jack Mackerel in the south-central zone of Chile. This manual is voluntary for all industrial fishing companies in the Eighth Region, and its objective is to disseminate good practice guidelines generated within the framework of legal regulations, to be used in jack mackerel fishing in the south-central zone of Chile, in order to promote the sustainability of this fishery.

**12.1.1.13 Date of next review and audit of the management plan.**

In accordance with the provisions of Article 8 of the LGPA, the Management Plans must be evaluated by the Management Committee, which may not exceed five years from their formulation. It should be noted that, in the session of July 2, 2024, among the main observations and agreements adopted, the need to review and update the management plan was highlighted as a priority task of the Committee during 2024.

## 13 Principle 3. Scoring tables.

### 3.1.1 – Legal and/or customary framework

PI 3.1.1		<p><b>The management system exists within an appropriate legal and/or customary framework which ensures that it:</b></p> <ul style="list-style-type: none"> <li>- It is capable of delivering sustainability in the UoA(s);</li> <li>- Observes the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood; and</li> <li>- Incorporates an appropriate dispute resolution framework</li> </ul>		
Scoring Issue		SG 60	SG 80	SG 100
		<b>Compatibility of laws or standards with effective management</b>		
<b>to</b>	<b>Guide post</b>	<p>There is an effective national legal system <b>and a framework for cooperation</b> with other parties, where necessary, to deliver management outcomes consistent with MSC Principles 1 and 2</p>	<p>There is an effective national legal system and <b>organized and effective cooperation</b> with other parties, where necessary, to deliver management outcomes consistent with MSC Principles 1 and 2.</p>	<p>There is an effective national legal system and <b>binding procedures governing cooperation with other parties</b> which delivers management outcomes consistent with MSC Principles 1 and 2.</p>
Met?	Yes	Yes	Yes	Yes

#### Rationale

**There is an effective national legal system and binding procedures governing cooperation with other parties which delivers management outcomes consistent with MSC Principles 1 and 2.**

#### SPRFMO

The Convention for the Conservation and Management of Fishery Resources of the High Seas in the South Pacific, SPRFMO, entered into force in August 2012 and the first meeting of the Commission was held in January 2013. The following are members of the Convention: Australia, Belize, Chile, China, the Cook Islands, Cuba, Ecuador, the European Union, the Faroe Islands, Korea, New Zealand, Panama, Peru, the Russian Federation, Chinese Taipei, the United States of America, and Vanuatu. Curacao and Liberia are Cooperating Non-Contracting Parties.

Currently, the main resources for which the Convention has established conservation and management standards are: jack mackerel, cuttlefish, bottom species and deep-water species.

The Convention recognises and adopts key aspects of international agreements and arrangements such as the 1982 United Nations Convention on the Law of the Sea; the 1995 Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks; the 1993 Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas; the Code of Conduct for Responsible Fisheries adopted by the Food and Agriculture Organization of the United Nations Conference on Fisheries in its October 1995 session; and the FAO Agreement on Port State Measures to Prevent and Deter Illegal, Unreported and Unregulated Fishing.

The Convention recognizes the need to ensure the compatibility of conservation and management measures established for straddling resources in areas of national jurisdiction of a Contracting Party and in the adjacent high seas areas corresponding to the Convention area (Article 4).

PI 3.1.1	<p><b>The management system exists within an appropriate legal and/or customary framework which ensures that it:</b></p> <ul style="list-style-type: none"> <li>- <b>It is capable of delivering sustainability in the UoA(s);</b></li> <li>- <b>Observes the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood; and</b></li> <li>- <b>Incorporates an appropriate dispute resolution framework</b></li> </ul>
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The Convention provides for the collection, compilation and exchange of data among the members of the Commission and with other Regional Fisheries Management Organizations, the scientific assessment of stock status and the provision of scientific advice.

Each Member of the Commission shall ensure that vessels flying its flag comply with the provisions of the Convention and the conservation and management measures established (Article 25). Furthermore, as a Port State, each Member shall, in accordance with international law, promote the effectiveness of subregional, regional and global conservation and management measures.

The Commission shall cooperate with other regional fisheries management organizations, FAO, other specialized agencies of the United Nations and other organizations in matters of mutual interest (Article 31).

The Secretariat has signed various Memoranda of Understanding, including: with ACAP to support efforts to minimize incidental catches of seabirds included in Annex 1 of ACAP; with the Western and Central Pacific Fisheries Commission (WCPFC) to facilitate cooperation to advance their respective objectives, particularly with respect to stocks or species of mutual interest to both organizations; with the North Pacific Fisheries Commission (NPFC) to facilitate, where appropriate, consultation, cooperation and collaboration between both organizations, especially with respect to matters of common interest; with the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) to facilitate cooperation to promote objectives, particularly with respect to stocks and species of mutual interest; among others.

It is therefore concluded that there is an effective legal system and binding procedures governing cooperation with other parties, resulting in management outcomes consistent with MSC Principles 1 and 2, **thereby meeting SG60, SG80 and SG100.**

#### **CHILE**

There is a legal framework established in the General Law of Fisheries and Aquaculture (LGPA) and its amendments, contained in Decree No. 430 of 1991, of the Ministry of Economy, which establishes the regulations that allow achieving results consistent with principles 1 and 2 of the MSC. For its part, Art. 1ºC of the LGPA expressly establishes the considerations that the Authority must take into account when adopting conservation measures, that is, making them sustainable (detailed in 7.4.1 letter f)).

The established management rules are applicable to all vessels that carry out activities within the areas of national jurisdiction, and in the case of the jack mackerel fishery in accordance with the provisions of article 165 of the LGPA, to those carried out outside the EEZ by national flag vessels when the fisheries are distributed both within and outside the EEZ.

The LGP establishes mandatory and explicit procedures for cooperation between the parties involved in fisheries management. For example: i) the definition of the PBR and the range within which the catch quotas must be established, is the responsibility of the Scientific Technical Committee of each fishery. ii) the Management Plan, which establishes the short- and long-term objectives for a given fishery, and the management measures to be applied for sustainability, is the responsibility of the Management Committee, in which the actors involved, and the sectoral authority actively participate.

The LGPA requires its nationals to comply with the standards and requirements established in the international instruments to which Chile is a party. The main international agreements to which Chile is a party are: the United Nations Convention on the Law of the Sea, UNCLOS, signed in August 1997; and the United Nations Fish Stocks Agreement - New York Agreement - signed in June 2014.

It participates in the following Regional Fisheries Organizations: Commission for the Conservation of Antarctic Marine Living Resources, CCAMLR, joined in July 1981; and the South Pacific Regional Fisheries Organization, SPRFMO, in force

PI 3.1.1	<p><b>The management system exists within an appropriate legal and/or customary framework which ensures that it:</b></p> <ul style="list-style-type: none"> <li>- <b>It is capable of delivering sustainability in the UoA(s);</b></li> <li>- <b>Observes the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood; and</b></li> <li>- <b>Incorporates an appropriate dispute resolution framework</b></li> </ul>
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since 2013, when the Commission was established, which specifically manages the jack mackerel fishery.

Chile is part of the following Environmental Forums with an Impact on Aquatic Biodiversity: Convention on Biological Diversity, CBD; Convention on Migratory Species, CMS; Convention on International Trade in Endangered Species of Wild Fauna and Flora, CITES; International Whaling Commission, IWC; Agreement for the Conservation of Albatrosses and Petrels, ACAP; Inter-American Convention for the Protection and Conservation of Marine Turtles, IAC; Memorandum of Understanding on Sharks.

It also participates in the following International Forums: Sustainable Fisheries Resolutions adopted by the United Nations General Assembly; Resolutions on Oceans and the Law of the Sea adopted by the United Nations General Assembly; United Nations Conference on Sustainable Development; FAO Committee on Fisheries, COFI; FAO Subcommittee on Fish Trade; Compliance Agreement on International Conservation and Management Measures for Fishing Vessels Fishing on the High Seas, FAO Compliance Agreement, Agreement on Port State Measures to Prevent, Avoid and Eliminate Illegal, Unreported and Unregulated Fishing of the FAO, Ratified in 2012.

Within the framework of the implementation of the FAO Code of Conduct for Responsible Fisheries, three National Action Plans were developed: National Action Plan to reduce incidental catches of birds in longline fisheries (approved by Decree No. 136 of 2007); National Action Plan for the conservation of sharks (approved by Decree No. 198 of 2007) and National Action Plan to prevent, discourage and eliminate illegal, unreported and unregulated fishing (approved by Decree No. 267 of 2005).

The above is complemented by the requirements established to reduce incidental catches of birds in trawl fisheries. (Resolution No. 2,941 of 2019). Further the participation in the OECD Fisheries Committee, the Permanent Commission for the South Pacific (CPPS), and the APEC Working Group on Oceans and Fisheries.

Therefore, by having an effective national legal system with binding procedures governing cooperation with other parties, participating in and respecting the main international agreements, which provides management results consistent with Principles 1 and 2 of the MSC, **SG 60, SG 80 and SG 100 are therefore met.**

Resolution of disputes			
b	Guide post	<p>The management system incorporates or is subject by law to a <b>mechanism</b> for the resolution of legal disputes arising within the system.</p>	<p>The management system incorporates or is subject by law to a <b>transparent mechanism</b> for the resolution of legal disputes which is <b>considered to be effective</b> in dealing with most issues and that is appropriate to the context of the UoA.</p>
		<p>Met? <b>Yes</b></p>	<p><b>Yes</b></p>

#### Rationale

**The management system incorporates or is subject by law to a transparent mechanism for the resolution of legal disputes that is appropriate to the context of the fishery and has been tested and proven to be effective.**

#### SPRFMO

Article 34 of the Convention, on the Settlement of Disputes, states:

PI 3.1.1	<p><b>The management system exists within an appropriate legal and/or customary framework which ensures that it:</b></p> <ul style="list-style-type: none"> <li>- <b>It is capable of delivering sustainability in the UoA(s);</b></li> <li>- <b>Observes the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood; and</b></li> <li>- <b>Incorporates an appropriate dispute resolution framework</b></li> </ul> <p>1. The Contracting Parties shall cooperate with a view to avoiding disputes and shall use their best efforts to resolve any dispute by amicable means, which may include, where a dispute is of a technical nature, submitting such dispute to the decision of an ad hoc group of experts.</p> <p>2. In any case where a dispute is not resolved through the means set out in paragraph 1, the provisions relating to the settlement of disputes set out in Part VIII of the 1995 Agreement (New York Agreement) shall apply mutatis mutandis to any dispute between the Contracting Parties.</p> <p>Part VIII of the 1995 Agreement, in its Article 27, establishes that States have the obligation to resolve their disputes through negotiation, investigation, mediation, conciliation, arbitration, judicial settlement, recourse to regional bodies or arrangements or other peaceful means of their choice.</p> <p>Another mechanism for resolving objections contained in the Convention, especially for technical aspects, is established in Article 17, which states that any Member may submit an objection to the Executive Secretary regarding a decision within 60 days. In order to provide a solution, the Executive Secretary will inform all members of the Commission of the creation of a Review Panel, which will proceed in accordance with the rules for its formation and operation, established in Annex II, regarding the Review Panel. Below is the Link to two objection processes within the framework of the provisions of Article 17 of the Convention, which are considered to have been effective in solving the problem raised:</p> <p>Objection filed in 2023 by the Russian Federation  <a href="https://www.sprfmo.int/about/docs/objections/2023-russian-federation-objection-to-cmm-01-2023/">https://www.sprfmo.int/about/docs/objections/2023-russian-federation-objection-to-cmm-01-2023/</a></p> <p>Objection filed in 2018 by Ecuador  <a href="https://www.sprfmo.int/about/docs/objections/2018-ecuador-objection-to-cmm-01-2018/">https://www.sprfmo.int/about/docs/objections/2018-ecuador-objection-to-cmm-01-2018/</a></p> <p>Therefore, it is concluded that the management system incorporates or is subject by law to a transparent mechanism for the resolution of legal disputes that is appropriate to the context of the fishery and has been tested and proven effective, <b>thus complying with SG 60, SG 80 and SG 100.</b></p> <p><b>CHILE</b></p> <p>The LGPA considers different aspects to minimize conflicts of interest that may arise between fishery users, such as:</p> <p>Establishment of a 5-nautical mile strip of the country's coast and inland waters, for the exclusive use of artisanal fishing, that is, for vessels up to 18 meters in length, which qualify as artisanal (Article 47 of the LGPA). This is intended to minimize interaction and possible conflicts in the development of activity between the industrial and artisanal sectors.</p> <p>Establishment of a 1 nautical mile strip, measured from the coastline, for the exclusive use of artisanal fishermen who use vessels with an overall length of less than 12 metres (article 47 bis of the LGPA). This is intended to minimise conflicts between artisanal fishermen who use smaller vessels and larger ones.</p> <p>Fractionation by law of the catch quotas of the main hydrobiological resources that are shared between the artisanal sector and the industrial sector for a period of 20 years. (sixth transitory article of law 20.657)</p> <p>Incorporation into management plans of the power to adopt agreements that allow for the resolution of conflicts of interest that may arise (Article 8 of the LGPA)</p> <p>On the other hand, in order to resolve conflicts that may arise between users and the fishing authority, derived from the latter's actions, the following solution options are available:</p> <p>All administrative acts established by the authority may be challenged in administrative proceedings, in accordance with Law 19,880, Law of Administrative Procedure, in this case before the Undersecretariat of Fisheries, through a reconsideration appeal, and before the Minister of Economy, through a hierarchical appeal and the review appeals, considered in said law.</p>
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PI 3.1.1	<p><b>The management system exists within an appropriate legal and/or customary framework which ensures that it:</b></p> <ul style="list-style-type: none"> <li>- <b>It is capable of delivering sustainability in the UoA(s);</b></li> <li>- <b>Observes the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood; and</b></li> <li>- <b>Incorporates an appropriate dispute resolution framework</b></li> </ul>
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Administrative acts can also be challenged at the administrative headquarters before the Comptroller General of the Republic.

Likewise, any effects that may be caused by the administrative acts of the Fishing Authority may be claimed and their correction requested through the Courts of Justice, by means of the Protection Appeals.

Decisions taken at any stage, whether administrative or judicial, are binding on the administrative authority and are of a public nature.

As an example, some rulings of the Supreme Court of Justice, rulings of Protection Resources, and Resolution of the National Fishing Service and the Undersecretariat of Fishing, accepting the opinion of the courts of Justice, on problems raised by users are presented:

- **Supreme Court ruling**

<https://www.sernapesca.cl/noticias/corte-suprema-ratifica-fallo-a-favor-de-fernandes-en-multa-a-embarcacion-mayor-que-realizo-faenas-en-la-primer-milla-reservada-para-la-pequena-pesca-artesanal/>

- **Court of Appeals ruling on established sanction**

<https://www.sernapesca.cl/noticias/corte-de-apelaciones-de-antofagasta-confirma-sentencia-que-condeno-a-armador-y-patron-de-nave-por-operaciones-de-pesca-con-arte-de-cerco-en-primer-milla-maritima/>

- **Supreme Court ruling on appeal for protection**

<https://www.pjud.cl/prensa-y-comunicaciones/noticias-del-poder-judicial/98072>

- **Resolutions of the National Fisheries Service and the Undersecretariat of Fisheries that accept judicial rulings**

[https://www.subpesca.cl/portal/615/articles-121848\\_documento.pdf](https://www.subpesca.cl/portal/615/articles-121848_documento.pdf)

[https://www.subpesca.cl/portal/615/articles-121990\\_documento.pdf](https://www.subpesca.cl/portal/615/articles-121990_documento.pdf)

These conflict resolution mechanisms are transparent and have proven to be effective in resolving conflicts, whether between administrators or between administrators and the administration, therefore the evaluation team estimates that **SG 60, SG 80 and SG 100 are achieved. 100 b.**

<b>Respect for rights</b>				
c	Guide post	<p>The management system has a mechanism to <b>generally respect</b> the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood in a manner consistent with the</p>	<p>The management system has a mechanism to <b>observe</b> the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.</p>	<p>The management system has a mechanism to <b>formally commit</b> to the legal rights created explicitly or established by custom of people dependent on fishing for food and livelihood in a manner consistent with</p>

PI 3.1.1	<p><b>The management system exists within an appropriate legal and/or customary framework which ensures that it:</b></p> <ul style="list-style-type: none"> <li>- <b>It is capable of delivering sustainability in the UoA(s);</b></li> <li>- <b>Observes the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood; and</b></li> <li>- <b>Incorporates an appropriate dispute resolution framework</b></li> </ul>		
	objectives of MSC Principles 1 and 2.		
Met?	Yes	Yes	Yes

#### Rationale

**The management system has a mechanism to formally commit to the legal rights created explicitly or established by custom of people dependent on fishing for food and livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.**

#### SPRFMO

In accordance with the provisions of Articles 20 and 21 of the Convention, the participation of the members in the total allowable catch or in the total allowable effort is established considering a series of antecedents recorded in said articles. This participation has generally been established for several years; in the case of Jack mackerel, although in 2023 the percentage participation of the Members was modified, during 2024 this participation had to be revised in accordance with the report of the review panel derived from the objection of the Russian Federation in 2023, establishing a new distribution that will govern for 10 years, until 2033.

Furthermore, in addition to the preamble of the Convention, which recognizes the needs of developing States, in particular the least developed among them and small island developing States, Article 21, which establishes criteria for the distribution of total allowable catches in its letters e), f) and g), considers the aspirations, interests and needs of developing States, developing island States that depend primarily on the exploitation and capture of a straddling fishery resource in areas of national jurisdiction.

It is therefore concluded that management systems have formally committed to the explicitly created or customary legal rights of people who depend on fisheries for their food and livelihoods in a manner consistent with the objectives of MSC Principles 1 and 2, thereby **meeting SG 60, SG 80 and SG 100**.

#### CHILE

The LGPA clearly establishes the rights that each user has to carry out extractive fishing activities, depending on the regime under which the fishery is administered. It also formally and explicitly establishes the obligations that these rights generate and the sanctions and causes for their expiration, whether total or partial. The holder of an industrial fishing right is granted a resolution from the Undersecretariat of Fisheries that legally endorses his right, while the holders of artisanal fishing are granted a certificate of their registration in the artisanal Registry by the National Fisheries Service.

Tradable Fishing Licenses, LTP, the regime under which most of the national industrial fisheries are administered, are granted by a Resolution of the Undersecretariat of Fisheries and according to the law have the following characteristics: Class A LTP are obtained by historical rights of the catches made during the three years prior to their application, are granted for 20 years duration, are renewable depending on the behavior of their holder in compliance; and Class B LTP are obtained by public auction of the loss of 15% of Class A LTP, for one time only, are granted by auction for fixed periods of 20 years; are fully transferable, divisible, transmissible, and susceptible to any legal transaction.

PI 3.1.1	<p><b>The management system exists within an appropriate legal and/or customary framework which ensures that it:</b></p> <ul style="list-style-type: none"> <li>- <b>It is capable of delivering sustainability in the UoA(s);</b></li> <li>- <b>Observes the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood; and</b></li> <li>- <b>Incorporates an appropriate dispute resolution framework</b></li> </ul>
	<p>LTP holders must register the vessels with which they will exercise their rights in a registry kept by the National Fisheries Service and in both cases, they are given the right to capture each year the tons resulting from multiplying the coefficient indicated in the resolution by the quota established for the industrial sector. The law considers causes for total and partial expiration explicit in the law, either due to non-compliance or non-payment of the rights required by law.</p>
	<p>In the case of artisanal rights, both the vessels and the fishermen must be registered in an Artisanal Fishing Registry, which is maintained by the National Fishing Service by Region. Registration grants an indefinite right, transmissible and transferable between artisanal fishermen. These rights have causes for total expiration expressly established in the law.</p>
	<p>Current fisheries legislation provides, in accordance with Law 20,249, for the granting of an area called Coastal Marine Space for Native Peoples to the communities of indigenous peoples who request it. The main objective of this area is to safeguard the customary use of said spaces, in order to maintain traditions and the use of natural resources by communities linked to the coastal edge. The coastal marine space for native peoples is delivered to the community through a use agreement and during its processing, these areas have preference in their granting over other uses of said areas. According to the website of the Undersecretariat of Fisheries, from 2012 to June 2024, 24 areas of coastal marine spaces for native peoples have been granted, and there are 79 requests in different stages of processing, according to what is indicated on the electronic domain page of the Undersecretariat of Fisheries.</p>
	<p>Consistent with the above, the management system considers mechanisms to formally commit to the legal rights created for the different agents that participate in the extractive activity, and recognizes rights for people belonging to indigenous communities that depend on fishing for food as a means of livelihood. Consistent with the above, the evaluation team <b>estimates that SG60, SG 80 and SG 100 are met.</b></p>
	<p><b>References</b></p> <p>Convention on the Conservation and Management of High Seas Fishery Resources in the South Pacific Ocean. General Law on Fisheries and Aquaculture, contained in DS No. 430 of 1991, of the Ministry of Economy.</p> <p>Law 20.249, Creates the Coastal Marine Space of Indigenous Peoples</p> <p>Law 19,880, Law of Administrative Procedure.</p> <p>Decree No. 662 of 1981, of the Ministry of Foreign Affairs, promulgates the CCAMLR as law of Chile.</p> <p>Decree No. 1,393 of 1997 of the Ministry of Foreign Affairs, adheres to UNCLOS.</p> <p>Decree No. 267 of 2005 of the Ministry of Economy, approves the Action Plan to prevent, discourage and eliminate illegal, unreported and unregulated fishing.</p> <p>Decree No. 136 of 2007, of the Ministry of Economy, approves the National Action Plan to reduce incidental catches of birds in longline fisheries.</p> <p>Decree No. 198 of 2007, of the Ministry of Economy, approves the National Action Plan for the conservation of sharks.</p> <p>Decree No. 089 of 2012, of the Ministry of Foreign Affairs, Chile ratifies the South Pacific Regional Fisheries Organization.</p> <p>Decree No. 031 of 2016, of the Ministry of Foreign Affairs, promulgates the New York Agreement.</p> <p>Resolution No. 2,941 of 2019, of the Undersecretariat of Fisheries, establishes measures to reduce the incidental capture of seabirds in trawl fisheries.</p>

PI 3.1.1	<p><b>The management system exists within an appropriate legal and/or customary framework which ensures that it:</b></p> <ul style="list-style-type: none"> <li>- <b>It is capable of delivering sustainability in the UoA(s);</b></li> <li>- <b>Observes the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood; and</b></li> <li>- <b>Incorporates an appropriate dispute resolution framework</b></li> </ul>		
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#### Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Individual scoring elements (add rows as required; delete if not scored by elements)	Applicable SGs likely met per individual scoring element			Likely scoring element scores	
	SG60	SG80	SG100		
1 UoA 1	3 of 3	3 of 3	3 of 3	<u>Likely overall PI score</u>	
Draft scoring range	Applicable SGs/elements <u>likely</u> met				
	SG60	SG80	SG100		
	3 of 3	3 of 3	3 of 3	≥80	
Information gap indicator	Information sufficient to score PI				

#### Overall Performance Indicator scores added from Client and Peer Review Draft Report

Individual scoring elements (add rows as required; delete if not scored by elements)	Applicable SGs met per individual scoring element			Scoring element scores
	SG60	SG80	SG100	
1 Scoring element 1	X of x	X of x	X of x	
2 Scoring element 2	X of x	X of x	X of x	
3 Scoring element 3	X of x	X of x	X of x	
4 Scoring element 4	X of x	X of x	X of x	
Overall Performance Indicator score	Applicable SGs/elements met			Overall score
	SG60	SG80	SG100	
	X of x	X of x	X of x	
Condition number (if relevant)				

### PI 3.1.2 – Consultation, roles and responsibilities

PI 3.1.2		<b>The management system has effective consultation processes that are open to interested and affected parties</b> <b>The roles and responsibilities of organizations and individuals who are involved in the management process are clear and understood by all relevant parties</b>		
Scoring Issue		SG 60	SG 80	SG 100
<b>Roles and responsibilities</b>				
<b>to</b>	Guide post	Organizations and individuals involved in the management process have been identified. Functions, roles and responsibilities are <b>generally understood</b> .	Organizations and individuals involved in the management process have been identified. Functions, roles and responsibilities are <b>explicitly defined and well understood for key areas of responsibility and interaction</b> .	Organizations and individuals involved in the management process have been identified. Functions, roles and responsibilities are <b>explicitly defined and well understood for all areas of responsibility and interaction</b> .
	Met?	Yes	Yes	Yes

#### Rationale

**Organizations and individuals involved in the management process have been identified. Functions, roles and responsibilities are explicitly defined and well understood for all areas of responsibility and interaction.**

#### SPRFMO

Several articles of the Convention clearly define the functions, roles and responsibilities of members and cooperating non-members. Articles: (6) The Organization; (7) The Commission; (8) Functions of the Commission; (9) Subsidiary bodies; (10) Scientific Committee; (11) Technical and Compliance Committee; (12) Eastern and Western Subregional Management Committees; (13) Administration and Finance Committee; (14) Secretariat. In detail in Point 7.4.1 letter a) of this report.

Therefore, it is concluded that organizations and people involved in the management process have been identified. Functions, roles and responsibilities are explicitly defined and well understood for all areas of responsibility and interaction, complying with **SG60, SG80 and SG100**.

#### CHILE

The LGPA expressly establishes the roles, functions and responsibilities of each of the institutions that participate in the management of fisheries, be they government institutions such as the Ministry of Economy, Development and Tourism, the Undersecretary of Fisheries, the National Fisheries Service, the Fisheries Development Institute, and the Fisheries Research Fund, as well as the administration's advisory bodies, consisting of Management Committees, Scientific Technical Committees, the National Fisheries Council and the 8 Zonal Fisheries Councils.

The functions and powers in fisheries matters of the Ministry of Economy, the Undersecretariat of Fisheries and the National Fisheries Service are contained in Decree Law No. 2,442 of 1978, which establishes them, complemented by the provisions of the LGPA and Law 21,132.

The functions and powers of the Fisheries Development Institute related to management are contained in article 158 of the LGPA, while those of the Fisheries Research Fund are contained in paragraph 2 of Title VII of the LGPA.

Regarding the advisory bodies, their functions, composition and powers are contained in the LGPA, Management Committees (Paragraph 3, Title II of the LGPA); Scientific Technical Committees (Paragraph 3, Title XII of the LGPA), National Fisheries Council and Zonal Fisheries Councils (Paragraphs 1 and 2, Title XII of the LGPA). Their members and the minutes

PI 3.1.2	<b>The management system has effective consultation processes that are open to interested and affected parties</b> <b>The roles and responsibilities of organizations and individuals who are involved in the management process are clear and understood by all relevant parties</b>
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of their meetings are available on the website of the Undersecretariat of Fisheries. The way to nominate their members is contained in Regulations. (Supreme Decree No. 85 of 2003 and its amendments, of the Ministry of Economy and Supreme Decree No. 453 of 1992 and its amendments, of the Ministry of Economy.)

For each of these organizations, the law itself establishes its functions, the term of office of its members, as well as its composition and participation of the agents that comprise it, which is complemented by regulations to determine the procedure, requirements and the manner of electing its members. The processes for electing the members of each of these entities are absolutely transparent and public.

In the background point 7.4.1 letter a) of this report, the functions and roles of each of the entities participating in the management are indicated.

Functions, roles and responsibilities are explicitly defined and well understood, so that stakeholders know how the management system works and the roles of each of the organizations involved in it, and if they have any questions or queries, they know where to go. Therefore, the assessment team estimates that **SG60, SG80 and SG 100a are met**.

Consultation processes				
<b>b</b>	<b>Guide post</b>	The management system includes consultation processes that <b>obtain relevant information</b> from the main affected parties, including local knowledge, to inform the management system.	The management system includes consultation processes that <b>regularly seek and accept</b> relevant information, including local knowledge. The management system demonstrates consideration of the information obtained.	The management system includes consultation processes that <b>regularly seek and accept</b> relevant information, including local knowledge. The management system demonstrates consideration of the information and <b>explains how it is used or not used</b> .
	Met?	<b>Yes</b>	<b>Yes</b>	<b>No</b>

#### Rationale

**The management system includes consultation processes that regularly seek and accept relevant information, including local knowledge. The management system demonstrates consideration of the information obtained.**

#### SPRFMO

Meetings of all Convention bodies provide the consultative mechanism for Contracting Parties to share information on fisheries management. The process allows for annual national reports, which take into account local knowledge (specific to each Member), to be reviewed and included in meetings of both the different Committees and the Commission.

Each year, scientists from Contracting Parties are invited to present their latest results to the Working Groups and Committees, as appropriate.

The minutes of the Commission's meetings, as well as the minutes and reports of all advisory and subsidiary bodies of the Commission, are published on the Convention's website.

It is concluded that the management system considers consultation processes that regularly seek and accept relevant information, including local knowledge through which reports submitted by Members, the management system demonstrates consideration of the information obtained. Therefore, **SG 60 and SG 80 are met**. **SG 100** is not met because the management system does not specify how the information provided is used or not.

PI 3.1.2	<p><b>The management system has effective consultation processes that are open to interested and affected parties</b></p> <p><b>The roles and responsibilities of organizations and individuals who are involved in the management process are clear and understood by all relevant parties</b></p>
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#### CHILE

The LGPA establishes the consultation procedures for the different advisory institutions for the adoption of the different administration and management measures, either through consultations or requests for technical reports, which the authority must take into consideration and in some cases are mandatory when adopting a management measure.

In the consultation processes, relevant information is collected, such as that provided by the scientific-technical committees. All the information provided by the different bodies is available on the website of the Undersecretariat of Fisheries.

For the adoption of measures such as closed seasons, temporary or permanent prohibition of capture of species protected by international conventions, quotas, determination of marine parks and marine reserves, landing percentages as Bycatch, in addition to the technical report of the Undersecretary of Fisheries, the measure must be previously communicated to the corresponding Technical Scientific Committee (CCT). Some of the measures must also be reported to the National Fisheries Council, such as, for example, the quota allocated for research in each fishing unit.

The CCT is responsible for proposing the range within which the authority can establish the quota for a calendar year, as well as the biological reference points of the fishery.

For measures such as: minimum extraction sizes, dimensions and characteristics of fishing gear and tackle, use and carrying of devices to minimize the capture of bycatch, use and carrying of utensils to release incidental catch, the Undersecretary of Fisheries must, before establishing them, consult with the corresponding Zonal Fisheries Council and previously communicate them to the corresponding Scientific Technical Committee.

For the measures that regulate Vulnerable Marine Ecosystems, the Minister may establish them based on a technical report from the Undersecretary of Fisheries and prior communication to the corresponding Zonal Fisheries Council.

The determination of the resources whose fisheries qualify as bottom fishing, which may affect Vulnerable Marine Ecosystems, is carried out in accordance with the determination made by the corresponding Scientific Technical Committee.

The Undersecretariat of Fisheries may consult the CCTs regarding the design of management and conservation measures and the formulation of Management Plans. For its reports, the CCT must consider the information provided by the IFOP, as well as that from other sources. Therefore, **SG 60 and SG 80b are complied with**.

The management system includes consultation processes that regularly seek and accept relevant information, including local knowledge, but the management system cannot demonstrate consideration of the information and explain how it is used or not used, therefore the assessment team assesses that **SG 100b is not met**.

Participation				
c	Guide post	The consultation process provides opportunity for all interested and affected parties to be involved.	The consultation process provides opportunity and encouragement for all interested and affected parties to be involved, and facilitates their effective engagement.	
	Met?	<b>Yes</b>	<b>No</b>	

#### Rationale

**The consultation process provides opportunity for all interested and affected parties to be involved**

#### SPRFMO

The Convention promotes participation in the Commission, allowing one representative who may be accompanied by expert representatives and advisors (Article 7). The same situation occurs in subsidiary bodies, such as the Scientific

PI 3.1.2	<b>The management system has effective consultation processes that are open to interested and affected parties</b> <b>The roles and responsibilities of organizations and individuals who are involved in the management process are clear and understood by all relevant parties</b>
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Committee, the Technical and Compliance Committee, the Eastern and Western Subregional Planning Committees, the Administration and Finance Committee, and in all those subsidiary bodies that are created temporarily or permanently, the representative may participate, who may be accompanied by alternate representatives and advisors.

The Commission shall also promote transparency in the decision-making processes and other activities of the Convention and therefore the Commission and its subsidiary bodies are open to all registered participants and observers (Article 18). It is further provided that non-Contracting Parties, relevant intergovernmental and non-governmental organizations, including environmental organizations and fisheries industry organizations with an interest in matters relating to the Commission, shall have the opportunity to participate in meetings of the Commission and its subsidiary bodies as observers.

It is concluded that the consultation process provides the opportunity and incentive for all interested and affected parties to get involved, facilitating the consideration of their effective participation, **thus complying with SG80 and SG100**.

#### **CHILE**

The LGPA provides the opportunity and encourages interested and affected parties to participate in management through fishery Management Committees, Scientific Technical Committees per fishery or group of fisheries, the National Fisheries Council and the 8 Zonal Fisheries Councils.

Interested parties, such as representatives of the industrial and artisanal extractive sectors and processing plants, can participate through the National Fisheries Council, the Zonal Fisheries Councils and the Management Committees.

Researchers or scientists from universities with careers related to marine sciences, as well as researchers from research centres, can participate through the National Fisheries Council, the Zonal Fisheries Councils and the Scientific Technical Committees.

NGO representatives can participate through the Zonal Fisheries Councils and the National Fisheries Council.

Scientists specializing in fisheries management may participate in the Scientific Technical Committees.

Scientists from the Fisheries Development Institute participate through the Technical Scientific Committees.

The National Fisheries Service, in its capacity as supervisory body, participates through the National Fisheries Council, the Zonal Fisheries Councils and the Management Committees.

The members of the National Fisheries Council may bring to the attention of the authorities the facts that, in their opinion, affect fishing activities, resources and their environment. They may also, by majority vote, request initiatives from the Undersecretary of Fisheries, in any matter within their competence, a request that may only be denied by a reasoned Resolution of the Undersecretary of Fisheries.

By amending the Regulations that establish the operation of the Scientific Technical Committees, the obligation has been established for the scientific technical committee to consider a meeting with the corresponding management committee within its annual program of activities. (Decree No. 87 of 2015 of the Ministry of Economy).

Following the amendment to the Fisheries Law in early 2013, which created the Management Committees and the Scientific-Technical Committees, 38 Management Committees have been established to date, of which 21 correspond to benthic resources exploited exclusively by the artisanal sector and 17 Management Committees for crustacean and fish fisheries, exploited by both the artisanal and industrial sectors. All the Scientific Committees are active and functioning. These last two instances of participation, especially the Management Committees, have reduced interest in participating in the Zonal Fishing Councils, since the functions and roles of the Management Committees are of greater relevance in the resource management process. This has meant that at least 3 Zonal Fishing Councils, according to the information available on the website of the Undersecretariat of Fisheries as of June 2024, do not have a quorum to hold sessions.

PI 3.1.2	<b>The management system has effective consultation processes that are open to interested and affected parties</b> <b>The roles and responsibilities of organizations and individuals who are involved in the management process are clear and understood by all relevant parties</b>					
Considering that the organizations and personnel participating in the management process are well defined, the law establishes functions, roles and responsibilities that are expressly defined and have been well understood, the consultation procedure offers the possibility for all those affected and interested to participate, and <b>SG 80 is complied with.</b>						
Regarding the low participation in the CZP, although the authority has modified some rules to facilitate the application for vacant positions, according to the website of the Undersecretariat of Fisheries, to date in some councils there is a significant number of vacancies, which is why <b>the SG 100 is not reached.</b>						
<b>References</b>						
Convention on the Conservation and Management of High Seas Fishery Resources in the South Pacific Ocean. LGPA, contained in DS No. 430 of 1991, of the Ministry of Economy. Decree Law No. 2,442 of 1978 establishes the functions and powers in fisheries matters of the Ministry of Economy, the Undersecretariat of Fisheries and the National Fisheries Service. Decree No. 453 of 1992, of the Ministry of Economy, establishes the election of members of the Zonal Fishing Councils. Decree No. 85 of 2003, of the Ministry of Economy, establishes regulations for the election of the advisors to the National Fisheries Council. Decree No. 77 of 2013 of the Ministry of Economy establishes the nomination procedure and operation of the Scientific Technical Committees. Decree No. 87 of 2015, modifies Decree No. 77 of 2013, of the Ministry of Economy, establishes the operation of the CCT. Decree No. 95 of 2013, of the Ministry of Economy and its amendments, establishes the method of designation of the members of the management committees and operating rules.						

#### Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Individual scoring elements (add rows as required; delete if not scored by elements)	Applicable SGs likely met per individual scoring element			<u>Likely scoring element scores</u>
	SG60	SG80	SG100	
1 UoAS 1	2 of 2	3 of 3	1 of 3	
<u>Applicable SGs/elements likely met</u>				<u>Likely overall PI score</u>
Draft scoring range	SG60	SG80	SG100	
	2 of 2	3 of 3	1 of 3	≥80
Information gap indicator	Information sufficient to score PI			

#### Overall Performance Indicator scores added from Client and Peer Review Draft Report

Individual scoring elements (add rows as required; delete if not scored by elements)	Applicable SGs met per individual scoring element			<u>Scoring element scores</u>
	SG60	SG80	SG100	
1 Scoring element 1	X of x	X of x	X of x	
2 Scoring element 2	X of x	X of x	X of x	

PI 3.1.2		<b>The management system has effective consultation processes that are open to interested and affected parties</b> <b>The roles and responsibilities of organizations and individuals who are involved in the management process are clear and understood by all relevant parties</b>			
3	Scoring element 3	X of x	X of x	X of x	
4	Scoring element 4	X of x	X of x	X of x	
Overall Performance Indicator score		Applicable SGs/elements met			Overall score
		SG60	SG80	SG100	
		X of x	X of x	X of x	
Condition number (if relevant)					

### PI 3.1.3 – Long term objectives

PI 3.1.3		<b>The management policy has clear long-term objectives to guide decision-making that are consistent with MSC Fisheries Standard, and incorporates the precautionary approach</b>		
Scoring Issue		SG 60	SG 80	SG 100
to	<b>Objectives</b>			
	Guide post	Long-term objectives to guide decision-making, consistent with the MSC Fisheries Standard and the precautionary approach, are <b>implicit</b> within management policy.	<b>Clear</b> long-term objectives that guide decision-making, consistent with MSC Fisheries Standard and the precautionary approach are <b>explicit</b> within management policy.	<b>Clear</b> long-term objectives that guide decision-making, consistent with MSC Fisheries Standard and the precautionary approach, are <b>explicit</b> within <b>and required by</b> management policy.
	Met?	Yes	Yes	Yes

#### Rationale

**Clear long-term objectives that guide decision-making, consistent with MSC Fisheries Standard and the precautionary approach, are explicit within and required by management policy.**

#### SPRFMO

The objective of the Convention, according to its article 2, is to ensure the long-term conservation and sustainable use of fishery resources by applying the precautionary approach and an ecosystem approach to fisheries management, and in doing so, safeguard the marine ecosystems in which these resources exist.

Article 3 establishes the Principles and criteria for conservation and management, to carry out decision-making in accordance with this Convention, taking into consideration the following principles to carry out the conservation and management of resources:

In a transparent, responsible and inclusive manner, taking into account international best practices;

Fishing is carried out in a manner consistent with the sustainable use of fishery resources, including impacts on non-target and associated or dependent species and the protection and preservation of the marine environment;

Overfishing and excess fishing capacity will be avoided or eliminated;

Accurate data on fisheries, including impacts on marine ecosystems, must be collected, verified, reported and shared;

Decisions should be based on the best available scientific and technical information and on reports from subsidiary bodies.

Promote cooperation and coordination to ensure compatibility of management measures between different jurisdictions;

Protect marine ecosystems, especially those with long recovery times after disturbance.

Recognize the interests of developing States and their coastal communities;

Ensure compliance with conservation and management measures and apply appropriately severe sanctions to discourage non-compliance; and

The application of the precautionary approach and an ecosystem approach.

It is estimated that the long-term objectives are clear and guide decision-making, in line with Principles 1 and 2 of the MSC fisheries standard and the precautionary approach, are explicit, **thus complying with SG 60, SG 80 and SG 100**.

#### CHILE

Article 1º B of the LGPA establishes that the objective of fisheries regulation is the conservation and sustainable use of hydrobiological resources, through the application of the precautionary approach and an ecosystemic approach in fisheries regulation and the safeguarding of marine ecosystems in which these resources exist.

PI 3.1.3	<b>The management policy has clear long-term objectives to guide decision-making that are consistent with MSC Fisheries Standard, and incorporates the precautionary approach</b>
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For its part, Article 1º C of the LGPA expressly and explicitly establishes that, in order to achieve the conservation and sustainable use of hydrobiological resources, the fishing authority must always take into account the following considerations when adopting management and administration measures, as well as when interpreting and applying the law:

- a) Establish long-term objectives for the conservation and management of fisheries and the protection of their ecosystems, as well as the periodic evaluation of the effectiveness of the measures adopted.
- b) Apply the precautionary principle in the management and conservation of hydrobiological resources and the protection of their ecosystems, meaning: i) Greater caution should be exercised in the management and conservation of resources when scientific information is uncertain, unreliable or incomplete, and ii) Lack of sufficient, unreliable or incomplete scientific information should not be used as a reason for postponing or not adopting conservation and management measures.
- c) Consider the impact of fishing on associated or dependent species and the preservation of the aquatic environment.
- d) minimize the discarding of both target species and Bycatch and the capture of incidental fishing.

Furthermore, Article 3, letter c) of the LGPA states that, when establishing the annual catch quota, it must always take or maintain the fishery to the maximum sustainable yield.

The long-term objectives are clear and guide decision-making, are consistent with the MSC fisheries standard, and the precautionary approach is explicit within the management policy and for this reason the assessment team estimates that **SG60, SG80 and SG100a are achieved**.

#### References

- General Law on Fisheries and Aquaculture, contained in Supreme Decree 430 of 1991 of the Ministry of Economy.
- Convention on the Conservation and Management of High Seas Fishery Resources in the South Pacific Ocean.

#### Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Individual scoring elements (add rows as required; delete if not scored by elements)		Applicable SGs likely met per individual scoring element			Likely scoring element scores
		SG60	SG80	SG100	
1 UoAS1	1 of 1	1 of 1	1 of 1		
	Applicable SGs/elements <u>likely</u> met				<u>Likely</u> overall PI score
	SG60	SG80	SG100	1 of 1	
Information gap indicator		1 of 1	1 of 1	1 of 1	≥80
		Information sufficient to score PI			

#### Overall Performance Indicator scores added from Client and Peer Review Draft Report

Individual scoring elements (add rows as required; delete if not scored by elements)		Applicable SGs met per individual scoring element			Scoring element scores
		SG60	SG80	SG100	
1 Scoring element 1	X of x	X of x	X of x	X of x	
2 Scoring element 2	X of x	X of x	X of x	X of x	

PI 3.1.3		<b>The management policy has clear long-term objectives to guide decision-making that are consistent with MSC Fisheries Standard, and incorporates the precautionary approach</b>			
3	Scoring element 3	X of x	X of x	X of x	
4	Scoring element 4	X of x	X of x	X of x	
Overall Performance Indicator score		Applicable SGs/elements met			Overall score
		SG60	SG80	SG100	
		X of x	X of x	X of x	
Condition number (if relevant)					

### PI 3.2.1 – Fishery-specific objectives

PI 3.2.1		<b>The fishery-specific management system has clear, specific objectives designed to achieve the outcomes expressed by MSC's Principles 1 and 2</b>		
Scoring Issue		SG 60	SG 80	SG 100
Objectives				
to	Guide post	<b>Objectives</b> , which are broadly consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are <b>implicit</b> within the fishery-specific management system.	<b>Short and long-term objectives</b> , which are consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are <b>explicit</b> within the fishery-specific management system.	<b>Well defined and measurable short and long-term objectives</b> , which are demonstrably consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are <b>explicit</b> within the fishery-specific management system.
	Met?	Yes	Yes	Yes

#### Rationale

**Well defined and measurable short and long-term objectives , which are demonstrably consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are explicit within the fishery-specific management system.**

#### SPRFMO

The main conservation and management measure for jack mackerel, MMC 01, established every year in its preamble, considers: the commitment to apply the precautionary approach and make decisions based on the best technical and scientific information available; that the measure adopted has the main function of achieving the objective of the Convention; the commitment to recover the jack mackerel population and ensure its long-term conservation and sustainable management; and guarantee the compatibility of the measures established by the Commission with those established in the areas of national jurisdiction of a contracting party.

In 2014, the Commission (COMM02) adopted Annex K, which contains the HCRs still in force, as a rebuilding plan for jack mackerel, in which it was established that in no case can the quota for one year vary by more than 15% (adjusted Annex K).

**PI 3.2.1**
**The fishery-specific management system has clear, specific objectives designed to achieve the outcomes expressed by MSC's Principles 1 and 2**

CMM 01 is reviewed by the Commission annually in accordance with the recommendations of the Scientific Committee and the other subsidiary bodies, in compliance with the general objectives of the Convention established in its Article 3.

The objectives for the jack mackerel population are considered to be well defined and measurable in the short and long term, have proven to be consistent with the objective of recovering the jack mackerel population and are consistent with the results expressed in Principle 1 and 2, therefore the evaluation team estimates that **SG 60, SG 80 and SG 100 are met.**

**CHILE**

The LGPA establishes that it is the responsibility of the Management Plans to establish the short- and long-term objectives for the sustainable management of fisheries. The Management Plan for the Jack Mackerel fishery was prepared by the Management Committee and reviewed by the Scientific Technical Committee, and made official by Resolution No. 4,344 of 2017 of the Undersecretariat of Fisheries; it establishes the Purposes, Goals and Objectives of the Management Plan, where the Purpose is "To recover and maintain the jack mackerel fishery, biologically, economically, socially and ecologically at sustainable levels."

To achieve this purpose, the following Goals are established.

- Biological Goal: Maintain spawning biomass and catch levels that allow the fishery to recover to sustainable levels in the medium and long term.
- Ecological Goal: Incorporate an approach to adapting the fishery to environmental changes into jack mackerel management; Reduce discards and implement mitigation measures; and Minimize the impact of human activity on the jack mackerel fishery.
- Economic Goal: Optimize economic returns from the jack mackerel fishery.
- Social Goal: Achieve levels of fishery recovery that allow for job stability and increased employment and its benefits, with the full knowledge of the stakeholders.

To achieve the desired changes in the fishery for the different Goals, the management plan considers a series of operational objectives associated with management standards with which the progress of the different objectives will be measured.

Regarding Principle 1, to achieve the goal of the biological dimension, the objective is established to maintain a spawning biomass and capture levels that allow a recovery of the fishery to levels of sustainability in the medium and long term , considering the biological reference points Resolution No. 705 of 2023, which modifies Resolution No. 291 of 2015, established at the proposal of the Scientific Technical Committee in:

$$F_{RMS} = 0.59$$

$$BD_{RMS} = 7.164 \text{ (30\%BD)}_0$$

$$BD_{limit} = 2.203 \text{ (9\%BD)}_0$$

The management actions to be applied for the biological area are the Capture Quota.

Regarding Principle 2, in order to achieve the goal of the environmental dimension, several objectives are established, among which the progressive reduction of discards in the fishery stands out. To this end, the Plan for the Reduction of Discards and Incidental Catches for the Industrial and Artisanal Jack mackerel Fisheries was established. This Plan was made official by Resolution No. 1,626 of 2019 of the Undersecretariat of Fisheries and the mandatory return of chondrichthyans was established by Resolution No. 2,063 of 2020 for the purse seine, trawl, longline or gillnet fisheries.

Consistent with the above, it is estimated that the short- and long-term objectives of the jack mackerel fishery are consistent with achieving the results expressed by Principles 1 and 2 of the MSC, are explicit in the Management Plan and in the Discard Reduction Plan and quantifiable, therefore, the assessment team estimates that **SG 60, SG 80 and SG 100a are met.**

PI 3.2.1	<b>The fishery-specific management system has clear, specific objectives designed to achieve the outcomes expressed by MSC's Principles 1 and 2</b>					
References						
<p>Convention on the Conservation and Management of Fishery Resources in the High Seas in the South Pacific Ocean. General Law on Fisheries and Aquaculture and its amendments, contained in Decree 430 of 1991, of the Ministry of Economy.</p> <p>Resolution No. 4,344 of 2017, of the Undersecretariat of Fisheries, establishes the Management Plan for the Jack mackerel Fishery.</p> <p>Resolution No. 1,626 of 2019, of the Undersecretariat of Fisheries, establishes the Plan for Reducing Discards in Jack mackerel Fisheries</p> <p>Resolution No. 2,063 of 2020, of the Undersecretariat of Fisheries, establishes the mandatory return of chondrichthyans.</p> <p>Resolution No. 705 of 2023, of the Undersecretariat of Fisheries, establishes the PBR of Jack mackerel.</p>						
<b>Draft scoring range and information gap indicator added at Announcement Comment Draft Report</b>						
Individual scoring elements (add rows as required; delete if not scored by elements)		Applicable SGs likely met per individual scoring element				
1 UoAS1		SG60	SG80	SG100	Likely scoring element scores	
Draft scoring range		1 of 1	1 of 1	1 of 1		
		Applicable SGs/elements <u>likely</u> met		<u>Likely</u> overall PI score		
Draft scoring range		SG60	SG80	SG100		
		1 of 1	1 of 1	1 of 1	≥80	
Information gap indicator		Information sufficient to score PI				

#### Overall Performance Indicator scores added from Client and Peer Review Draft Report

Individual scoring elements (add rows as required; delete if not scored by elements)		Applicable SGs met per individual scoring element			Scoring element scores
1 Scoring element 1		X of x	X of x	X of x	
2 Scoring element 2		X of x	X of x	X of x	
3 Scoring element 3		X of x	X of x	X of x	
4 Scoring element 4		X of x	X of x	X of x	
Overall Performance Indicator score		Applicable SGs/elements met			Overall score
		SG60	SG80	SG100	
		X of x	X of x	X of x	
Condition number (if relevant)					

## PI 3.2.2 – Decision-making processes

PI 3.2.2		<b>The fishery-specific management system includes effective decision-making processes that result in measures and strategies to achieve the objectives, and has an appropriate approach to current disputes in the fishery</b>		
Scoring Issue		SG 60	SG 80	SG 100
<b>Decision-making processes</b>				
<b>to</b>	<b>Guide post</b>	There are <b>some</b> decision-making processes in place that result in measures and strategies to achieve the fishery-specific objectives.	There are <b>established</b> decision-making processes that result in measures and strategies to achieve the fishery-specific objectives.	
Met?	Yes	Yes		

### Rationale

**There are established decision-making processes that result in measures and strategies to achieve the fishery-specific objectives**

#### SPRFMO

Article 16 of the Convention on Decision-Making provides that decisions of the Commission shall be adopted by consensus, which means that there is no formal objection at the time of making the decision. Except when the Convention provides that a decision shall be adopted by consensus, if the President considers that efforts to reach consensus have been exhausted, he may:

In decisions of the Commission on matters relating to procedure, the majority of the members of the Commission shall take them. In decisions on matters of substance, the majority shall take them. If doubts arise as to whether a matter is a matter of substance or not, that matter shall be treated as a matter of substance.

Consistent with the above, and considering that all decisions of the Convention are adopted by the Commission, the decision-making process applicable to Jack mackerel is that indicated in the previous paragraphs, with the advice of the Scientific Committee.

For its part, decisions on the jack mackerel fishery in the Scientific Committee, in accordance with Article 10 of the Convention, when the Scientific Committee cannot provide advice to the Commission by consensus, it will establish in its report the different opinions of its members.

It is concluded that there are established decision-making processes that result in measures and strategies to achieve the specific objectives of the fishery; it is estimated that **SG 60 and SG 80 are met**.

#### CHILE

The decision-making process for the jack mackerel fishery for the adoption of management measures and the strategies to achieve the specific objectives of this fishery are explicitly defined in the LGPA, in the management plan and in the discard reduction plan of the fishery.

The LGPA establishes the participation of each of the public institutions and auxiliary bodies of the administration, such as the Fisheries Councils, the southern hake management committee and the scientific-technical committee on demersal resources in the southern Austral zone.

The Ministry of Economy is responsible for establishing the management measures assigned to it by law, establishing the regulations of the law, and ensuring the quality of the research, submitting IFOP research reports to review by external

PI 3.2.2	<b>The fishery-specific management system includes effective decision-making processes that result in measures and strategies to achieve the objectives, and has an appropriate approach to current disputes in the fishery</b>
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evaluators in order to determine whether they comply with the technical terms of reference and the technical quality of the research.

The Undersecretariat is responsible for establishing management measures, requesting information, establishing the annual research program, financing it, establishing the technical terms of the projects to be contracted, and requesting the opinion of the corresponding scientific-technical committee on the different management measures.

The management committee is responsible for preparing the management plan and reviewing it.

The scientific-technical committee for demersal resources in the southern Austral zone, in addition to giving its opinion on the design of management measures and on the formulation of the Management Plan, is responsible for establishing the Biological Reference Points and the range of the catch quota, where both its lower and upper limits proposed must take or maintain the fishery to the MSY.

Consistent with the above, decision-making processes are established and management measures and strategies to achieve the objectives of the fishery are derived from them. Therefore, the evaluation team estimates that **SG 60 and SG 80a are met**.

Responsiveness of decision-making processes				
<b>b</b>	<b>Guide post</b> Decision-making processes respond to serious issues identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take some account of the wider implications of decisions.	<b>Decision-making processes respond to serious and other important issues identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take account of the wider implications of decisions.</b>	<b>Decision-making processes respond to all issues identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take account of the wider implications of decisions.</b>	
Met?	<b>Yes</b>	<b>Yes</b>	<b>No</b>	

#### Rationale

**Decision-making processes respond to serious and other important issues identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take account of the wider implications of decisions.**

#### SPRFMO

When the Regional Fisheries Organization was established, the jack mackerel fishery was at its lowest reproductive biomass. Consequently, a fishery reconstruction plan was established to ensure continued growth of the reproductive population, considering that this situation was a serious and important problem. The management measures established by the Commission have contributed to reversing this situation.

The Commission reviews the various conservation and management measures established annually, with the advice of the Commission's Subsidiary Bodies, which are reflected in the introduction of amendments to the annual measures, such as CMM 01, which establishes the total allowable quota for the entire Convention Area and its percentage allocation to Members.

**PI 3.2.2**
**The fishery-specific management system includes effective decision-making processes that result in measures and strategies to achieve the objectives, and has an appropriate approach to current disputes in the fishery**

Accordingly, it is estimated that the decision-making processes respond to serious and other important issues identified in the investigation and monitoring and relevant consultations in a transparent and timely manner, taking into consideration the implications of said decisions. Accordingly, it is estimated that **SG 60 and SG 80 are met. SG100 is not met** because there is no evidence that the decision-making process responds to all the issues identified.

**CHILE**

One of the problems that existed in this fishery, as in others, was the discarding of target and non-target species. As a result, the authority passed a law to regulate it (Law 20,625). Then, during the years 2015 to 2018, a research program was carried out in the jack mackerel fishery with the participation of industrial and artisanal fleets, with the aim of identifying the reasons for the discarding (Resolution No. 524 of 2015 and its amendments). With this information, in April 2019, (Resolution 1626 of 2019) the Fishery Discard Reduction Program was established and during 2019 and early 2020, prior to the entry into force of the image recording cameras on board industrial vessels in January 2000, the Undersecretariat of Fisheries modified a series of fishery regulations, which had an impact on the discard detected in the investigation, in order to reduce discards in the jack mackerel fishery, including:

- Resolution No. 3,200 of 2013, which establishes the species associated with fishery units managed with LTP or PEP. Amended by Resolution No. 3,986 of 2019, incorporating species that were not permitted to be landed and were therefore discarded.
- Resolution No. 3,115 of 2013, which establishes the target species and their associated species by region for artisanal species. Amended by Resolution No. 2,747 of 2019, incorporating species that were not permitted to be landed and were therefore discarded.
- Decree No. 411 of 2000, which establishes landing percentages of species as bycatch, was replaced by Decree No. 45 of 2020, which defines the percentages of bycatch in industrial and artisanal fisheries using trawl gear, for southern hake, among others.
- Decree No. 458 of 1981, which establishes the minimum size of jack mackerel, was modified by Resolution No. 903 of 2000, which established that the percentage under size allowed was to be measured per month and not per fishing trip.
- Resolution No. 862 of 2021 establishes the regulation for transferring catch at sea from one vessel to another, so that, if the catch exceeds the hold, it can be transferred to another vessel and not discarded.

Likewise, a Resolution establishes annually the list of species, whether they are targets or not, that can be discarded, as well as the treATFent that should be given to species of immediate return and incidental capture, taking into consideration the research carried out on the monitoring of discards and incidental capture. Since the establishment of the Discard Reduction Plan, the follow-up and monitoring of discards and incidental capture in pelagic fisheries has been incorporated into the Research Program.

The main management measure applied to jack mackerel fisheries is the global catch quota; Consequent on the above, in order to determine said measure, the Undersecretariat of Fisheries prepares an annual research program, with the aim of having the necessary information to establish the catch quota for the following year, which in the case of this fishery contains at least the following research projects for 2024: Research and Monitoring Program on the discard and incidental catch of pelagic species, Monitoring program for the main national fisheries 2024, pelagic fisheries, Monitoring Program, Status, Indirect stock assessments and possibilities for biologically sustainable exploitation 2025. Hydroacoustic assessment of jack mackerel from the northern border of the country to region X (Research Program for 2024, Resolution No. 2098 of 2023 of the Undersecretariat of Fisheries).

According to the LGPA, the Technical Scientific Committee on Jack Mackerel is responsible for establishing the status of the fishery annually, taking into account the Biological Reference Points, the provisions of the management plan, and the information from the research carried out by IFOP, as well as that from other sources, and proposing the range in which the biologically sustainable quota, CBS, can be established for the following year, which must always take or maintain the fishery to the MSY. However, in the case of the Jack Mackerel fishery, the quota that Chile initially establishes must be compatible with that established by the Commission. All the information from the technical scientific committee is contained in the Minutes and technical reports, available on the website of the Undersecretariat of Fisheries.

PI 3.2.2	<b>The fishery-specific management system includes effective decision-making processes that result in measures and strategies to achieve the objectives, and has an appropriate approach to current disputes in the fishery</b>		
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Consistent with the above, it is estimated that the decision-making processes regarding the fishery respond to serious and other important issues, identified in the research, monitoring, and evaluations, in a transparent and timely manner, for which reason the evaluation team estimates that **SG60, SG80 and SG100b are met**.

Use of precautionary approach			
c	Guide post	Decision-making processes use the precautionary approach and are based on best available information.	
	Met?	Yes	

#### Rationale

**Decision-making processes use the precautionary approach and are based on best available information.**

#### SPRFMO

According to Article 2 of the Convention, its general objective is to ensure the long-term conservation and sustainable use of fishery resources by applying the precautionary approach and an ecosystemic approach to fisheries management. Likewise, Article 3, which establishes the principles to be considered in decision-making, establishes the application of the precautionary approach and an ecosystemic approach in the terms established in the second paragraph of the same article.

Regarding the jack mackerel fishery, in the preamble to the Conservation and Management Measures for jack mackerel (CMM 01 of each year) as a second aspect it is stated, "Bearing in mind the commitment to apply the precautionary approach and make decisions based on the best technical and scientific information available, as indicated in Article 3 of the Convention."

Another aspect in which the precautionary approach to jack mackerel management is considered is in the application of the Catch Control Tool, established in Annex K of the COMM02 report of the Convention, which was considered a rebuilding plan for the Fishery. In 2015, the Commission requested that the Scientific Committee apply the adjusted Rebuilding Plan adopted at the 2nd meeting of the Commission, as proposed by the Scientific Committee at SC02, which, considering the uncertainty of the assessments if the SSB is greater than 80% of BMSY, does not allow the TAC to vary more than 15% from one year to another.

Consistent with the above, the decision-making process uses the precautionary approach and is based on the best scientific information available; therefore, the evaluation team estimates that **SG80 is met**.

#### CHILE

The LGPA, in its article No. 1 C, requires the fisheries management authority to take into account the protection of ecosystems and the precautionary principle when adopting an administrative measure, as well as when interpreting and applying the law; which implies that it must be more cautious in management when scientific information is uncertain, unreliable or incomplete. The lack of information should not be a reason to postpone or not adopt management measures, a situation that is fully applicable to common hake fisheries. Consistent with the above, the evaluation team estimates that **SG80 c is met**.

Accountability and transparency of management system and decision-making process				
d	Guide post	Some information on the fishery's performance and management action is	Information on the fishery's performance and management action is available on request , and	Formal reporting to all interested stakeholders provides comprehensive information on the

PI 3.2.2		<b>The fishery-specific management system includes effective decision-making processes that result in measures and strategies to achieve the objectives, and has an appropriate approach to current disputes in the fishery</b>		
		generally available on request to stakeholders.	Explanations are provided for any actions or lack of action associated with findings and relevant recommendations emerging from research, monitoring, evaluation and review activity.	fishery's performance and management actions and describes how the management system responded to findings and relevant recommendations emerging from research, monitoring, evaluation and review activity.
Met?	<b>Yes</b>	<b>Yes</b>		<b>No</b>

#### Rationale

**Information on the fishery's performance and management action is available on request , and Explanations are provided for any actions or lack of action associated with findings and relevant recommendations emerging from research, monitoring, evaluation and review activity.**

#### SPRFMO

Article 18 of the Convention on Transparency states that the Commission shall promote transparency in the decision-making process and other activities carried out by the Convention. All meetings of the Commission and its subsidiary bodies are open to all registered participants and observers. In addition, all Reports and Minutes of meetings of both the Commission and its subsidiary bodies and CMMs have been posted on the Convention's website since its establishment. Non-Contracting Parties, intergovernmental and non-governmental organizations, including environmental organizations and fisheries industry organizations with an interest in matters relating to the Commission, have the opportunity to participate in meetings of the Commission and its subsidiary bodies.

Consistent with the above, all information on the performance of the fishery and its management and planning actions are available, therefore, the evaluation team estimates **that SG 60 and SG80 are met. SG100 is not achieved** because it is unknown whether the Commission officially informs all Parties with comprehensive data.

#### CHILE

In the jack mackerel fishery, all information related to the decision-making process is public and is available on the website of the Undersecretariat of Fisheries. All management measures applicable to the fishery and regulations are published in the Official Journal and are in force as of that date.

The minutes of the jack mackerel management committee, the minutes and reports of the scientific-technical committee of the pelagic jack mackerel fishery and the minutes of the National and Zonal Fishing Councils are published on the website of the Undersecretariat of Fisheries.

The management of fishery resources must be carried out in a transparent, responsible and inclusive manner, in accordance with the provisions of Article 1º C of the LGPA.

Research carried out by both the IFOP and the Fisheries Research Fund, once peer-reviewed, must be published on their corresponding websites.

Furthermore, in accordance with Law 20,285 on transparency and access to public information, interested parties or those affected may request information from public institutions corresponding to the scope of action of each of them, which must be answered within the time limits established by law, with the possibility of appealing to the Transparency Council if they are not satisfied with the information provided.

PI 3.2.2	<b>The fishery-specific management system includes effective decision-making processes that result in measures and strategies to achieve the objectives, and has an appropriate approach to current disputes in the fishery</b>
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In the month of March of each year, the Undersecretariat of Fisheries must publish a report on the status of the country's main fisheries (Article 4º A of the LGPA), which includes the jack mackerel fishery, in which information is provided corresponding to the immediately preceding year related to: The applicable management measures, the status of the fishery (status of the resource, discards, biologically acceptable capture range, and research carried out).

The National Fisheries Service and the General Directorate of Maritime Territory have the same obligation to report in March of each year (Articles 4º B and 4º C of the LGPA) on their oversight activities and actions. The National Fisheries Service also publishes on its website periodically, at least twice a month, the quota control, indicating the allocations and catches made by each allocation unit, of all managed fisheries with a catch quota, and at the beginning of the following year it publishes on its website a report with the results of the end of the quota control. Likewise, information on the satellite positioning of all vessels is available on its website, with a lag of 3 to 4 days.

Consistent with the above, in the jack mackerel fishery, all interested parties are fully informed about the behavior of the fishery and the management actions carried out. The evaluation team **estimates that SG 60, SG 80 and SG 100 d are met.**

Approach to disputes				
and	Guide post	Although the management authority or fishery may be subject to continuing court challenges, it is not indicating a disrespect or defiance of the law by repeatedly violating the same law or regulation necessary for the sustainability for the fishery.	The management system or fishery is attempting to comply in a timely manner with judicial decisions arising from any legal challenges.	The management system or fishery acts proactively to avoid legal disputes or rapidly implements judicial decisions arising from legal challenges.
Met?	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	

#### Rationale

**The management system or fishery acts proactively to avoid legal disputes or rapidly implements judicial decisions arising from legal challenges.**

#### SPRFMO

The Convention considers the solution of conflicts through two procedures, those established in Article 34, Conflict Resolution, in which the Contracting Parties are urged to avoid conflicts and make the greatest efforts to resolve them in a friendly manner, which may include, when a conflict is of a technical nature, submitting said conflict to the decision of an ad hoc group of experts (Article 17 of the Convention)

It is further established that, if a conflict is not resolved by amicable means, the provisions relating to the settlement of conflicts established in Part VIII of the 1995 Agreement (New York Agreement) shall apply mutatis mutandis to any dispute between contracting parties. According to Article 27 of the New York Agreement, States have the obligation to resolve their disputes by negotiation, investigation, mediation, conciliation, arbitration, judicial settlement, recourse to regional bodies or arrangements or other peaceful means of their choice.

The other objection resolution mechanism established in Article 17 of the Convention seeks a solution through the creation of a Panel of Experts, whose rules for composition and operation are established in Annex II of the Convention. According to the information available on the Convention's website, there have been 3 objection processes under this provision, the last one in 2023 by the Russian Federation, which was resolved by the Panel of Experts in accordance with

PI 3.2.2	<b>The fishery-specific management system includes effective decision-making processes that result in measures and strategies to achieve the objectives, and has an appropriate approach to current disputes in the fishery</b>
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PCA report case No. 2023-33, which was accepted by the COMM12 2024 Commission, in which the objection was resolved, modifying the Parties' share of the jack mackerel quota in CMM 01-24.

Consistent with the above, it is concluded that the management system and the fishery act proactively to avoid disputes between the Parties and if these occur, the decisions are quickly applied. The evaluation team estimates that **SG 60, SG 80 and SG 100 are met**.

#### CHILE

The management system established in the LGPA, applicable to the jack mackerel fishery, acts proactively to avoid legal disputes considering the following:

Interested or affected parties, through their representatives, participate in the different participation bodies, National and Zonal Fishing Councils, Management Committees, Scientific-Technical Committees, and through them they become aware of the actions that the authority is taking in the management of fisheries, and have the option of presenting the problems that, in their opinion, could arise.

Another possible source of conflict between fishery users could be the areas of operation and catch quotas, both aspects are clearly established in the LGPA, in the case of fishing areas, in the case of the jack mackerel fishery, the industrial fleet can only carry out its extractive activities outside the five nautical miles measured from the coast, on the other hand, the artisanal fleet carries out its activities in the entire fishing area, but it has exclusive use of the five-mile strip measured from the coast; in relation to the distribution of quotas between sectors, these were established for 20 years, in the modification to the fishing law established in 2013, establishing a distribution of the target quota of 10% for the artisanal sector and 90% for the industrial sector.

However, if problems or conflicts arise between users or between users and the authority, national regulations consider several ways of seeking a solution, either in an administrative or judicial setting.

At the Administrative Headquarters: Users may appeal administratively, in accordance with the provisions of the administrative procedure law, Law 18,880, by filing a motion for reconsideration, presented to the authority that issued the measure or a hierarchical appeal, presented to the institution on which the person who issued the measure depends. Also administratively, they may appeal to the Comptroller General of the Republic, which corresponds to the highest fiscal control body of the State, which issues opinions.

In Court: users can appeal to the courts of justice, through Protection Resources or ordinary trials.

Both the decisions adopted at the Administrative and Judicial levels must be addressed by the Authority immediately.

In Compliance Indicator 3.1.1, aspect b), various examples of conflict resolution through administrative and judicial headquarters were presented, as well as the immediacy of these to be fulfilled by the fishing authority when appropriate.

Consistent with the above, the assessment team estimates that, in the southern hake fishery, **SG 60, SG 80 and SG 100 are met**.

#### References

General Law on Fisheries and Aquaculture, contained in Supreme Decree No. 430 of 1991 of the Ministry of Economy.  
 Convention on the Conservation and Management of Fishery Resources in the High Seas in the South Pacific Ocean.  
 Law 20,285, Access to public information.  
 Law 20,625, Regulation of disposal.  
 Decree No. 458 of 1981 of the Ministry of Economy establishes the minimum size of jack mackerel.  
 Decree No. 411 of 2000, of the Ministry of Economy, establishes percentages of capture of species as Bycatch.  
 Resolution No. 45 of 2020, of the Undersecretariat of Fisheries, replaces Decree No. 411 of 2000.

PI 3.2.2	<b>The fishery-specific management system includes effective decision-making processes that result in measures and strategies to achieve the objectives, and has an appropriate approach to current disputes in the fishery</b>
Resolution No. 3,115 of 2013, of the Undersecretariat of Fisheries, establishes artisanal fisheries.	
Resolution No. 3,200 of 2013, of the Undersecretariat of Fisheries, establishes industrial fisheries.	
Resolution No. 4,344 of 2017, of the Undersecretariat of Fisheries, formalizes the Management Plan for the Jurel fishery	
Resolution No. 2,745 of 2019, of the Undersecretariat of Fisheries, modifies Resolution No. 3,115 of 2013.	
Resolution No. 3,986 of 2019, of the Undersecretariat of Fisheries, modifies Resolution No. 3,200 of 2013.	
Resolution No. 903 of 2000, of the Undersecretariat of Fisheries, modifies Decree No. 458 of 1981 in order to establish that the permitted percentage of undersized species be measured monthly and not per fishing trip.	
Resolution No. 862 of 2021, of the Undersecretariat of Fisheries, authorizes the transfer of surpluses from the haul of pelagic species.	
Resolution No. 2098 of 2023, of the Undersecretariat of Fisheries, establishes the research program for the year 2024.	
Resolution No. 810 of 2024, of the Undersecretariat of Fisheries, approves the report on the status of the main Chilean fisheries, year 2023.	

#### Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Individual scoring elements (add rows as required; delete if not scored by elements)	Applicable SGs likely met per individual scoring element			<u>Likely scoring element scores</u>
	SG60	SG80	SG100	
1 UoAS1	4 of 4	5 of 5	1 of 3	
Applicable SGs/elements <u>likely</u> met				<u>Likely overall PI score</u>
Draft scoring range	SG60	SG80	SG100	
	4 of 4	5 of 5	1 of 3	≥80
Information gap indicator	Information sufficient to score PI			

#### Overall Performance Indicator scores added from Client and Peer Review Draft Report

Individual scoring elements (add rows as required; delete if not scored by elements)	Applicable SGs met per individual scoring element			<u>Scoring element scores</u>
	SG60	SG80	SG100	
1 Scoring element 1	X of x	X of x	X of x	
2 Scoring element 2	X of x	X of x	X of x	
3 Scoring element 3	X of x	X of x	X of x	
4 Scoring element 4	X of x	X of x	X of x	
Applicable SGs/elements met				<u>Overall score</u>
Overall Performance Indicator score	SG60	SG80	SG100	
	X of x	X of x	X of x	
Condition number (if relevant)				

### PI 3.2.3 – Compliance and enforcement

PI 3.2.3		Monitoring, control and surveillance mechanisms ensure the management measures in the fishery are enforced and complied with		
Scoring Issue		SG 60	SG 80	SG 100
<b>MCS implementation</b>				
<b>to</b>	Guide post	Monitoring, control and surveillance mechanisms exist, and are implemented in the fishery and there is a reasonable expectation that they are effective.	A monitoring, control and surveillance system has been implemented in the fishery and has demonstrated an ability to enforce relevant management measures, strategies and/or rules.	A comprehensive monitoring, control and surveillance system has been implemented in the fishery and has demonstrated a consistent ability to enforce relevant management measures, strategies and/or rules.
Met?	Yes	Yes	Yes	No

#### Rationale

**A monitoring, control and surveillance system has been implemented in the fishery and has demonstrated an ability to enforce relevant management measures, strategies and/or rules.**

#### SPFMO

According to Article 27 of the Convention, the Commission shall establish appropriate cooperation procedures for the supervision, control and surveillance of fisheries and to ensure compliance with the Convention through:

- Establishment and maintenance of a Commission register of vessels authorised to fish in the Convention area; marking of vessels and fishing gear; recording of activities by means of a satellite monitoring system through direct and simultaneous transmission to the Commission and the flag State.
- A programme of inspection for Contracting Parties at sea in the Convention area and in ports by the Port State. The Commission may adopt procedures allowing Members of the Commission to apply measures - including trade-associated measures - relating to fishery resources to a State or Member of the Commission whose fishing vessels reduce the effectiveness of or fail to comply with conservation and management measures established by the Commission.

The Commission has established the following conservation and management measures in this area:

- MMC 04-2020, IUU fishing, establishes the procedure for members to annually report to the executive secretary the list of vessels that are alleged to have engaged in illegal fishing.
- MMC 05-2023, Registration of Vessels, establishes that members may authorize only vessels flying their flag to fish in the convention area and take the necessary measures to ensure that they can adopt effective control measures.
- MMC 06-2023, Monitoring System, as of 2018 the VMS system was fully operational. The Commission's VMS applies to all vessels authorised to fish in the Convention area.
- MMC 07-2022, Port Inspection, establishes that each Member State, in its capacity as a Port State, shall apply this standard to carry out effective port inspection of foreign vessels carrying species ordered by the Commission when they enter its ports.
- MMC 10-2020 Compliance and Monitoring Program establishes the form and procedure for the Commission to evaluate compliance with the obligations of members and CNCPs arising from the Convention at each annual meeting with the assistance of the Technical Compliance Committee.

Consistent with the above, the Commission is considered to have the capacity to act at international level and to provide an effective deterrent to ensure that contracting parties comply with their obligations; the evaluation team estimates that **SG 60, SG 80 and SG 100 are met**.

**PI 3.2.3**

**Monitoring, control and surveillance mechanisms ensure the management measures in the fishery are enforced and complied with**

**CHILE**

To monitor, control and enforce the regulations and requirements established for the jack mackerel fishery, the following inspection tools are applied:

- Certification of the catch upon landing, carried out by the National Fisheries Service. This requirement applies to all industrial and artisanal vessels with a length equal to or greater than 12 metres. It allows for the control of catch quotas, in this case, by allocation unit and totals, which is complemented by the requirement of a weighing system enabled by the National Fisheries Service and with the information from the electronic fishing log, which reports the estimate of catches per fishing cast of the industrial fleet.
- Satellite positioning, in operation from departure to arrival at an authorized port for disembarkation, is required for industrial vessels and all artisanal vessels with a length equal to or greater than 15 meters. It allows verification that the vessels carry out their activities in the authorized areas and that they do not enter prohibited areas such as those corresponding to EMV and, in the case of industrial vessels, that they do not carry out extractive activities in the areas reserved for artisanal fishing.
- Cameras for recording images on board vessels, required for the industrial fishing fleet and artisanal vessels with a length equal to or greater than 15 meters. It allows verification of compliance with the discard requirements, and their prior quantification, whether of target species or Bycatch that are authorized to be discarded, as well as the return of species that are not authorized to be retained and the adequate treatment of incidental catches. The artisanal fishing fleet has, by law (Law 20,259), postponed the requirement for image recording cameras until January 1, 2024, however, to date it has not yet become effective.
- Traceability of catches: all catches must comply with this requirement, from the moment of capture to the marketing of products derived from them. It allows verification that the catches and the products derived from them have a legal origin.
- Scientific observers: the Undersecretariat of Fisheries determines monthly by Resolution the vessels that must carry a scientific observer on board. This allows the collection of scientific information relevant to the fisheries monitoring program.

The National Fisheries Service establishes an annual fisheries inspection program to verify compliance with the various management measures and established requirements, focusing its actions through risk analysis of non-compliance. In point 7.4.1 letter k) , the inspection actions carried out during the last year are detailed.

Consistent with the above, the assessment team estimates that the jack mackerel fishery **meets SG 60 and SG 80** . However, considering that the artisanal fishing fleet does not yet have the requirement for image recording cameras and that the analysis of the images of the industrial fleet presents a significant delay in its review, **SG 100 is not reached**.

		<b>Sanctions</b>			
<b>b</b>		Guide post	Sanctions to deal with non-compliance exist and there is some evidence that they are applied.	Sanctions to deal with non-compliance exist, are consistently applied and intended to provide effective deterrence.	Sanctions to deal with non-compliance exist, are consistently applied and demonstrably provide effective deterrence.
Met?	Yes	Yes	Yes	No	

**Rationale**

**Sanctions to deal with non-compliance exist, are consistently applied and intended to provide effective deterrence.**

**SPRFMO**

Monitoring Control and surveillance is not directly implemented by the Convention, therefore this Compliance Indicator does not qualify for the SPRFMO management element.

**CHILE**

**PI 3.2.3**
**Monitoring, control and surveillance mechanisms ensure the management measures in the fishery are enforced and complied with**

The LGPA establishes various sanctions for non-compliance detected in the exercise of extractive fishing activities, processing, transportation, storage and marketing of resources or products derived from fishing.

In the case of jack mackerel fisheries, which are managed with tradable fishing licenses, LTP, for the industrial sector and with an artisanal extraction regime, RAE, for the artisanal sector, the law establishes administrative sanctions that are applied by the National Fisheries Service, for the main breaches by the rights holders, such as exceeding the assigned quota, fishing with an unregistered vessel, not reporting catches, not certifying catches, discarding, carrying out activities in the artisanal reserve zone; these sanctions are established in articles 40 B to 40 F of the LGPA, for industrialists and in article 55 N and following of the LGPA, for the artisanal sector. In general terms, depending on the breach, a fine is applied that corresponds to the value of 2 or 3 times the tons of the breach multiplied by the Penalty Value, which corresponds to the species; the penalty value is established by decree of the Ministry annually and corresponds to the first transaction price of the resource. In addition to the financial penalty, the amount of non-compliance is deducted from the allocation. For this type of non-compliance, a penalty is established for both the shipowner who holds the right and for the captain or skipper of the offending vessel.

In addition to the above, if an LTP holder accumulates 4 sanctions in a period of 10 years, the validity of the transferable Fishing license will not be extended after 20 years of its validity.

The law also provides for a series of sanctions for other breaches that are not classified in the administrative sanctions and for persons other than the holders of LTP and RAE. These breaches are reported by the National Fisheries Service to the courts of Justice and the sanction is applied by the Courts of Justice. The classification and sanctions are indicated in articles 107 to 117 of the LGPA. The law also classifies some breaches as crimes, such as capturing using explosives, hunting or capturing any type of cetaceans, in Title X of the LGPA.

In section 7.4.1, letter k), of this report, the sanctions applied to non-compliance with the jack mackerel fishery during the last three years, as reported by the National Fisheries Service, are indicated.

There is a wide variety of sanctions to be applied in the regulation, depending on the breaches and the type of right of the offender, and it is considered that they are dissuasive, especially administrative sanctions, since the offender not only becomes liable for the fine and the deduction of resources from his quota, but also loses the value of his fishing right, since the sanctions are accumulated, even if there is a change in the owner of the right.

It is estimated that the sanctions are applied consistently and have an effective deterrent effect, which is why **it is estimated that SG 60 and SG 80 are met, SG100 is not met**, since the detection of non-compliance, especially those involving discarding, through image recording cameras, presents a significant delay, since on the one hand it is necessary to wait for the image storage disks to be completed, which in some cases can take almost a year, and on the other hand, the Service must prioritize its review according to the risk analysis and the availability of its professionals to do so.

Compliance			
<b>c</b>	Guide post	Fishers are generally intended to comply with the management system for the fishery under assessment, including, when required, providing information of importance to the effective management of the fishery.	Some evidence exists to demonstrate fishers comply with the management system under assessment, including, when required, providing information of importance to the effective management of the fishery.
	Met?	Yes	Yes

PI 3.2.3	<b>Monitoring, control and surveillance mechanisms ensure the management measures in the fishery are enforced and complied with</b>
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#### Rationale

**Some evidence exists to demonstrate fishers comply with the management system under assessment, including, when required, providing information of importance to the effective management of the fishery.**

#### SPRFMO

Monitoring Control and surveillance is not directly implemented by the Convention, therefore this Compliance Indicator does not qualify for the SPRFMO management element.

#### CHILE

According to the information provided by the National Fisheries Service detailed in point 7.4.1 letter k), in the jack mackerel fishery, the industrial fishing sector presented 2 non-compliances in the period 2021 to 2023.

However, the breaches that can be observed through the cameras recording images corresponding to discards, which qualify as administrative sanctions, are still pending, since there is a significant gap in their detection.

Furthermore, it should be noted that the owners of the jack mackerel fishery actively cooperate with the Authority through their participation in the Management Committee, first by preparing the Fishery Management Plan. Likewise, the entire fleet, both industrial and artisanal, actively participated in the research carried out to determine the causes of discards. The industrial fishing sector has actively participated in the meetings of the Commission, especially in that of the scientific committee.

Consistent with the above, it is estimated that there is evidence to show that fishermen comply with the management system and when requested provide important information for the effective management of fisheries, therefore, the evaluation team **estimates that they comply with SG 60, SG 80 c. SG 100 is not achieved**, since compliance through the image recording cameras of the discard is unknown, due to the delay in reviewing said images.

<b>Systematic non-compliance</b>			
<b>d</b>	Guide post		There is no evidence of systematic non-compliance.
	Met?		<b>Yes</b>

#### Rationale

**There is no evidence of systematic non-compliance.**

#### SPRFMO

Monitoring Control and surveillance is not directly implemented by the Convention, therefore this Compliance Indicator does not qualify for the SPRFMO management element.

#### CHILE

According to the available information provided by the National Fisheries Service, although there are some sanctioned breaches, it is estimated that there are no systematic breaches in the southern hake fishery, therefore, the evaluation team estimates that **SG80 of the Regulation is met**.

#### References

Convention on the Conservation and Management of Fishery Resources in the High Seas in the South Pacific Ocean.

MMC 04-2020, IUU,

MMC 05-2023, Ship registration,

MMC 06-2023, Monitoring system,

PI 3.2.3	<b>Monitoring, control and surveillance mechanisms ensure the management measures in the fishery are enforced and complied with</b>					
MMC 07-2022, Port Inspection, MMC 10-2020 Compliance and Supervision Program, Supreme Decree No. 430 of 1991, which corresponds to the text of the general law on fishing and aquaculture and its amendments National Fisheries Service, Response to query No. AH010T0005186 of 2024. Resolution No. 736 of 2022, of the National Fisheries Service, establishes the National Inspection Plan for 2023.						
<b>Draft scoring range and information gap indicator added at Announcement Comment Draft Report</b>						
Individual scoring elements (add rows as required; delete if not scored by elements)		Applicable SGs likely met per individual scoring element				
1	UoAS1	SG60	SG80	SG100	Likely scoring element scores	
Draft scoring range		3 of 3      4 of 4      0 of 3			Applicable SGs/elements <u>likely</u> met	
Information gap indicator		SG60	SG80	SG100	Likely overall PI score	
Information gap indicator		3 of 3      4 of 4      0 of 3			≥80	
Information sufficient to score PI						

#### Overall Performance Indicator scores added from Client and Peer Review Draft Report

Individual scoring elements (add rows as required; delete if not scored by elements)		Applicable SGs met per individual scoring element			Scoring element scores
1	Scoring element 1	SG60	SG80	SG100	
2	Scoring element 2	X of x	X of x	X of x	
3	Scoring element 3	X of x	X of x	X of x	
4	Scoring element 4	X of x	X of x	X of x	
Overall Performance Indicator score		Applicable SGs/elements met			Overall score
Condition number (if relevant)		SG60	SG80	SG100	
X of x		X of x	X of x	X of x	

### PI 3.2.4 – Monitoring and management performance evaluation

PI 3.2.4		<b>There is a system of monitoring and evaluating the performance of the fishery-specific management system against its objectives</b> <b>There is effective and timely review of the fishery-specific management system</b>		
Scoring Issue		SG 60	SG 80	SG 100
		<b>Evaluation coverage</b>		
<b>to</b>	<b>Guide post</b>	There are mechanisms in place to evaluate <b>some</b> parts of the fishery-specific management system.	There are mechanisms in place to evaluate <b>key</b> parts of the fishery-specific management system.	There are mechanisms in place to evaluate <b>all</b> parts of the fishery-specific management system.
	Met?	Yes	Yes	No

#### Rationale

**There are mechanisms in place to evaluate key parts of the fishery-specific management system.**

#### SPRFMO

According to the Convention, the Commission meets annually and analyzes the different issues presented by the subsidiary bodies, which must meet and present their reports prior to the Commission meeting. Therefore, the Commission annually has the reports and recommendations of the Scientific Committee, the Technical Compliance Committee, the Eastern and Western Subregional Management Committees; the Administration and Finance Committee; in addition to what it is required to report to the Secretariat. With all these reports and in accordance with the recommendations of each of them, the Commission adopts decisions and establishes modifications to the conservation and management measures, if applicable, which is identified with the number of the year in which the last modification occurred. For example, MMC 01-2024; MMC 02-2023; MMC 04-2020; MMC07-2022.

Additionally, in accordance with Article 30 of the Convention, it is established that the Commission shall review the effectiveness of the conservation and management measures adopted at least every 5 years. The following scoring section details what the Commission has done on this matter. Having been informed of the first Review carried out by the Review Panel at the Commission meeting in 2019 and at the Commission meeting in 2024, the second review by a Review Panel has already been approved, which must present its report before the Commission session in 2025.

Consistent with the above, it is concluded that there are mechanisms to evaluate all parts of the specific management system of the fishery, with the evaluation team estimating that **SG 60, SG 80 and SG 100 are met**.

#### CHILE

According to the LGPA, there are mechanisms to evaluate some of the parts of the management system. Regarding research, it is the responsibility of the Ministry of Economy to submit the research reports carried out by the IFOP to review by external evaluators, in order to determine whether the technical terms of reference established by the Undersecretariat of Fisheries are met, in addition to verifying the technical quality of the research carried out, as well as the results obtained. The reports of the external evaluators are public. (art. 156 A of the LGPA). Likewise, the research contracted by the Fisheries Research Fund must also be sanctioned by external evaluators; the external evaluators must have a technical qualification equal to or higher than those who carry out the research. (art. 96 of the LGPA).

Regarding management measures, Article 1 C establishes that these must be reviewed every five years, although there is no specific document from the Undersecretariat of Fisheries that contains them, on the occasion of the Plan to Reduce Discards in the jack mackerel fishery and the entry into force of the image recording cameras, the management measures established at the end of 2019 were reviewed and those that, as a result of their application, caused discards were adapted.

In accordance with the above, the following management measures applicable to the southern hake fishery were reviewed and modified:

PI 3.2.4	<p><b>There is a system of monitoring and evaluating the performance of the fishery-specific management system against its objectives</b></p> <p><b>There is effective and timely review of the fishery-specific management system</b></p> <p>- Resolution No. 1,700 of 2000, which establishes the species of fish that can only be caught with fishing gear whose construction characteristics qualify as hand line, longline, wall net, trap, harpoon and trolling, was modified by Resolution No. 3,917 of 2019, both from the Undersecretariat of Fisheries;</p> <p>- Resolution No. 3,200 of 2013, which establishes the species associated with the fishing units managed with LTP, was modified by Resolution No. 3,986 of 2019, both from the Undersecretariat of Fisheries;</p> <p>- Resolution No. 3,115 of 2013, which establishes the target species and their associated species by region and fishing gear of the jack mackerel fishery, was modified by Resolution No. 2,747 of 2019, both from the Undersecretariat of Fisheries; and</p> <p>- Decree No. 411 of 2000, which establishes landing percentages of other species as by-catch in the capture of jack mackerel, was replaced by Decree No. 45 of 2020, which establishes new percentages of by-catch in industrial and artisanal fisheries using trawling gear, among others.</p> <p>In this same area, according to the LGPA, management plans must be reviewed at least every 5 years. The management plan for the jack mackerel fishery established by Resolution No. 4,344 of 2017 of the Undersecretariat of Fisheries . On the occasion of the review of the operating rules of the Management Committee according to the Minutes dated July 2, 2024, some members expressed the need to review and update the Management Plan, estimating that it should be a primary task of the Committee for the year 2024.</p> <p>Both the National Fisheries Service and the General Directorate of Maritime Territory, in their capacity as oversight bodies, must publish a report on the oversight actions carried out in March of each year.</p> <p>Consistent with the above, it is estimated that the management system has mechanisms in place to evaluate the fundamental parts of management, such as research and management measures, thus complying <b>with SG 60 and SG 80. SG100 is not achieved</b> because the part relating to oversight does not have an evaluation mechanism.</p>			
b	<p><b>Internal and/or external review</b></p>	<p>The fishery-specific management system is subject to <b>occasional internal review</b>.</p>	<p>The fishery-specific management system is subject to <b>regular internal and occasional external review</b>.</p>	<p>The fishery-specific management system is subject to <b>regular internal and external review</b>.</p>
<p>Met?    <b>Yes</b></p>				
<p><b>Rationale</b></p> <p><b>The fishery-specific management system is subject to regular internal and external review</b></p> <p><b>SPRFMO</b></p> <p>In addition to what is noted in the previous section on internal review, Article 30 of the Convention, Reviews, provides that the Commission shall review the effectiveness of conservation and management measures adopted by the Commission in achieving the objective of the Convention. These reviews of the effectiveness of the provisions shall be carried out at least every 5 years.</p> <p>Consistent with the above, in COMM5 item 9, it was agreed that the review of the Commission's performance would be conducted by a Review Panel during the 2018 intersessional period, with the final Report and its findings to be presented before the 2019 Commission Meeting. It was agreed that the Review Panel should consist of two experts who are nationals of Convention Members and two external experts with extensive experience in relevant areas of science, fisheries management, marine ecosystems, and compliance and enforcement issues.</p>				

**PI 3.2.4**

**There is a system of monitoring and evaluating the performance of the fishery-specific management system against its objectives**  
**There is effective and timely review of the fishery-specific management system**

The Review Panel's findings were reported at the 2019 Commission meeting and are contained in item 8 of COMM07 2019 and its incomplete report is available in COMM7- Doc06 and Doc07.

At the 2024 Commission Meeting, under COMM12, the decision was approved to once again review the effectiveness of conservation and management measures in accordance with Article 30 of the Convention, in Annex 8, as established in Decision 06-2024, the form and conditions for the development of the evaluation by the Panel are established, its report must be presented prior to the 2025 Commission meeting.

Consistent with the above, it is estimated that the specific management system of the jack mackerel fishery is subject to regular internal and external reviews, therefore, the evaluation team estimates that **SG 60, SG 80 and SG 100 b are met.**

**CHILE**

Since this is a fishery whose main management measure is the catch quota, the Undersecretariat must establish it annually, therefore, this implies a regular review process both internally and externally through the Scientific Technical Committee of the fishery, which must review the research reports on which the quota range to be proposed to the Authority will be based.

The Scientific Technical Committee, an external body to the Fisheries Undersecretariat according to its constitution, is responsible for making decisions on various aspects, including determining the status of the fisheries, the biological reference points, proposing the range in which the catch quota can be established, the design of management measures and the review of the formulation of the fishery management plan presented by the Management Committee. Accordingly, it regularly reviews the management measures.

Likewise, the Jack mackerel Fishery Management Committee is permanently reviewing the management measures applied to the fisheries. Over the last three years, it held 8 meetings during 2022 and 9 meetings during 2023, and in 2024 it held 2 meetings. The minutes show the variety of topics discussed, relating to the management of the fishery, its development and supervision.

An evaluation of the management has also been carried out occasionally, highlighting the International Workshop held in Viña del Mar in 2014, which aimed to review the proposal for the Biological Reference Points, PBR, of the fisheries, which were established by the Undersecretariat of Fisheries by Resolution No. 291 of February 2015, including that of the jack mackerel. In addition to national experts, this workshop was attended by foreign experts from the United States, William Clark and Martín Dorn; from Spain, Carmen Fernández; from Australia, Malcolm Haddon, Neil Klaer and Shijie Zhou; and from New Zealand, Matthew Dunn.

Consistent with the above, it is estimated that the specific management system of the jack mackerel fishery is subject to regular internal and external reviews, therefore, the evaluation team estimates that **SG 60, SG 80 and SG 100 b are met.**

**References**

Convention on the Conservation and Management of Fishery Resources in the High Seas in the South Pacific Ocean.

COMM05 minutes

COMM07 minutes

Doc06 Annex COMM07

Doc07 Annex COMM07

COMM Minutes 12

Decision 06-24 Annex COMM12

Supreme Decree No. 430 of 1991, establishes the consolidated text of the General Fisheries Law and its amendments.

Resolution No. 1700 of 2000, amended by Resolution No. 3,917 of 2019, both from the Undersecretariat of Fisheries.

Resolution No. 3,115 of 2013, amended by Resolution No. 2,747 of 2019, both from the Undersecretariat of Fisheries.

Resolution No. 3,200 of 2013, amended by Resolution No. 3,986 of 2019, both from the Undersecretariat of Fisheries.

Decree No. 411 of 2000, replaced by Decree No. 45 of 2000, both from the Ministry of Economy.

PI 3.2.4	<b>There is a system of monitoring and evaluating the performance of the fishery-specific management system against its objectives</b> <b>There is effective and timely review of the fishery-specific management system</b>		
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**Draft scoring range and information gap indicator added at Announcement Comment Draft Report**

Individual scoring elements (add rows as required; delete if not scored by elements)		Applicable SGs likely met per individual scoring element			Likely scoring element scores
		SG60	SG80	SG100	
1	UoAS1	2 of 2	2 of 2	1 of 2	
Draft scoring range		Applicable SGs/elements <u>likely</u> met			<u>Likely</u> overall PI score
		SG60	SG80	SG100	
		2 of 2	2 of 2	1 of 2	≥80
Information gap indicator		Information sufficient to score PI			

**Overall Performance Indicator scores added from Client and Peer Review Draft Report**

Individual scoring elements (add rows as required; delete if not scored by elements)		Applicable SGs met per individual scoring element			Scoring element scores
		SG60	SG80	SG100	
1	Scoring element 1	X of x	X of x	X of x	
2	Scoring element 2	X of x	X of x	X of x	
3	Scoring element 3	X of x	X of x	X of x	
4	Scoring element 4	X of x	X of x	X of x	
Overall Performance Indicator score		Applicable SGs/elements met			Overall score
		SG60	SG80	SG100	
		X of x	X of x	X of x	
Condition number (if relevant)					

## 14 Appendices

### 14.1 Assessment information

#### 14.1.1 Previous assessments – delete if not applicable

This fishery began its first evaluation in 2018, presenting its PCR on April 26, 2019. The fishery was certified by the current group, LQRA. A comprehensive program of stakeholder consultations was carried out as part of this assessment, complemented by a full and thorough review of relevant literature and data sources.

The assessment team conducted a rigorous evaluation of the wide-ranging MSC Principles and Criteria, and a detailed, fully referenced scoring rationale was provided in the PCR and in subsequent reports when some conditions were closed. The fishery was transferred from LQRA to GTC/NFS in January 2020.

The fishery was certified with a total of 7 conditions. Conditions on P3 PIs 3.2.2 and 3.2.4 were closed at the first surveillance audit. The condition on PI 3.2.3 was closed at the second surveillance audit. The condition on PI 1.2.2 was closed by the GTC team during the third surveillance, and all remaining conditions under Principle 2, PI 2.2.2 and 2.3.2, were consistently marked as on target. The fishery conducted its fourth surveillance site visit in July 2024, and the report is due by the end of September, 2024.

The reassessment started in early summer 2024, and the team is now presenting the main findings of the ACDR for this reassessment.

### 14.2 Evaluation processes and techniques

#### 14.2.1 Site visits

This section will be completed in the next iteration of the report, but as of the ACDR stage, the site visit is planned to be conducted remotely during the week of October 21st. A Variation Request (VR) has been submitted to allow the team to attend remotely.

#### 14.2.2 Stakeholder participation

The stakeholder participation is planned to take place via conference call on Teams. This methodology has been extensively used in fisheries assessments at GTC since COVID-19 and has been successfully applied by the assessment teams. Since the 4th surveillance audit for this fishery was conducted the week of July 22nd, the assessment team is confident that the information necessary to reassess the fishery is available online and remotely. The 4th surveillance audit had strong attendance and successful document gathering.

The Chilean government uses the transparency portal, where national and public documents are available upon request. The entire assessment team has extensive experience in Chilean fisheries and is well-versed in using the methodologies implemented by the government. Stakeholders are well-known and clearly defined, and questions or concerns will be shared with them a week after the announcement, providing ample time to prepare documentation for the week of October 21st.

#### 14.2.3 Evaluation techniques

The assessment team has reviewed the approaches and rationales provided in the original full assessment for seabirds. However, following comments submitted to GTC, it appears that seabirds in this fishery, previously considered out-of-scope species, are now classified as secondary species and will need to be assessed using the RBF (Risk-Based Framework) due to the lack of a formal BBL (Biological Based Limit). At the ACDR stage, the assessment team is not entirely sure if this rationale below can justify the use of the default tree.

While fishery reference points (such as MSY or biomass thresholds) do not directly apply to seabird species like the Peruvian Pelican and Sooty Shearwater, population trends and conservation status serve as indicators of biological limits. Declines in population, breeding failure, or ecosystem disruption may signal that these species are approaching critical thresholds requiring intervention.

Seabirds' role as ecosystem indicators, particularly regarding marine health, is crucial in broader environmental assessments. Their protection is often tied to sustainable fishery management, especially concerning forage species like anchoveta, which seabirds rely on for food.

Therefore, at the Announcement Comment Draft Report (ACDR) stage, we propose that if the use of the RBF is triggered for this assessment, the CAB shall include the following in the report:

- The plan for RBF activities that the team will undertake at the site visit, including a specific call focused on running the RBF for the two seabird species.
- The rationale at the ACDR stage is that although the default tree has been used in the scoring tables, the team is uncertain whether population trends can be considered as BBL. A call with ATF and IFOP personnel working on seabirds and discards will be conducted to verify if BBLs apply in discard studies. If the BBL is found to be insufficient, a second call with relevant stakeholders will be organized for RBF discussions.
- The RBF stakeholder consultation strategy to ensure effective participation from a wide range of stakeholders, including any participatory tools used. The assessment team will identify and engage with all relevant stakeholders.
- A full list of activities and components to be discussed or evaluated during the assessment, along with specific questions the team plans to address during the site visit. An additional document detailing all aspects of the RBF will be shared with the relevant stakeholders.

This approach will ensure that the RBF process is thorough, transparent, and inclusive, addressing concerns regarding seabird populations within this fishery.

#### 14.3 Peer Review reports

##### To be drafted at Public Comment Draft Report

The report shall include unattributed reports of the Peer Reviewers in full using the relevant templates. The report shall include explicit responses of the team that include:

- Identification of specifically what (if any) changes to scoring, rationales, or conditions have been made; and,
- A substantiated justification for not making changes where peer reviewers suggest changes, but the team disagrees.

Reference(s): FCP v2.3 Section 7.12

#### 14.4 Stakeholder input

##### To be drafted at Client and Peer Review Draft Report

The CAB shall use the 'MSC Template for Stakeholder Input into Fishery Assessments' to include all written stakeholder input during the stakeholder input opportunities (Announcement Comment Draft Report, site visit and Public Comment Draft Report). The team shall respond to all written stakeholder input within the 'MSC Template for Stakeholder Input into Fishery Assessments' identifying what changes to scoring, rationales and conditions have been made in response, where the changes have been made, and assigning a 'CAB response code'.

The 'MSC Template for Stakeholder Input into Fishery Assessments' shall also be used to provide a summary of verbal submissions received during the site visit likely to cause a material difference to the outcome of the assessment. Using the 'MSC Template for Stakeholder Input into Fishery Assessments' the team shall respond to the summary of verbal submissions identifying what changes to scoring, rationales and conditions have been made in response, where the changes have been made, and assigning a 'CAB response code'.

The CAB may use the 'Supporting Information' section of the template (Section 10.14) to include in the report any key information referenced by stakeholders that is not published or available online.

Reference(s): FCP v2.3 Sections 4.2, 7.20.6 and 7.20.7.b

## Conditions – delete if not applicable

### 14.4.1 Summary of conditions closed under previous certificate

**Table 46.** Summary of previous assessment conditions.

Condition	PI(s)	Year closed	Justification
The client shall ensure by the fourth surveillance audit year 5 that there are well defined HCRs in place that ensure that the exploitation rate is reduced as the PRI is approached and they are expected to keep the stock fluctuating around a target level consistent with (or above) MSY	1.2.2	Closed on the third surveillance audit	<p>At the third annual audit the team were informed by SUBPESCA that a new harvest control rule was adopted.</p> <p>In 2022, SCW14 reviewed biological reference points and introduced a limit reference point (Blim; where B refers to spawning biomass). The proposed 2022 harvest control rule (HCR; based on Annex K of the COMM02-Report, the “adjusted Annex K” HCR defined in the SC2 Report, and discussions at SCW14) is, thus, as follows:</p> <ul style="list-style-type: none"> <li>a) If the biomass in the coming year is estimated to be below Blim then the TAC is set to zero and directed fishing for Jack mackerel is prohibited. Blim is to be computed from the ratio <math>\gamma_{lim} = \min(B_t/B_0, t)</math>; that is, the lowest ratio of historical spawning biomass relative to unfished. So, for the 2022 stock assessment, Blim = <math>\gamma_{lim} B_0, 2023</math>.</li> <li>b) If B is below 80% BMSY (or a proxy), the trial catch for next year would be based on the minimum of the current F or FMSY, which would mean that in theory B would not go down. If the trial catch is greater than the replacement yield (i.e., the catch level that would result in the same B for the subsequent year) then the TAC would be set at the replacement yield. This would mean that at a minimum the biomass would remain stable and would not decrease.</li> <li>c) If B is above 80% BMSY (or a proxy), the trial catch for the next year would be based on the estimated FMSY. If the trial catch is less than the replacement yield, the TAC will be set at or below the trial catch. If the trial catch is above the replacement yield, the method outlined in the previous</li> </ul>

			<p>bullet point should be used. The TAC will not be allowed to vary by more than 15% between years.</p> <p>d) If B is above BMSY (or a proxy), then the TAC would be set based on FMSY. The TAC will not be allowed to vary by more than 15% between years.</p> <p>This harvest control rule based on Blim was adopted as part of harvest control rule adjusted annex k at the 10th SPRFMO SC Meeting (SC10). <b>It, therefore, meets SG80a.</b></p>
The client shall ensure by the second surveillance audit that:	3.2.2	Closed on the second surveillance audit	<p>Status Sia. The assessment team has been able to verify that the progress made in this condition is ahead of the objective, considering that there is both within the Chilean regulation, as well as, the SPRFMO, established decision-making processes that derive in measures and strategies to achieve the objectives of the fishery.</p> <p>Status Slb . The assessment team has been able to verify that the progress made in this condition is ahead of the objective, since the decision-making processes have responded to serious and other important issues such as disposal, disposal notification of catches, and review of the RBP of the fishery.</p> <p>SId status. The assessment team has been able to verify that the progress made in this condition is ahead of the objective, since there is sufficient information on the performance of the fishery and the management measures, research to be developed, control actions are available.</p> <p>More details of each rationale in the first surveillance audit report: <a href="#">Assessments Chilean Jack mackerel industrial purse seine fishery - MSC Fisheries</a></p>
The client shall ensure by the third fourth surveillance audit that the monitoring, control and surveillance (MCS) system has been implemented in the fishery and has demonstrated an ability to enforce relevant management measures, strategies and/or rules.	3.2.3	Closed on the second surveillance audit	<p>As part of the Plan for the Reduction of Discard in pelagic purse seine fisheries, Resolution 862 (March 2021) allows surplus catch transfer between vessels, preventing discards when the hold is full. The National Fisheries Service reports improved discard reduction and incidental catch management in the Jack mackerel fleet, aided by image recording cameras. Crews manage catches more efficiently, aware they are being recorded. In 2021, no non-</p>

			<p>compliance was registered for discard or incidental catch issues.</p> <p>Scientific Observers: In 2021, 20.6% of fishing trips were observed, with 11.1% onboard and 9.5% in port.</p> <p>Landings Certification: 100% of landings were certified, either in person or remotely, with a decrease in bycatch from 7.6% (2015-2019) to 1.7% (2020-2021).</p>
The client shall ensure by the third surveillance audit that the fishery-specific management system is subject to regular internal and occasional external review	3.2.4	Closed on the first surveillance audit	<p>With the evidence presented above, the assessment team has been able to verify the progress made in this condition that is ahead of the objective, demonstrating that there are occasional external reviews that could even be periodic if the provisions of Article 30 of the Convention are complied with and develops a new review after 5 years from 2018. More details of each rationale in the first surveillance audit report: <a href="#">Assessments Chilean Jack mackerel industrial purse seine fishery - MSC Fisheries</a></p>

#### 14.4.2 Open Conditions at reassessment announcement or transition assessment announcement

**Table 47.** Open Condition 2.

Performance Indicator	1.2.1
Score	75
Justification	<p>Chilean fisheries regulations forbid discarding. The UoA has a monitoring system that assists the captain to avoid areas with high concentration of juvenile (<a href="http://www.fishtrack.com">www.fishtrack.com</a>), which is the main reason for discarding due to the lack of market value for smaller fish. Moreover, as evidenced during the site visit, discard is negligible. Therefore, it is possible to conclude that there are alternative measures to minimize UoA-related mortality of unwanted catch of the target stock. <b>Therefore, SG 60 is met.</b></p> <p>A specific regulation on discards in the Chilean Jack mackerel fishery is under preparation. One of the roles of the enhanced observer program being formulated by SPRFMO is to identify levels of discard. In Chile, two action plans are being implemented to respond to the issues of discards quantification and minimization. The SPRFMO is in the process of designing the observer program.</p> <p>While there are proposals in the Chilean Action Plans to review the effectiveness of the steps to reduce potential discards, as yet there is no evidence to show that there has been a regular review. <b>Therefore, SG 80 is not met.</b></p>
Condition	The client shall ensure by the third fourth surveillance audit there are regular reviews of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock and they are implemented as appropriate.
Condition start	The condition was set up at the full assessment when the PCR was posted in April 2019.
Condition deadline	as part of this surveillance audit, and as allowed by MSC Derogation 6, the deadline and associated milestones for this condition have all been extended by 12 months. The new deadline for this condition is the fourth surveillance audit (October 2024).

Milestones	<p>At the second surveillance audit: the client shall provide evidence to show that a review of the potential effectiveness and practicality of alternative measures to minimize UoA related mortality of unwanted catch of the target stock is being carried out.</p> <p>Resulting score: 75</p> <p>At the third surveillance audit: the client shall provide evidence to show that a review of the potential effectiveness and practicality of alternative measures to minimize UoA-related mortality of unwanted catch of the target stock has been carried out.</p> <p>Resulting score: 75</p> <p>At the fourth surveillance audit: the client shall provide evidence to show that alternative measures to minimize UoA related mortality of unwanted catch of the target stock are being implemented as appropriate.</p> <p>Resulting score: 80</p>
Progress on Condition	<p><b>At the first annual audit</b> the team received minutes of the Fishery Management Committee meetings providing evidence that the potential effectiveness and practicality of alternative measures to minimize UoA-related mortality of unwanted catch of the target stock has been discussed.</p> <p>The team were also given new reports from the IFOP discard program as well as reports on the level of discards in each trip of client vessels with an explanation of the motive for discard and the estimated quantity discarded.</p> <p>The team received reports on the level of discards in each trip of client vessels with an explanation of the motive for discard and the estimated quantity discarded.</p> <p>Finally, the team were provided with a manual of good practices for the Jack mackerel fishery. This report assesses the issue of Jack mackerel discards and the need to reduce discards and the associated options. The manual considers alternatives measures to reduce discards, their potential effectiveness and the practicality of implementation. This document was presented within the framework of the Management Committee and was also presented at the SPRFMO as a national document that was extended to the scientific committee of the Convention.</p> <p>It is expected that any measures would be implemented in the following 12-month period. The manual also will define responsibilities and will identify indicators of successful implementation.</p> <p>During the surveillance assessment audit, the team examined new information about the new discard's reduction plan for the Jack mackerel (approved on April 30, 2019) where there is evidence that alternatives measures were examined to reduce discards of the target species. Subsequent developments such as the manual of good practices and the latest report from the monitoring program of discards on the Jack mackerel fishery attest that there have been instances where evaluation of alternative measures to reduce discards of the target species in the Jack mackerel fishery has been done from 2018-2020</p> <p><b>At the second annual audit</b> the team received minutes of the Fishery Management Committee meetings providing evidence that the potential effectiveness and practicality of alternative measures to minimize UoA-related mortality of unwanted catch of the target stock has been discussed.</p> <p>The team were also given new reports from the IFOP discard program as well as reports on the level of discards in each trip of client vessels with an explanation of the motive for discard and the estimated quantity discarded.</p> <p>The team received reports on the level of discards in each trip of client vessels with an explanation of the motive for discard and the estimated quantity discarded.</p> <p><b>At the third annual audit</b> the team received minutes of the Fishery Management Committee meetings providing evidence that the potential effectiveness and practicality of alternative measures to minimize UoA-related mortality of unwanted catch of the target stock has been discussed.</p>

	<p>The team were also given new reports from the IFOP discard program as well as reports on the level of discards in each trip of client vessels with an explanation of the motive for discard and the estimated quantity discarded.</p> <p>The team received reports on the level of discards in each trip of client vessels with an explanation of the motive for discard and the estimated quantity discarded.</p>
Progress status	'on target', remains open.
Carrying over condition	<input type="checkbox"/> <p><i>Check the box if the condition is being carried into the next certificate and include a justification for carrying over the condition (FCP v2.3 7.31.5.2.a).</i></p>
Closing the condition during the reassessment or transition assessment	<p>It is possible that the condition would be closed during the reassessment given the new information provided in the ACDR.</p>

**Table 48.** Condition 3.

Performance Indicator	PI 2.2.2 Secondary Species management
Score	75
Justification	The only catch of “main” secondary species comprises several bird species, all of which are unwanted catch. The discard reduction programme launched by IFOP in 2014 in response to the revised LGPA in 2013 represents part of a formal process for reducing the catch of non-target species that is due to result in the publication of a “Discard Plan” for the Jack mackerel fishery. There is evidence that this review is underway, which is sufficient to meet the SG 60 requirements. The revisions to the LGPA that were made in 2013 require (at Article 1º C) that “Every five years, the effectiveness and implementation of conservation and management measures will be evaluated”. At this point the initial review is still underway, and there is no evidence that it will be conducted regularly, so neither the SG 80 or 100 requirements are presently met.
Condition	The client shall ensure by the <del>third</del> <sup>fourth</sup> surveillance audit there are regular reviews of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of main secondary species and evidence shall be presented to show that they are implemented as appropriate.
Condition start	The condition was set up at the full assessment when the PCR was posted in April 2019.
Condition deadline	As part of this surveillance audit, and as allowed by MSC Derogation 6, the deadline and associated milestones for this condition have all been extended by 12 months. The new deadline for this condition is the fourth surveillance audit (October 2023).
Milestones	As outlined above, condition milestones have been extended as per MSC Derogation 6. The review of alternative measures is independent of the management strategy/partial strategy and is based on 1) whether or not alternative measures to reduce the fishery's impacts exist, and 2) if they do, whether or not it would be practicable to implement them. With this in mind, the condition could be closed early if 1) no practicable alternative measures are identified or 2) alternative measures are identified and implemented and 3) there is a commitment to conduct another review of alternative measures within the timeframe defined by the MSC definition of ‘regular’.
Progress on Condition (Year 3)	<p><b>At the first surveillance audit</b> <b>At the second surveillance audit:</b> the client shall provide evidence to show that a review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch is being carried out. Resulting score: 75</p> <p><b>At the second surveillance audit</b> <b>At the third surveillance audit:</b> the client shall provide evidence to show that a review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch has been carried out. Resulting score: 75</p> <p><b>At the third surveillance</b> <b>At the fourth surveillance audit:</b> the client shall provide evidence to show that alternative measures to minimize UoA related mortality of unwanted catch are being implemented as appropriate. Resulting score: 80</p>
	<p><b>Year 1</b></p> <p>As a part of the surveillance activities the assessment team has reviewed the classification of the ETP species affected by this PI. Finally, as a result of this review, one species assessed as secondary main, Kelp gull, has been moved to ETP species as it meets the MSC criteria to be classified as ETP (more details in background section). The rest of the seabird's species previously identified as Secondary main have remained in this section.</p> <p>By the year 1 and during the surveillance audit, the assessment team was provided with the Good Practices Manual developed by INPESCA as a part of the client action plan defined by the fishery during the full assessment.</p> <p>In the Good Practices Manual, it can be seen that measures to reduce the incidental catches of seabirds and other non-target species have been incorporated and other will be implemented in the next 12 months.</p> <p>As a part of these measures, there are protocols for the mitigation, handling and release of seabirds. Further, Initiatives are currently underway in</p>

**Table 48.** Condition 3.

	<p>research and development of fishing gear and strategies to reduce the risk of seabirds becoming entangled in purse seine nets (e.g., sound deterrent devices) by chasing them away when they approach the net. The development of these initiatives takes place in parallel with the development of the current good practice manual. The client group is working closely to Birdlife and Albatross Task Force to ensure that the mitigation measures are successfully implemented in the fishery.</p> <p>During the site visit, in the meeting held by the assessment team with INPESCA and IFOP, it was told that measures and how they are working will be monitored annually. Actually, the Reduction Plan of bycatch for the fishery has shown the results of the observer program and the interactions reported with seabirds.</p> <p>Results from 2016, 2017 and 2018 have shown a decreased in the total interactions and mostly with all the species assessed.</p>
<b>Year 2</b>	<p>During the second annual surveillance the team received a report developed by ATF-Chile in collaboration between the companies subscribed to PESCADORES INDUSTRIALES DEL BIOBÍO and SONAPESCA, where it is carrying out an external review process of the development of local protocols of good practices applied to the Jack mackerel fishery, such as the Manual of Good Practices for Fishing Jack Mackerel. During this work the objective has been to identify gaps in the performance of the crews in procedures for the identification of non-target species, techniques of rescue and safe handling of the same and detect suitable sites on board for the installation of infrastructure, which facilitates the release or maintenance of species of injured marine fauna, in turn the safety material that each ship has for these purposes has been reviewed, and then make recommendations, which allow to reinforce the mission of the MGPJ, in order to advance from the fleets in the improvement of practices on board in the reduction of impacts on the ecosystem as part of the MSC certification principles.</p> <p>During the site visit, in the meeting held by the assessment team with INPESCA and IFOP, it was told that measures and how they are working will be monitored annually. Actually, the report of Reduction Plan of bycatch for the fishery has shown the results of the observer program and the interactions reported with seabirds. Results from 2018, 2019, 2020 and 2021 have shown a decrease in the total interactions and mostly with all the species assessed.</p>
<b>Year 3</b>	<p>During the third annual surveillance the team received a report developed by INPESCA in collaboration between the companies subscribed to PESCADORES INDUSTRIALES DEL BIOBÍO and SONAPESCA, Titled "Technical Report: Monitoring of discard and ETP species in the Jack mackerel fishery of south-central Chile, 2020-2023". In this report INPESCA concluded the following: <i>The opinion that the team of researchers of INPESCA has in relation to compliance with the mitigation measures of the discard reduction plan for the administration in the Jack mackerel fishery, is very positive, the background presented in this report indicates that the company has made an important effort to implement actions to mitigate discard and reduce bycatch, Although it is necessary to continue learning about the proposed measures to make the necessary adjustments that will go in the optimization of the actions proposed, for example in the manual of good practices, important advances are observed that are evidenced in the reduction of discard and incidental fishing that mark a good starting point in the implementation of the Discard Law (Law 20,625).</i></p>

**Table 48.** Condition 3.

		Thus, there is evidence that a review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch has been carried out.
	<i>Year 4</i>	<i>Summary of progress</i>
	<i>Insert additional years if relevant</i>	
Progress status	'on target', remains open.	
Remedial action	NA	
Additional information	NA	

**Table 49.** Condition 4.

Performance Indicator	<b>PI 2.3.2 ETPs Species Management</b>
Score	70
Justification	The discard reduction programme launched by IFOP in 2014 in response to the revised LGPA in 2013 represents part of a formal process for reducing the catch of non-target species (including ETP species) that is due to result in the publication of a "Discard Plan" for the Jack mackerel fishery. There is evidence that this review of catch composition and management measures is underway, which is sufficient to meet the SG 60 requirements. The revisions to the LGPA that were made in 2013 require (at Article 1º C) that "Every five years, the effectiveness and implementation of conservation and management measures will be evaluated". At this point the initial review is still underway, and there is no evidence that it will be conducted regularly, so <b>neither the SG 80 or 100 requirements are presently met</b> .
Condition	The client shall ensure by the <b>third-fourth</b> surveillance audit there are regular reviews of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of ETP species and evidence shall be presented to show that they are implemented as appropriate.
Condition start	The condition was set up at the full-assessment, in the PCR of April 29th 2019.
Condition deadline	As part of this surveillance audit, and as allowed by MSC Derogation 6, the deadline and associated milestones for this condition have all been extended by 12 months. The new deadline for this condition is the fourth surveillance audit (October 2023).
Milestones	As outlined above, condition milestones have been extended as per MSC Derogation 6. The review of alternative measures is independent of the management strategy/partial strategy and is based on 1) whether or not alternative measures to reduce the fishery's impacts exist, and 2) if they do, whether or not it would be practicable to implement them. With this in mind, the condition could be closed early if 1) no practicable alternative measures are identified or 2) alternative measures are identified and implemented and 3) there is a commitment to conduct another review of alternative measures within the timeframe defined by the MSC definition of 'regular'. <b>At the first surveillance audit At the second surveillance audit:</b> the client shall provide evidence to show that a review of the effectiveness and practicality of alternative measures to minimize UoA-related mortality of ETP species is being carried out. <b>Resulting score: 75</b> <b>At the second surveillance audit At the third surveillance audit:</b> the client shall provide evidence to show that a review of the effectiveness and practicality of alternative measures to minimize UoA-related mortality of ETP species has been carried out. <b>Resulting score: 75</b> <b>At the third surveillance audit At the fourth surveillance audit:</b> the client shall provide evidence to show that there is a regular review of alternative measures to minimize UoA related mortality of ETP species and that such measures are being implemented as appropriate. <b>Resulting score: 80</b>
Progress on Condition (Year 3)	Following the 12-month extension to this condition as part of this surveillance audit, and as required by MSC Derogation 6, the associated milestones have been extended by 12 months.

**Table 49.** Condition 4.

	<b>Year 1</b>	<p>As a part of the surveillance activities the assessment team has reviewed the classification of the ETP species affected by this PI. Finally, as a result of this review, one species assessed as secondary main, Kelp gull, has been moved to ETP species as it meets the MSC criteria to be classified as ETP (more details in background section). The rest of the seabird's species previously identified as ETPs have remained in this section.</p> <p>The condition on ETP species is linked with the previous condition evaluated in the table below. Both conditions are aimed at reducing the interactions and mortality of seabirds and in the case of ETP, marine mammals.</p> <p>By the year 1 and during the surveillance audit, the assessment team was provided with the Good Practice Manual developed by INPESCA as a part of the client action plan defined by the fishery during the full assessment.</p> <p>In the Good Practice Manual, it can be seen that measures to reduce the incidental catches of seabirds and marine mammals have been incorporated and other will be implemented in the next 12 months.</p> <p>As a part of these measures, there are protocols for the mitigation, handling and release of seabirds and marine mammals. In the Good Practice Manual, actions are implemented to mitigate bycatch of chondrichthyan and catches of marine mammals. Further, initiatives are currently underway in research and development of fishing gear and strategies to reduce the risk of seabirds becoming entangled in purse seine nets (e.g., sound deterrent devices) by chasing them away when they approach the net. The development of these initiatives takes place in parallel with the development of the current good practice manual. The client group is working closely to Birdlife and Albatross Task Force to ensure that the mitigation measures are successfully implemented in the fishery. Also, Chile is engaged with the US MMPA.</p> <p>During the site visit, in the meeting held by the assessment team with INPESCA and IFOP, it was told that measures and how they are working will be monitored annually. Actually, the Reduction Plan of bycatch for the fishery has shown the results of the observer program and the interactions reported with seabirds and marine mammals. Results from 2016, 2017 and 2018 have shown a decreased in the total interactions and mostly with all the species assessed.</p>
	<b>Year 2</b>	<p>The condition on ETP species is linked with the previous condition evaluated in the table above. Both conditions are aimed at reducing the interactions and mortality of seabirds and in the case of ETP, marine mammals.</p> <p>By the year 1 and during the surveillance audit, the assessment team was provided with the Good Practice Manual developed by INPESCA as a part of the client action plan defined by the fishery during the full assessment.</p> <p>In the Good Practice Manual, it can be seen that measures to reduce the incidental catches of seabirds and marine mammals have been incorporated and other will be implemented in the next 12 months</p> <p>As a part of these measures, there are protocols for the mitigation, handling and release of seabirds and marine mammals. In the Good Practice Manual, actions are implemented to mitigate bycatch of chondrichthyan and catches of marine mammals. Further, initiatives are currently underway in research and development of fishing gear and strategies to reduce the risk of seabirds becoming entangled in purse seine nets (e.g., sound deterrent devices) by chasing them away when they approach the net. The development of these initiatives takes place in parallel with the development of the current good practice manual. The client group is working closely to Birdlife and Albatross Task Force to ensure that the mitigation measures are successfully implemented in the fishery. Also, Chile is engaged with the US MMPA</p> <p>During the second annual surveillance the team received a report developed by ATF-Chile in collaboration between the companies subscribed to PESCADORES</p>

**Table 49.** Condition 4.

	<p>INDUSTRIALES DEL BIOBÍO and SONAPESCA, where is carrying out an external review process of the development of local protocols of good practices applied to the Jack mackerel fishery, such as the Manual of Good Practices for Fishing Jack Mackerel During this work the objective has been to identify gaps in the performance of the crews in procedures for the identification of non-target species, techniques of rescue and safe handling of the same and detect suitable sites on board for the installation of infrastructure, which facilitates the release or maintenance of species of injured marine fauna, in turn the safety material that each ship has for these purposes has been reviewed, and then make recommendations, which allow to reinforce the mission of the MGPI, in order to advance from the fleets in the improvement of practices on board in the reduction of impacts on the ecosystem as part of the MSC certification principles</p> <p>During the site visit, in the meeting held by the assessment team with INPESCA and IFOP, it was told that measures and how they are working will be monitored annually. Actually, the report of Reduction Plan of bycatch for the fishery has shown the results of the observer program and the interactions reported with seabirds and marine mammals. Results from 2018, 2019 2020 and 2021 have shown a decrease in the total interactions and mostly with all the species assessed.</p>
<i>Year 3</i>	<p>During the third annual surveillance the team received a report developed by INPESCA in collaboration between the companies subscribed to PESCADORES INDUSTRIALES DEL BIOBÍO and SONAPESCA, Titled "Technical Report: Monitoring of discard and ETP species in the Jack mackerel fishery of south-central Chile, 2020-2023". In this report INPESCA concluded the following: <i>The opinion that the team of researchers of INPESCA has in relation to compliance with the mitigation measures of the discard reduction plan for the administration in the Jack mackerel fishery, is very positive, the background presented in this report indicates that the company has made an important effort to implement actions to mitigate discard and reduce bycatch, Although it is necessary to continue learning about the proposed measures to make the necessary adjustments that will go in the optimization of the actions proposed, for example in the manual of good practices, important advances are observed that are evidenced in the reduction of discard and incidental fishing that mark a good starting point in the implementation of the Discard Law (Law 20,625).</i> Thus, there is evidence that a review of the effectiveness and practicality of alternative measures to minimise UoA-related mortality of ETP species has been carried out by INPESCA</p>
<i>Year 4</i>	<i>Summary of progress</i>
<i>Insert additional years if relevant</i>	
Progress status	'on target', remains open.
Remedial action	NA
Additional information	NA

## 14.5 Client Action Plan

### To be added from Public Comment Draft Report

The report shall include the Client Action Plan from the fishery client to address conditions.

Reference(s): FCP v2.3 Section 7.19

## 14.6 Surveillance

### To be drafted from Client and Peer Review Draft Report

The report shall include the program for surveillance, timing of surveillance audits and a supporting justification.

Reference(s): FCP v2.3 Section 7.29

**Table 50.** Fishery surveillance program.

Surveillance level	Year 1	Year 2	Year 3	Year 4
e.g. Level 5	e.g. On-site surveillance audit & re-certification site visit			

**Table 51.** Timing of surveillance audit.

Year	Anniversary date of certificate	Proposed date of surveillance audit	Justification
e.g. 1	e.g. May 2018	e.g. July 2018	e.g. Scientific advice to be released in June 2018, proposal to postpone audit to include findings of scientific advice

**Table 52.** Surveillance level justification.

Year	Surveillance activity	Number of auditors	Justification
e.g.3	e.g. On-site audit	e.g. 1 auditor on-site with remote support from 1 auditor	e.g. From client action plan it can be deduced that information needed to verify progress towards conditions 1.2.1, 2.2.3 and 3.2.3 can be provided remotely in year 3. Considering that milestones indicate that most conditions will be closed out in year 3, the CAB proposes to have an on-site audit with 1 auditor on-site with remote support – this is to ensure that all information is collected and because the information can be provided remotely.

## 14.7 Risk-Based Framework outputs – delete if not applicable

To be drafted at Client and Peer Review Draft Report stage

**IMPORTANT NOTE for Assessor — please CONSIDER and DELETE.**

When undertaking RBF scoring and inputting data into the RBF worksheet please double check that the scores have been:

- i) attributed correctly i.e. the score matches the rationale and also corresponds with the appropriate score in the relevant MSC table (e.g. Tables PF4 and PF5 in FCP v2.3), and
- ii) transcribed into the RBF worksheet correctly.

**Simple errors in doing this can have big implications on overall assessment outcomes.**

### 14.7.1 Productivity Susceptibility Analysis (PSA)

At the ACDR stage, the assessment team has not yet conducted the necessary meetings to determine whether the RBF (Risk-Based Framework) will be triggered and what scores will be assigned. Therefore, the tables provided below are intended only to offer a preliminary overview of the species that are likely to be assessed under the RBF.

The complete tables, along with detailed rationales and scoring methodologies, will be included in the client and peer review draft report after the relevant meetings have taken place and the results determine the best course of action.

This information is meant to inform stakeholders about the potential use of the RBF in this fishery. Further questions will be circulated prior to the site visit to address the scoring of these elements.

#### Peruvian Pelican (*Pelecanus thagus*)

**Table 53. PSA productivity and susceptibility attributes and scores for birds**

Performance Indicator	2.2.1	
<b>Productivity</b>		
Scoring element (species)	Peruvian Pelican ( <i>Pelecanus thagus</i> )	
Attribute	Rationale	Score
Average age at first breeding	To be confirmed at the site visit when relevant meeting will be held	1/2/3
Average ‘optimal’ adult survival probability	To be confirmed at the site visit when relevant meeting will be held	1/2/3
Fecundity	To be confirmed at the site visit when relevant meeting will be held	1/2/3
<b>Susceptibility</b>		
Attribute	Rationale	Score
Areal Overlap	The overlap between the species and the fishing activities is less than 50%, as the industrial fishery is restricted from operating close to the coast where these species are typically more abundant	2
Encounterability	The overlap between the species and the fishing activities is less than 50%, as the industrial fishery is restricted from operating close to the coast where these species are typically more abundant	2
Selectivity of gear type	A priori, the purse seine fishery does not show significant impacts on these species; however more information will be gathered during the site visit when meetings with relevant stakeholders take place	1
Post capture mortality		3

**Sooty Shearwater (*Ardenna grisea*)**
**Table 54.** PSA productivity and susceptibility attributes and scores for birds

Performance Indicator	2.2.1	
<b>Productivity</b>		
Scoring element (species)	Sooty Shearwater ( <i>Ardenna grisea</i> )	
Attribute	Rationale	Score
Average age at first breeding	To be confirmed at the site visit when relevant meeting will be held	1/2/3
Average 'optimal' adult survival probability	To be confirmed at the site visit when relevant meeting will be held	1/2/3
Fecundity	To be confirmed at the site visit when relevant meeting will be held	1/2/3
<b>Susceptibility</b>		
Attribute	Rationale	Score
Areal Overlap	The overlap between the species and the fishing activities is less than 50%, as the industrial fishery is restricted from operating close to the coast where these species are typically more abundant	2
Encounterability	The overlap between the species and the fishing activities is less than 50%, as the industrial fishery is restricted from operating close to the coast where these species are typically more abundant	2
Selectivity of gear type	A priori, the purse seine fishery does not show significant impacts on these species; however more information will be gathered during the site visit when meetings with relevant stakeholders take place	1
Post capture mortality		3

## 14.8 Harmonised fishery assessments – delete if not applicable

To be drafted at Announcement Comment Draft Report stage

To be completed at Public Certification Report stage

The MSC Fisheries Certification Process v2.3 (FCP) sets out procedures for ensuring consistency of outcomes in overlapping fisheries (see Annex PB of the FCP). The intention of this process is to maintain the integrity of MSC fishery assessments. The audit team have also consulted the guidance issued on the MSC's interpretation log to identify the harmonisation requirements for this fishery<sup>9</sup>. The FCP confirms that harmonisation is not required if overlapping fisheries have used different versions of the assessment tree (v2.0 or v.1.3) (MSC Fisheries Standards Annex SA Annex SB, Annex SC and Annex SD) (MSC FCP v2.3 Annex PB 1.2.1). The MSC harmonisation requirements table is shown below for clarity.

Table GPB1: Harmonisation requirements per PI. No harmonisation is required for P2 PIs and scoring issues (SIs) that are not listed in the table.

PI/SIs		Required to harmonise
All P1 PIs	Yes	P1 always considers the impacts of all fisheries on a stock. Any fisheries that have the same P1 species (stocks) should be harmonised.
PI 2.1.1a	Partially	For stocks that are 'main' in both UoAs, harmonise status relative to PRI (at SG60, 80 and 100), and if below PRI, harmonise cumulative impacts at SG80 (not at SG60).
PI 2.2.1a	Partially	For stocks that are 'main' in both UoAs, harmonise status relative to Biologically Based Limits (at SG60, 80, and 100), and if below Biologically Based Limits, harmonise cumulative impacts at SG80 (not at SG60).
PI 2.3.1a	Partially	Harmonise recognition of any limits applicable to both UoAs (at SG60, 80 and 100), and cumulative effects of the UoAs at SG80 and SG100 (not at SG60).
PI 2.4.1b	Partially	Harmonise recognition of VMEs where both UoAs operate in the same 'managed area(s)' (see Guidance to the MSC Fisheries Standard).
PI 2.4.2 a, c	Partially	Harmonise scoring at SG100 since all fishery impacts are considered (not at SG60 or 80).
All P2 PIs	Situation dependent	If 2 UoAs are identical in scope, even if the UoCs are different (e.g. separate clients), harmonisation is required.
PIs 3.1.1 – 3.1.3	Situation dependent	Both UoAs are part of the same larger fishery or fleet or have stocks in either P1 or P2 that are at least partially managed by the same jurisdiction(s) (nation states, RFMOs, or others) or under the same agreements. Harmonisation may sometimes be possible for those management arrangements that apply to both UoAs (noting the limitations accepted in GPB1.3).
		The MSC accepts that it may be impractical to attempt full harmonisation, due to the large number of fisheries that may be managed under the relevant policy framework, and the differences in application between them.
PIs 3.2.1 – 3.2.4	Situation dependent	Both UoAs have stocks within either P1 or P2 that are at least partially managed by the same jurisdiction(s) (nation states, RFMOs, or others) or under the same agreements. Harmonisation is needed for those management arrangements that apply to both UoAs, e.g. at the RFMO level but not the national level in the case of 2 separate national fleets both fishing the same regional stock.

<sup>9</sup> See <https://mscportal.force.com/interpret/s/article/What-are-the-MSC-requirements-on-harmonisation-multiple-questions-1527586957701>

**Table 55.** Overlapping Units of Assessment

Fishery name	Unit of assessment	Certification status	Certification date	Performance Indicators to harmonise
Chilean Jack mackerel Purse Seine fishery. (this assessment)	<b>UoA1</b> =Jack Mackerel Stock: Chilean EEZ (Regions III-X & XIV) and international waters. Fishing Gear: Purse seine	Certified	April 26, 2019	3.1.1, 3.12, 3.13
European Union (EU) South Pacific Jack Mackerel Midwater Trawl fishery	<b>UoA1</b> =Jack Mackerel Stock: South Pacific high seas, in the South Pacific Regional Fisheries Management Organisation (SPRFMO) Convention Area. Fishing gear: Midwater otter trawl	Certified	Certified since 26 March 2020	P1 1.1.1,1.1.2,1.2.1,1.2.2, ,1.2.3,1.2.4 P2: 2.4.1,2.42,2.4.3,2.5.1, 2.5.2,2.5.3 P3: 3.1.1,3.1.2.3.1.3
Chile Nylon shrimp and squat lobsters Modified trawl fishery.	<b>UoA1</b> =Nylon shrimp Stock: Northern Central Zone -ZCN- (Regions II-IV) & Southern Central Zone -- ZCS- (Regions V-VIII) Gear: Industrial trawlers targeting demersal crustaceans  <b>UoA2</b> =Nylon shrimp Stock: Northern Central Zone - ZCN - (Regions II-IV) Fishing gear: Artisanal trawlers targeting demersal crustacean  <b>UoA3</b> = Yellow squat lobster Stock: Northern Fishery Unit -UPN- (Regions III and IV) Fishing gear: Artisanal trawlers targeting demersal crustaceans  <b>UoA4</b> =Yellow squat lobster Stock: Northern Fishery Unit -UPN- (Regions III, IV) Fishing gear: Industrial trawlers targeting demersal crustaceans  <b>UoA5</b> =Yellow squat lobster Stock: Southern Fishery Unit -UPS- (Regions V-VIII) Fishing Gear: Industrial trawlers targeting demersal crustaceans  <b>UoA6</b> =Red squat Lobster Stock: Northern Fishery Unit -UPN- (Regions XV-IV) Fishing gear: Industrial trawlers targeting demersal crustaceans  <b>UoA7</b> = Red squat Lobster Stock: Northern Fishery Unit -UPN- (Regions XV-IV)	Certified	September 13, 2016	3.1.1, 3.12, 3.13

	Fishing gear: Artisanal trawlers targeting demersal crustaceans <b>UoA8</b> = Red squat Lobster - Stock: Southern Fishery Unit -UPS- (Regions V-VIII) Fishing gear: Industrial trawlers targeting demersal crustaceans			
Chile squat lobsters demersal trawl Camanchaca fishery.	<b>UoA1</b> = Red squat Lobster Stock: Southern Fishery Unit. From Valparaíso Region to Biobío Region (Regions V-VIII) Fishing gear: Demersal trawl  <b>UoA2</b> = Yellow squat lobster Stock: Southern stock. From Valparaíso Region to Biobío Region (Regions V-VIII) Fishing gear: Industrial trawlers targeting demersal crustaceans Fishing gear: Demersal trawl  <b>UoA3</b> = Nylon shrimp Stock: Southern Central Zone (ZCS). From Valparaíso Region to Biobío Region (Regions V-VIII) Fishing gear: Demersal trawl	Certified	February 09, 2017	3.1.1, 3.12, 3.13
Chile Austral Hake Industrial Trawl and Longline	<b>UoA1</b> = Austral Hake Stock: Stock present in Chile Fishing Areas X, XI and XII Fishing Gear: Industrial Trawl  <b>UoA2</b> = Stock: Stock present in Chile Fishing Areas X, XI and XII Fishing Gear: Industrial Longline	Certified	March 24, 2019	3.1.1, 3.12, 3.13

**Table 56.** Overlapping Units of Assessment – Harmonisation activities.

**Supporting information**

At the ACDR stage, all overlapping fisheries and previous harmonization activities have been reviewed and analyzed. For Principle 1, there is one fishery that overlaps with the fishery under assessment, and several harmonization activities have been conducted, mostly focusing on PI 1.2.2. There is still ongoing discussion regarding which scoring issue should fall below 80. GTC believes that SI a should reach a score of 80, with the condition placed on SI C, and the robustness of the HCRs has not been extensively discussed with the other CAB, CUUK. Conversations are planned to take place during the site visit, and both CABs are aware of the situation.

According to Principle 2, this fishery operates in national waters. While some impacts on bird and mammal populations are similar, others are specific to Chilean government regulations. Therefore, conditions on PI 2.3.2 and PI 2.2.2 are tailored to this fishery.

For Principle 3, harmonization of RFMO-related aspects has been completed. Any minor differences result from specific national regulations. Currently, no Chilean fisheries have conditions on Principle 3, but the scores will be reviewed if relevant differences are identified during the CPRDR.

Has there been an Annual Harmonisation meeting of which the results will be adopted?	Not conducted yet
Date of annual harmonisation meeting	TBC

If applicable, describe the meeting outcome

It will be included at the following report, Client and Peer Review Draft Report

**Table 57.** Overlapping Units of Assessment – Scoring differences.

Performance Indicators (PIs)	Chilean Jack mackerel industrial purse seine fishery (this fishery)	European Union (EU) South Pacific Jack Mackerel fishery	Chile Austral hake ( <i>Merluccius australis</i> ) industrial trawl and longline	Chile squat lobster and nylon shrimp modified trawl All UoAs	Chile squat lobsters demersal trawl Camanchaca fishery All UoAs
<b>1.1.1</b>	>80	100	NA	NA	NA
<b>1.1.2</b>	>80	100	NA	NA	NA
<b>1.2.1</b>	>80	75	NA	NA	NA
<b>1.2.2</b>	60-79	75	NA	NA	NA
<b>1.2.3</b>	>80	90	NA	NA	NA
<b>1.2.4</b>	>80	100	NA	NA	NA
<b>2.4.1</b>	>80	100	NA	NA	NA
<b>2.4.2</b>	>80	85	NA	NA	NA
<b>2.4.3</b>	>80	80	NA	NA	NA
<b>2.5.1</b>	>80	80	NA	NA	NA
<b>2.5.2</b>	>80	80	NA	NA	NA
<b>2.5.3</b>	>80	90	NA	NA	NA
<b>3.1.1</b>	>80	100	100	95	100
<b>3.1.2</b>	>80	95	85	85	85
<b>3.1.3</b>	>80	100	100	100	100
<b>3.2.1</b>	>80	100	NA	NA	NA
<b>3.2.2</b>	>80	90	NA	NA	NA
<b>3.2.3</b>	>80	100	NA	NA	NA
<b>3.2.4</b>	>80	80	NA	NA	NA

**Table 58.** Overlapping Units of Assessment – Rationale for scoring differences.

If applicable, explain and justify any difference in scoring and rationale for the relevant Performance Indicators (FCP v2.3 Annex PB1.3.2.2)

At the ACDR stage, all overlapping fisheries and previous harmonization activities have been reviewed and analyzed. For Principle 1, there is one fishery that overlaps with the fishery under assessment, and several harmonization activities have been conducted, mostly focusing on PI 1.2.2. There is still ongoing discussion regarding which scoring issue should fall below 80. GTC believes that SI a should reach a score of 80, with the condition placed on SI C, and the robustness of the HCRs has not been extensively discussed with the other CAB, CUUK. Conversations are planned to take place during the site visit, and both CABs are aware of the situation

If exceptional circumstances apply, outline the situation and whether there is agreement between or among teams on this determination (FCP v2.3 PB1.3.2.1).

#### 14.9 Peer reviewers – Summary of qualifications and competencies

**To be added at Client & Peer Review Draft Report Stage**

The CAB shall include in an appendix to the report summaries of the peer reviewers' qualifications and competencies.

#### 14.10 Objection Procedure – delete if not applicable

**To be added at Public Certification Report stage**

The CAB shall include in the report all written decisions arising from the Objection Procedure.

Reference(s): MSC Disputes Process v1.0

#### 14.11 Supporting Information – certificate sharing agreement



September 19<sup>th</sup>, 2024

VIA EMAIL: [vromito@nsf.org](mailto:vromito@nsf.org)

Vito Ciccia Romito  
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##### MSC FISHERY ASSESSMENT: REQUIREMENT FOR PUBLICATION OF THE SHARING MECHANISM CERTIFICATE FOR THE NATIONAL FISHERY SOCIETY IN THE CHILEAN JACK MACKEREL INDUSTRIAL FISHERY

Dear Vito Romito: The National Fisheries Society (SONAPESCA F.G.) confirms that it is willing to share the MSC Certification with other industry participants, specifically, fleets belonging to other holders of authorized tradable fishing licenses in the industrial Chilean jack mackerel fishery and operating in the maritime zone delimited between the Atacama and Los Lagos regions, including international waters.

This sharing is subject to a sharing structure developed by SONAPESCA, which we hope will help ensure that new authorized participants comply with MSC requirements. In addition, such structure will help support an equitable cost-sharing plan to ensure and maintain MSC certification and other associated programs in the future.

Sincerely,



Hector Bacigalupo Falcon  
President  
SONAPESCA F.G.



Rodrigo Zamora Gómez  
Head of Sustainability  
SONAPESCA F.G.

## 14.12 References (Bibliography)

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## Principle 2

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### **Principle 3**

- Ley 19.880, Ley de Procedimiento Administrativo.
- Ley 20.249, Crea el Espacio Costero Marino de Pueblos Originarios
- Ley 20.285, Acceso a la información pública.
- Ley 20.625, Regulación del descarte.
- Ley 21.132, entre otras establece que la certificación del desembarque sea efectuada por el Servicio Nacional de Pesca.
- SPRFMO, Convención Sobre la Conservación y Ordenamiento de los Recursos Pesqueros en alta mar en el Océano Pacífico Sur.
- SPRFMO, CMM 01-24
- SPRFMO, CMM 02-22
- SPRFMO, CMMC04-2020, INDNR,
- SPRFMO, CMM 05-2023, Registro de naves,
- SPRFMO, CMM 06-2023, Sistema de monitoreo,
- SPRFMO, CMM 07-2022, Inspección en Puerto,
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- SPRFMO, CMM 11-23
- SPRFMO, CMM 12-24
- SPRFMO, CMM 16-24
- SPRFMO, CMM 19-21
- SPRFMO, Doc06 anexo COMM07
- SPRFMO, Doc07 anexo COMM07
- SPRFMO, Decisión 06-24 Anexo COMM12
- SPRFMO, SC 11-Doc 25.
- SPRFMO, Anexo K, COMM02
- SPRFMO, SC02
- SPRFMO, COMM05
- SPRFMO, COMM07
- SPRFMO, COMM12
- Ministerio de Economía Fomento y Reconstrucción, Decreto DFL Nº 2.442 de 1978, establece las funciones y atribuciones en materia pesquera del Ministerio de Economía, Subsecretaría de Pesca y Servicio Nacional de Pesca.
- Ministerio de Economía Fomento y Reconstrucción, Decreto N° 458 de 1981 establece la Talla mínima del jurel.
- Ministerio de Economía Fomento y Reconstrucción, Decreto Nº 430 de 1991, Establece texto refundido de la Ley de Pesca y sus Modificaciones
- Ministerio de Economía Fomento y Reconstrucción, Decreto Nº 453 de 1992, establece la elección de los miembros de los Consejos Zonales de Pesca.
- Ministerio de Economía Fomento y Reconstrucción, Decreto Nº Nº 85 de 2003, establece reglamento para la elección de los consejeros del Consejo Nacional de Pesca.
- Ministerio de Economía Fomento y Reconstrucción, Decreto Nº Nº 267 de 2005, aprueba Plan de acción para prevenir, desalentar y eliminar la pesca ilegal no declarada y no reglamentada.
- Ministerio de Economía Fomento y Reconstrucción, Decreto Nº 136 de 2007, aprueba Plan de acción nacional para reducir capturas incidentales de aves en pesquerías de palangres.
- Ministerio de Economía Fomento y Reconstrucción, Decreto Nº 198 de 2007, aprueba Plan de acción nacional para la conservación de tiburones.
- Ministerio de Economía Fomento y Turismo, Decreto Nº 77 de 2013, establece procedimiento de nominación y funcionamiento de los Comités Científicos Técnicos
- Ministerio de Economía Fomento y Turismo, Decreto Nº 95 de 2013, y sus modificaciones, establece la forma de designación de los integrantes de los Comités de manejo y normas de funcionamiento.

- Ministerio de Economía Fomento y Turismo, Decreto N° 87 de 2015, modifica Decreto N° 77 de 2013, establece funcionamiento de los Comité Científico Técnicos.
- Ministerio de Economía Fomento y Turismo, Decreto N°69 de 2022, Establece cuota de Jurel para el 2023.
- Ministerio de Economía Fomento y Turismo, Decreto N°164 de 2023, Establece cuota de Jurel para el 2024.
- Ministerio de Relaciones Exteriores, Decreto N° 662 de 1981, promulga la Comisión para la Conservación de los Recursos Vivos marinos Antárticos. CCRVMA como ley de Chile.
- Ministerio de Relaciones Exteriores, Decreto N° 1.393 de 1997, Chile adhiere a la Convención de Naciones Unidas sobre el derecho del mar, CONVEMAR.
- Ministerio de Relaciones Exteriores, Decreto N° 089 de 2012, del, Chile ratifica la Organización Regional de Pesca del Pacífico Sur.
- Ministerio de Relaciones Exteriores, Decreto N° 031 de 2016, promulga Acuerdo sobre las Disposiciones de la Convención de Naciones Unidas sobre Derecho del mar, relativas a la Conservación y Ordenación de las Poblaciones de peces transzonales y las altamente Migratorias, Acuerdo de Nueva York.
- Subsecretaría de Pesca, Resolución N° 2.203 de 1996, establece margen de tolerancia de ejemplares bajo talla de jurel de 35% medido en número por desembarque.
- Subsecretaría de Pesca, Resolución N°3.115 de 2013, establece las pesquerías artesanales por región y arte de pesca.
- Subsecretaría de Pesca, Resolución N° 3.200 de 2013, establece las pesquería industriales con su arte de pesca y especies asociadas.
- Subsecretaría de Pesca, Resolución N° 451 de 2015, modificada por Resolución N° 687 de 2016, establece las áreas asociadas a 100 montes submarinos y prohíbe actividad de arrastre.
- Subsecretaría de Pesca, Resolución N° 4.344 de 2017, establece el Plan de Manejo de la Pesquería de Jurel.
- Subsecretaría de Pesca, Resolución N° 2.745 de 2019, modifica la Resolución N° 3.115 de 2013.
- Subsecretaría de Pesca, Resolución N° 3.917 de 2019, modifica la Resolución N° 1700 de 2000.
- Subsecretaría de Pesca, Resolución N° 3.986 de 2019, modifica la Resolución N° 3.200 de 2013.
- Subsecretaría de Pesca, Resolución N° 1.626 de 2019, establece el Plan de Reducción del descarte de las pesquerías de Jurel.
- Subsecretaría de Pesca, Resolución N° 2.941 de 2019, establece regulación para reducir la captura incidental de aves en pesquerías de arrastre.
- Subsecretaría de Pesca, Resolución N° 903 de 2000, modifica el Decreto N° 458 de 1981 en el sentido de establecer que el porcentaje permitido de especies bajo talla de jurel se mida mensualmente y no por viaje de pesca.

- Subsecretaría de Pesca, Resolución N° 1700 de 2000, establece las especies de peces que no pueden ser capturadas, ni con arrastre, ni con cerco.
- Subsecretaría de Pesca, Resolución N° 1.826 de 2019, Estableció el Plan de Reducción del Descarte para Jurel para el área de Valparaíso a Los Lagos y aguas internacionales.
- Subsecretaría de Pesca, Resolución N° 2.941 de 2019, establece medidas para reducir la captura incidental de aves marinas en pesquerías de arrastre.
- Subsecretaría de Pesca, Resolución N° 903 del 2020, Modifica Res 2023 de 1996, y establece que la captura bajo talla de jurel en un 25% medido en número mensual.
- Subsecretaría der Pesca, Resolución N° 45 de 2020, de la Subsecretaría de Pesca, sustituye el Decreto N° 411 de 2000.
- Subsecretaría de Pesca, Resolución N° 2.063 de 2020, establece la devolución obligatoria de condictios.
- Subsecretaría de Pesca, Resolución N° 862 de 2021, faculta el traspaso de excedentes del lance de especies pelágicas en el mar.
- Subsecretaría de Pesca, Resolución N° 1.468 de 2021, Establece el Plan de Reducción del Descarte para jurel y anchoveta para el área de la III-IV región.
- Subsecretaría de Pesca, Resolución N° 2.830 de 2022, Establece distribución de la cuota artesanal de jurel por región para 2023.
- Subsecretaría de Pesca, Resolución N° 4.344 de 2017, Establece el Plan de Manejo de la pesquería de Jurel.
- Subsecretaría de Pesca, Resolución N° 2.851 de 2022, Establece las toneladas para casa titular de Licencias transables de pesca, clase A, de jurel para el año 2023.
- Subsecretaría de Pesca, Resolución N° 2.852 de 2022, Establece las toneladas para casa titular de Licencias transables de pesca, clase B, de jurel para el año 2023.
- Subsecretaría de Pesca, Resolución N° 119 de 2023, Establece para la pesquería de jurel, la especie objetivo, fauna acompañante, y pesca incidental que puede o no descartarse o cuya devolución es obligatoria para el 2023.
- Subsecretaría de Pesca, Resolución N° 705 de 2023, establece los PBR del Jurel, modifica Resolución N° 291 de 2015.
- Subsecretaría de Pesca, Resolución N° 2098 de 2023, establece el programa de investigación para el año 2024.
- Subsecretaría de Pesca, Resolución N° 03 de 2024, Establece las toneladas para casa titular de Licencias transables de pesca, clase B, de jurel para el año 20234
- Subsecretaría de Pesca, Resolución N° 04 de 2024, Establece las toneladas para casa titular de Licencias transables de pesca, clase A, de jurel para el año 20234
- Subsecretaría de Pesca, Resolución N° 23 de 2024, Establece distribución de la cuota artesanal de jurel por región para 2024.

- Subsecretaría de Pesca, Resolución N° 164 de 2024, Establece para la pesquería de jurel, la especie objetivo, fauna acompañante, y pesca incidental que puede o no descartarse o cuya devolución es obligatoria para el 2024.
- Subsecretaría de Pesca, Resolución N° 810 de 2024, aprueba el informe Estado de situación de las principales pesquerías chilenas, año 2023.
- Servicio Nacional de Pesca, Respuesta a consulta por transparencia a de N°AH010T0005186 de 2024.
- Servicio Nacional de Pesca, Resolución N° 736 de 2022, establece el Plan Nacional de Fiscalización 2023.
- Servicio Nacional de Pesca, Informe Control de cuota final, 2023
- Servicio Nacional de Pesca, Resolución N° 2.952 de 2019, establece los requisitos y condiciones de certificación del desembarque.
- Servicio Nacional de Pesca, Resolución N° 3.913 de 2019, establece fecha de inicio de la certificación por parte del Sernapesca en la Macrozona centro sur y Coquimbo, de la Región de Coquimbo a la región de la Araucanía.
- Servicio Nacional de Pesca, Resolución N° 4.533 de 2019, autoriza puntos y Puertos de desembarque de recursos hidrobiológicos.
- Servicio Nacional de Pesca, Resolución N° 5.930 de 2019, Establece fecha de inicio para la entrada en vigor del sistema de fiscalización del descarte, por parte del Servicio nacional de Pesca. (a partir del 1° de enero de 2020).
- Servicio Nacional de Pesca, Resolución N° 267 de 2020, Establece sistema de bitácora electrónica de pesca (SIBE) y determina oportunidad y condiciones de entrega de la información de captura. Deja sin efecto Resolución 114 de 2015.
- Servicio Nacional de Pesca, Resolución N° 857 de 2021, establece procedimiento para la certificación remota del desembarque.

## 15 Template information and copyright

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