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IFFO RS
Global Standard for Responsible Supply
of Marine Ingredients

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Global Standard for Responsible Supply of Marine Ingredients

Fishery Assessment Methodology and Template Report V2.0



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Fishery Under Assessment	Chilean anchovy <i>Engraulis ringens</i> FAO 87 PACIFIC, SOUTHEAST Chile EEZ Regions V to X
Date	November 2020
Assessor	Virginia Polonio

Application details and summary of the assessment outcome				
Name:				
Address:				
Country: Chile		Zip:		
Tel. No.:		Fax. No.:		
Email address:		Applicant Code		
Key Contact:		Title:		
Certification Body Details				
Name of Certification Body: SAI Global				
Assessor Name	Peer Reviewer	Assessment Days	Initial/Surveillance/R e-approval	Whole fish/ By-product
V. Polonio	Géraldine Criquet	3	SURV2	Whole fish
Assessment Period	November 2020			

Scope Details	
Management Authority (Country/State)	Subsecretaria de Pesca (SUBPESCA) and SERNAPESCA
Main Species	<i>Engraulis ringens</i>
Fishery Location	FAO 87 Pacific Southeast Chile EEZ Regions V to X
Gear Type(s)	Purse seine
Outcome of Assessment	
Overall Outcome	Chilean anchovy, <i>Engraulis ringens</i>
Clauses Failed	None
Peer Review Evaluation	Peer Reviewer agrees with the assessor's determination.
Recommendation	APPROVED

Assessment Determination
<p>If any species is categorised as Endangered or Critically Endangered on IUCN's Red List, or if it appears in the CITES appendices, it cannot be approved for use as IFFO RS raw material. Anchoveta (<i>Engraulis ringens</i>); Araucanian herring (<i>Strangomera bentincki</i>) and Chilean jack mackerel (<i>Trachurus murphy</i>) do not appear as Endangered or Critically Endangered on IUCN's Red List, nor does it appear in CITES; therefore, the three species are eligible for approval for use as IFFO RS by-product raw material.</p> <p>Chilean anchovy (anchoveta, <i>Engraulis ringens</i>) and Araucanian herring (Sardina, <i>Strangomera bentincki</i>) in the V-X Regions are harvested as part of a mixed pelagic fishery. These species are caught during the same period and area by industrial fleets that fish for both using the same fishing gear (which is non-selective). Discarding represents less than 10% of catches in industrial fisheries.</p> <p>The Subsecretaria de Pesca (Undersecretariat of Fisheries, SUBPESCA or SSP); positioned within the Chilean Ministry (MINECOM) provide policy settings and regulatory framework for domestic management of the sector. The Instituto de Fomento Pesquero (Fisheries Development Institute, IFOP) is the research arm; providing scientific advice to SUBPESCA on fisheries and aquaculture issues.</p> <p>A management plan for Chilean anchovy and Araucanian herring (Chile V-X) has been officially adopted. The plan sets lines of action to address biological, economic, social and ecological matters. Fixed and mobile temporal closures to protect spawning stock and juveniles are included. Catches are reported annually. Catch limits are modified in an adaptive way during the year to account for updated scientific data. Direct hydroacoustic surveys (Chilean anchovy and Araucanian herring) have been conducted biannually since 1999.</p>

According to the latest assessment CCT-PP (Scientific and Technical Committee formed by IFOP and SUBPESCA) confirmed that the anchovy stock (V-X) is not overfished and overfishing is not happening.

Araucanian herring and Jack mackerel stocks are also above limits in the last stock assessment carried out for these species.

ETP, habitat and ecosystems do not present important changes from the previous assessment as the fishery still operate in the same way and impacts on these components of the ecosystem are not relevant.

The SAI Global assessor recommends the approval of Chilean anchovy V-X *Engraulis ringens* whole-fish (Category A); Araucanian herring *Strangomera bentincki* whole-fish (Category A) and Chilean Jack mackerel (*Trachurus murphyi*) by-product (Category C) for the production of fishmeal and/or fish oil under the current IFFO-RS Whole fish and by-product Standard (v 2.0).

Peer Review Comments

The assessor correctly classified the three species in conformity with the Species categorisation requirements.

The fishery is managed by the Chile national fishery management system. There is a monitoring, surveillance and control system in place. There is a harvest strategy in place to ensure that stocks are fished at sustainable levels. Data are collected and stocks are assessed. None of the three stocks are overfished and overfishing does not occur.

Given the type of gear, there is no evidence that the fishery impacts significantly habitats. There is no evidence that the fishery has significant negative impacts on the ecosystem.

Regarding, interactions with ETP species, monitoring shows that interactions occur. The rationale for F1.2 should be strengthened to clearly show that the fishery does not have significant negative impacts on the ETP species populations.

The stocks in questions should be awarded continued approval for the production of fishmeal and fish oil under the IFFO-RS v 2.0 standard.

Notes for On-site Auditor

Note: This table should be completed for whole fish assessments only.

General Results

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

Species-Specific Results

Category	Species	% landings	Outcome (Pass/Fail)	
Category A	Chilean Anchovy (Anchoveta) <i>Engraulis ringens</i>	37	A1	Pass
			A2	Pass
			A3	Pass
			A4	Pass
Category A	Araucanian herring (Sardina) <i>Strangomera bentincki</i>	58	A1	Pass
			A2	Pass
			A3	Pass
			A4	Pass
Category C	Chilean Jack mackerel (Jurel) <i>Trachurus murphyi</i>	5	Pass	

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

HOW TO COMPLETE THIS ASSESSMENT REPORT

This assessment template uses a modular approach to assessing fisheries against the IFFO RS standard.

Whole Fish

The process for completing the template for a **whole fish** assessment is as follows:

1. ALL ASSESSMENTS: Complete the Species Characterisation table, to determine which categories of species are present in the fishery.
2. ALL ASSESSMENTS: Complete clauses M1, M2, M3: Management.
3. IF THERE ARE CATEGORY A SPECIES IN THE FISHERY: Complete clauses A1, A2, A3, A4 for **each** Category A species.
4. IF THERE ARE CATEGORY B SPECIES IN THE FISHERY: Complete the Section B risk assessment for **each** Category B species.
5. IF THERE ARE CATEGORY C SPECIES IN THE FISHERY: Complete clause C1 for **each** Category C species.
6. IF THERE ARE CATEGORY D SPECIES IN THE FISHERY: Complete Section D.
7. ALL ASSESSMENTS: Complete clauses F1, F2, F3: Further Impacts.

A fishery must score a pass in **all applicable clauses** before approval may be recommended. To achieve a pass in a clause, the fishery/species must meet **all** of the minimum requirements.

By-products

The process for completing the template for **by-product raw material** is as follows:

1. ALL ASSESSMENTS: Complete the Species Characterisation table with the names of the by-product species and stocks under assessment. The '% landings' column can be left empty; all by-products are considered as Category C and D.
2. IF THERE ARE CATEGORY C BYPRODUCTS UNDER ASSESSMENT: Complete clause C1 for **each** Category C by-product.
3. IF THERE ARE CATEGORY D BYPRODUCTS UNDER ASSESSMENT: Complete Section D.
4. ALL OTHER SECTIONS CAN BE DELETED. Clauses M1 - M3, F1 - F3, and Sections A and B do not need to be completed for a by-product assessment.

By-product approval is awarded on a species-by-species basis. Each by-product species scoring a pass under the appropriate section may be approved against the IFFO RS Standard.

SPECIES CATEGORISATION

The following table should be completed as fully as the available information permits. Any species representing more than 0.1% of the annual catch should be listed, along with an estimate of the proportion of the catch each species represents. The species should then be divided into Type 1 and Type 2 as follows:

- **Type 1 Species** can be considered the 'target' or 'main' species in the fishery. They make up the bulk of annual landings and are subjected to a detailed assessment.
- **Type 2 Species** can be considered the 'bycatch' or 'minor' species in the fishery. They make up a small proportion of the annual landings and are subjected to relatively high-level assessment.

Type 1 Species must represent 95% of the total annual catch. Type 2 Species may represent a maximum of 5% of the annual catch (see Appendix B).

Species which make up less than 0.1% of landings do not need to be listed (NOTE: ETP species are considered separately). The table should be extended if more space is needed. Discarded species should be included when known.

The 'stock' column should be used to differentiate when there are multiple biological or management stocks of one species captured by the fishery. The 'management' column should be used to indicate whether there is an adequate management regime specifically aimed at the individual species/stock. In some cases it will be immediately clear whether there is a species-specific management regime in place (for example, if there is an annual TAC). In less clear circumstances, the rule of thumb should be that if the species meets the minimum requirements of clauses A1-A4, an adequate species-specific management regime is in place.

NOTE: If any species is categorised as Endangered or Critically Endangered on the IUCN Red List, or if it appears in the CITES appendices, it **cannot** be approved for use as an IFFO RS raw material. This applied to whole fish as well as by-products.

TYPE 1 SPECIES (Representing 95% of the catch or more)

Category A: Species-specific management regime in place.

Category B: No species-specific management regime in place.

TYPE 2 SPECIES (Representing 5% OF THE CATCH OR LESS)

Category C: Species-specific management regime in place.

Category D: No species-specific management regime in place.

Common name	Latin name	Stock	% of landings	Management	Category
Chilean Anchovy	<i>Engraulis ringens</i>	FAO 87 Pacific Southeast Chile EEZ Regions V to X	37	SUBPESCA, SERNAPESCA and MINECON	A

Araucanian herring	<i>Strangomera bentincki</i>	FAO 87 Pacific Southeast Chile EEZ Regions V to X	58	SUBPESCA, SERNAPESCA and MINECON	A
Chilean Jack mackerel	<i>Trachurus murphyi</i>	FAO 87 Pacific Southeast Chile EEZ Regions V to X and high seas	5	SUBPESCA, SERNAPESCA and MINECON	C

MANAGEMENT

The two clauses in this section relate to the general management regime applied to the fishery under assessment. A fishery must meet all the minimum requirements in every clause before it can be recommended for approval.

M 1	Management Framework – Minimum Requirements		
	M1.1	There is an organisation responsible for managing the fishery	Pass
	M1.2	There is an organisation responsible for collecting data and assessing the fishery	Pass
	M1.3	Fishery management organisations are publically committed to sustainability	Pass
	M1.4	Fishery management organisations are legally empowered to take management actions	Pass
	M1.5	There is a consultation process through which fishery stakeholders are engaged in decision-making	Pass
	M1.6	The decision-making process is transparent, with processes and results publically available	Pass
outcome:		Clause	PASS
Evidence			
M1.1 There is an organisation responsible for managing the fishery			
<p>MINECON (Actions of Chile’s Ministry of Economy, Development and Tourism) is the organism involved in promoting the development of the fisheries sector, along with the protection, conservation, and full use of resources and the marine environment. Chile’s institutional structure involves governing the fisheries sector centres around three key organisations, with several other institutions providing additional research and enforcement:</p> <ul style="list-style-type: none"> ▪ The Subsecretaria de Pesca (Undersecretariat of Fisheries, SUBPESCA or SSP); positioned within MINECOM; provides policy settings and regulatory framework. ▪ The Servicio Nacional de Pesca (National Fisheries Service, SERNAPESCA) is also based within MINECOM. Responsible for executing fisheries policy through enforcement. ▪ The Instituto de Fomento Pesquero (Fisheries Development Institute, IFOP) is the research arm of the institutional framework and the primary source of scientific advice to SUBPESCA. <p>The LGPA created under the regulation Ley N 1626, 21 December 21st, 1946 is the current law that these organisations follow to manage the fisheries in Chile.</p>			
M1.2 There is an organisation responsible for collecting data and assessing the fishery			
<p>IFOP (Instituto de Fomento Pesquero) is the organization responsible for sampling stocks and carrying out annual acoustic surveys. IFOP is a non-profit organisation created in 1964 under a joint agreement between the Chilean government, the FAO, and the UN Development Program. (UNDP). IFOP’S public role is to support sustainable development of Chile’s fishing sector.</p>			

A Scientific and Technical Committee for Small Pelagic fisheries (Comité Científico Técnico de Pesquerías de Pequeños Pelágicos, CCT-PP), formed by IFOP and SUBPESCA, analyse updates on stock status and catch projections and make official recommendations to the authorities. Further, South Pacific Regional Fisheries Management Organisation (SPRFMO) is coordinated with IFOP for highly migratory stocks caught in the mixed pelagic fisheries.

M1.3 Fishery management organisations are publically committed to sustainability

IFOP gives advice to SUBPESCA to set up BAC every fishing season. Overall BAC's are agreed for certain stocks, with a part under Conservation and Management Measures (CMM's) applying to international waters outside Chile's EEZ. Furthermore, as laid down in the LGPA (see M1.4) one of the main objectives of the Act is to guarantee sustainability of Chile's marine resources. Long term management plans, which reference the Act, ensure rules are in place to achieve this objective. MINECON's mission statement, available on their website, is to generate feasible and sustainable development, with stable progressive equality in the allocation of economic interests.

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

Created in 1976 and adopted for this fishery in 2013, the primary legal instrument for fisheries management in Chile has been la Ley General de Pesca y Acuicultura (LGPA) No. 20.657. The LGPA is a modification of the previous fisheries legislation, and includes:

- Commitments convened to manage the sustainable use and conservation of marine resources.
- Commitments convened to make key decisions on conservation measures based on scientific information above all other considerations. Recommendations of Scientific and Technical Committees (CCT-PP) have been made mandatory for all stakeholders.

The LGPA also includes commitments to develop management plans for any fishery with restricted access, and to review and update these plans every five years. Article 5 of the LGPA states that SUBPESCA should determine Biological Reference Points (BRP's) for all targeted stocks. Biologically Acceptable Catches (BAC's) and resource recovery plans are implemented under Article 9.

SUBPESCA resolution No 291/2015 states that all stocks should be exploited around the MSY level, and that the MSY is the objective to be considered when quotas are established.

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

Management Plans set lines of action to address biological, economic, social and ecological matters. There is consultation and evaluation of a series of harvest control rules and definitions of robust rules to allow viable mixed fisheries. Minutes of these and other CCT-PP meetings are published on the relevant websites. A National Fisheries Council created by the Fisheries and aquaculture Law LGPA No. 18.892, ensures the participation of all stakeholders in the fisheries and aquaculture sector.

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

The status of each managed stocks is annually public in the memorandum "Estado de situación de las principales pesquerías en Chile ". In this report information from the Committee for small fisheries and IFOP are taken into account by SUBPESCA to establish management plans.

Therefore, the system is transparent; all information is available in official websites. Should more details be needed they can be obtained under request.

R1-4

References

See references at the end of the report

Standard clauses 1.3.1.1, 1.3.1.2

M2 Surveillance, Control and Enforcement - Minimum Requirements			
M2.1	There is an organisation responsible for monitoring compliance with fishery laws and regulations		PASS
M2.2	There is a framework of sanctions which are applied when laws and regulations are discovered to have been broken		PASS
M2.3	There is no substantial evidence of widespread non-compliance in the fishery, and no substantial evidence of IUU fishing		PASS
M2.4	Compliance with laws and regulations is actively monitored, through a regime which may include at-sea and portside inspections, observer programmes, and VMS.		PASS
outcome:			Clause PASS
Evidence			
M2.1 There is an organisation responsible for monitoring compliance with fishery laws and regulations			
Compliance both within and outside Chile's EEZ is monitored by a number of different entities:			
<ul style="list-style-type: none"> • SERNAPESCA: Carry out audits of capture fisheries; implement surveillance and control of compliance with all legal provisions relating to fisheries. Health and environmental monitoring of aquaculture. Develop strategies and procedures for prevention, surveillance and control of high-risk diseases. Information and sectoral statistics. Managing fisheries and aquaculture records. • Chilean Navy: Within Chile's Exclusive Economic Zone (EEZ) the Navy monitor an area covering approximately 4,542,990 km² ensuring the prevention of depredation of natural resources by protecting the ecosystem from unauthorized activities. • Observer Programme: There is a plan of reduction of the bycatch of the species that is reviewed periodically and the information is used to establish the limits of additional catches in the fishery. 			
M2.2 There is a framework of sanctions which are applied when laws and regulations are discovered to have been broken			
The LGPA defines a range of sanctions for offences including fishing with an unlicensed vessel, illegal discarding, incorrect logbook use, failure to report landings and fishing in a region or fishery other than the one for which the vessel is licenced. Other sanctions are in place for industrial vessels landing more fish than they have quota for. Depending on the offence, sanctions can include one or a combination of: monetary penalties; suspension of fishing licence; and revocation of licence.			
M2.3 There is no substantial evidence of widespread non-compliance in the fishery, and no substantial evidence of IUU fishing			
In 2005, a national action plan was approved with the aim of preventing, deterring and eliminating IUU fishing. The fishery is monitored and there is no currently no evidence of widespread IUU fishing activities. Chile is now involved in an international program to avoid illegal fishing; "Acuerdo sobre medidas del Estado rector del Puerto "(Port State Measures). This program obliges landings from			

other countries to be controlled by Chile and applies to foreign flagged vessels fishing in Chilean waters.

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

Industrial vessels operate under mandatory VMS monitoring. SERNAPESCA carry out audits of capture fisheries; implementing surveillance and control of compliance. Within the EEZ the Chilean Navy monitor an area covering approximately 4,542,990. Km² . SERNAPESCA makes public an annual report with the infractions registered by fleet.

R1-R14

References

See reference section at the end of the report

Standard clause 1.3.1.3

CATEGORY A SPECIES

The four clauses in this section apply to Category A species. Clauses A1 - A4 should be completed for **each** Category A species. If there are no Category A species in the fishery under assessment, this section can be deleted. A Category A species must meet the minimum requirements of all four clauses before it can be recommended for approval. If the species fails any of these clauses it should be re-assessed as a Category B species.

Species Name		Chilean Anchovy, <i>Engraulis ringens</i>	
A1	Data Collection - Minimum Requirements		
	A1.1	Landings data are collected such that the fishery-wide removals of this species are known.	Pass
	A1.2	Sufficient additional information is collected to enable an indication of stock status to be estimated.	Pass
outcome:			Clause PASS
Evidence			
A1.1 Landings data are collected such that the fishery-wide removals of this species are known.			
Fishery-dependent data is collected through port sampling of landings (SERNAPESCA Inspectors) and observer reports (IFOP directed).			
A1.2 Sufficient additional information is collected to enable an indication of stock status to be estimated			
Hydro acoustic surveys have been conducted biannually since 1999 by means of two cruises: RECLAS in January (summer season; over the recruitment period) and PELACES in May (autumn season). As this method does not consider stock reproductive dynamics, assessments of SSB for small pelagic fish with partial spawning are conducted through the Daily Egg Production Method (DEPM). Last survey was in January and the results are still being analysed but result from 2019 are available in SUBPESCA and are used for advice. R10-R15			
References			
See reference section at the end of the report			
<i>Standard clause 1.3.2.1.1</i>			

A2	Stock Assessment - Minimum Requirements		
	A2.1	A stock assessment is conducted at least once every 3 years (or every 5 years if there is substantial supporting information that this is sufficient for the long-term sustainable management of the stock), and considers all fishery removals and the biological characteristics of the species.	Pass
	A2.2	The assessment provides an estimate of the status of the biological stock relative to a reference point or proxy.	Pass
	A2.3	The assessment provides an indication of the volume of fishery removals which is appropriate for the current stock status.	Pass
	A2.4	The assessment is subject to internal or external peer review.	Pass
	A2.5	The assessment is made publically available.	Pass

outcome:

Evidence

A2.1 A stock assessment is conducted at least once every 3 years (or every 5 years if there is substantial supporting information that this is sufficient for the long-term sustainable management of the stock), and considers all fishery removals and the biological characteristics of the species.

Hydro acoustic surveys have been conducted biannually since 1999 by means of two cruises: RECLAS in January (summer season; over the recruitment period) and PELACES in May (autumn season). Together with fishery-dependent data IFOP conduct annual stock status assessments which are presented every year to SUBPESCA through meetings of the Scientific Committee for Small Pelagics (CCT-PP).

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

Biomass target reference points - BMSY proxy -are defined at 55% of virgin spawning stock biomass (SSB0). Limit reference points - Blim proxy – are set at 27.5% of SSB0. Target fishing mortality is associated with the fishing intensity that maintains BMSY, being estimated at FMSY proxy 60%BDPR. Each annual assessment provides updates on reference points calculated relative to stock status. SSBMSY for the stock is calculated according to the management plan. Stock status is referenced using Kobe plots:

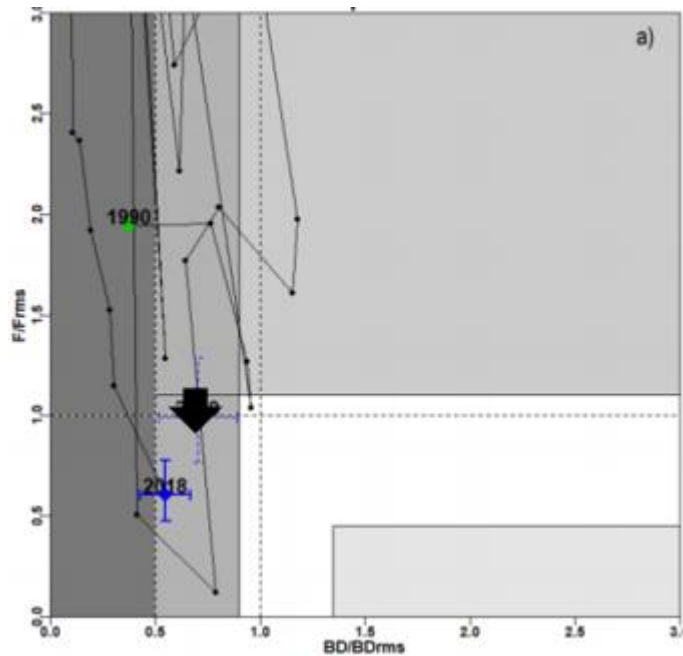


Figure 1. Kobe plot for Anchoveta in the region Valparaiso to Los Lagos. (SUBPESCA 2020).

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

BAC's are defined every year following the scientific advice. For 2019 the BAC's was set up at 162.876 t where 35083 t were designated for industrial fisheries. BACs are available in the Ex. D. N 243/2019 where allocation for each fishery can be consulted.

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

Stock assessments and the management approach used in the fishery undergo detailed peer review through annual CCT-PP meetings. These peer reviews can be considered both internal and external as members of committees' present may also be outside the assessment process. Both IFOP and SUBPESCA have also commissioned external peer reviews for their publications. The Chilean authorities have also invited international experts to evaluate their setting of biological reference points within the MSY framework.

A2.5 The assessment is made publically available.

Reports stock assessments and advice on BAC's can be found on IFOP and SUBPESCA websites. ACTAS published on SUBPESCA's website give summaries of the stock assessment process and confirm final decisions on BAC's. Stock-recruitment and spawning period are closely monitored by IFOP and published in monthly bulletins (INFORMES) which also contain details of closed seasons by area and general information on current stock status. All the information is available however some of them is under request.

References

See references section at the end of the report

Standard clause 1.3.2.2, 1.3.2.1.2, 1.3.2.1.4

A3 Harvest Strategy - Minimum Requirements		
A3.1	There is a mechanism in place by which total fishing mortality of this species is restricted.	Pass
A3.2	Total fishery removals of this species do not regularly exceed the level indicated or stated in the stock assessment. Where a specific quantity of removals is recommended, the actual removals may exceed this by up to 10% ONLY if the stock status is above the limit reference point or proxy.	Pass
A3.3	Commercial fishery removals are prohibited when the stock has been estimated to be below the limit reference point or proxy (small quotas for research or non-target catch of the species in other fisheries are permissible).	Pass
Clause		PASS
outcome:		
Evidence		
A3.1 There is a mechanism in place by which total fishing mortality of this species is restricted.		
The BAC is set up every year following scientist recommendations and data from historical series of data and biannual surveys. BAC's are divided into three categories: research, industrial and artisanal. The number of commercial landings permitted are subject to change depending on survey results.		

Normally BAC's are set up for two fishing seasons, effort may be controlled depending on the period of the year. By Chilean Law (LGPA Law No. 20.657) recommendations are provided as a range with the lower limit as 20% of actual recommendations. Workshops have been provided by Government to demonstrate best fishing practice including minimising discards and bycatch. Temporary closure orders have been issued by Government when high proportions of juvenile anchovy have been detected. When large quantities of juveniles are detected closure orders may be extended for periods of one week to fifteen days or more. A maximum catch limit per owner regime has been established for industrial sector (Regions V, VIII and X). All these strategies implemented allow control the fishing pressure and therefore there are mechanism to control F.

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

BACs are in place since 2001 and are split to accommodate commercial and research purposes. BAC's are allocated to the industrial fishery in three periods (January-April 85%, May-August 7% and September-December 7%) considering seasonality of the catch and temporal closures that protect spawning stock and recruits. BACs are set up initially and can be corrected after acoustic surveys. Further, BAC's are set up following different scenarios what allows certain flexibility to proceed depends on the status of the stock. In 2020 BAC for anchoveta in region V to X has been modified and then increased to 179,021 tonnes. Therefore, following this recommendation published in Informe Técnico (R.PESQ.) N° 173-2020 the removals are not exceeded as recommendations fits in the limits set up in the management plan for this fishery.

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

In Chile Blim or Proxy is used to inform management decisions rather than prohibit fishery removals. The Fisheries Act (LGPA) does not establish catch restrictions when stocks are below limit biomass (for social and economic reasons and to facilitate further research). Instead a resource recovery plan must be implemented. Management committees are required to elaborate and implement such recovery plans (Article 9 LGPA); implying reductions in fishing mortality at levels below or equal to FRMS. However due to removals are controlled following the advice, they are not exceeding the references points and therefore prohibitions are not needed. Further this year BAC has been reviewed and increased that means that the stock is not below limits (Subpesca 2020).

R10-R15

References

See references section at the end of the report

Standard clause 1.3.2.1.3

Stock Status - Minimum Requirements

A4	A4.1	The stock is at or above the target reference point, OR IF NOT:	Pass
		The stock is above the limit reference point or proxy and there is evidence that a fall below the limit reference point would result in fishery closure OR IF NOT: The stock is estimated to be below the limit reference point or proxy, but fishery removals are prohibited.	

Clause PASS

outcome:

Evidence

The last summary of stock status has shown that the stock has a biomass of 880 mt. Recruitment has been also higher than the previous year, calculated as 494 mt, 29% higher than 2018. Mortality trends has shown a decrease since 2010. However last year result has shown a mortality of 1% lower than the reference point FMRS. In October 2020 a report from the CCT-PP small pelagic group was posted due to a review of the BAC allocated to anchoveta.

In this committee different approach were used to calculate the stock status of the anchoveta in the region V to X. Finally the Committee decided to use the new approach signed for 2021. Different scenarios were analysed and the final decision was that the stock is not overfished and overfishing is not happening: $BD/BDRMS=1,066$ y $F/FRMS=0,809$ (figure 2).

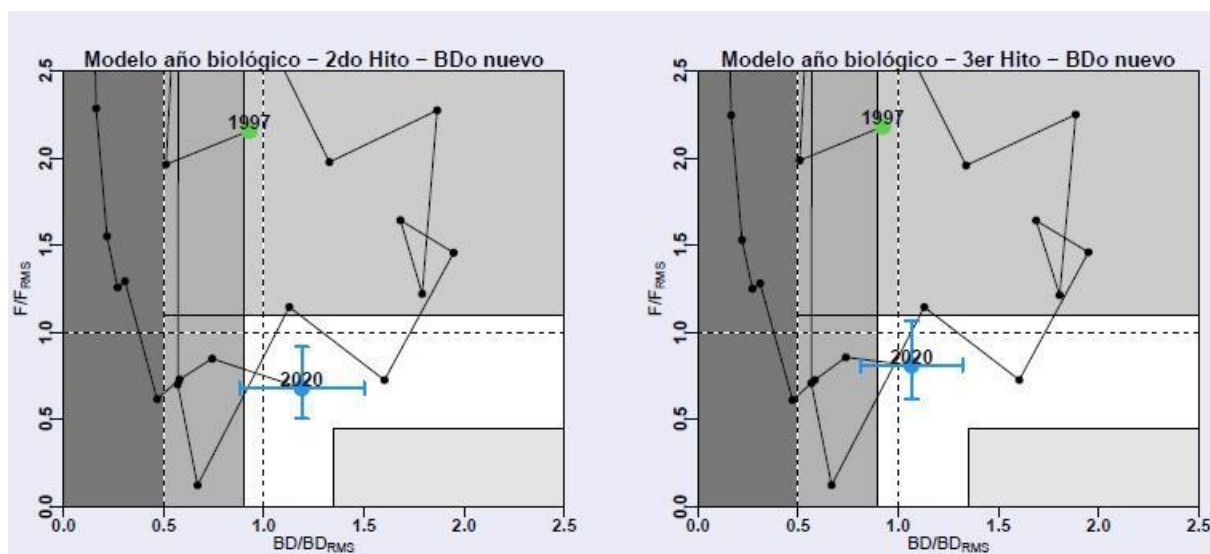


Figure 2. Stock Status of Anchoveta in the Regions V to X for the biological year 2019/2020. Data series 1997-2020. Source: IFOP 2020

Therefore after reviewing BAC has been set up at 179.021 tonnes (9143.217 - 179.021 mt) following the article 153 a of the LGPA.

R10-R15

References

See reference section at the end of the report

Standard clause 1.3.2.1.4

Species Name		Araucanian herring, <i>Strangomera bentincki</i>	
A1	Data Collection - Minimum Requirements		
	A1.1	Landings data are collected such that the fishery-wide removals of this species are known.	Pass
	A1.2	Sufficient additional information is collected to enable an indication of stock status to be estimated.	Pass
outcome:			Clause PASS
Evidence			
A1.1 Landings data are collected such that the fishery-wide removals of this species are known.			
Fishery-dependent data is collected through port sampling of landings (SERNAPESCA Inspectors) and observer reports (IFOP). Further the commercial landings data, a fraction of the global BAC is for science purposes and are also considered as removals.			
A1.2 Sufficient additional information is collected to enable an indication of stock status to be estimated.			
As mentioned for anchoveta, the Araucanian herring is caught in a mixed pelagic fishery which is monitored by different acoustic surveys. These surveys are conducted biannually since 1999 by means of two cruises: RECLAS in January (summer season; over the recruitment period) and PELACES in May (autumn season). As this method does not consider stock reproductive dynamics, assessments of SSB for small pelagic fish with partial spawning is conducted through the Daily Egg Production Method (DEPM).			
Data as spatial distribution, climate conditions and size distribution are also considered in the models to estimate the stock status.			
R15-R28			
References			
See reference section at the end of the report			
<i>Standard clause 1.3.2.1.1</i>			

A2	Stock Assessment - Minimum Requirements		
	A2.1	A stock assessment is conducted at least once every 3 years (or every 5 years if there is substantial supporting information that this is sufficient for the long-term sustainable management of the stock), and considers all fishery removals and the biological characteristics of the species.	Pass
	A2.2	The assessment provides an estimate of the status of the biological stock relative to a reference point or proxy.	Pass
	A2.3	The assessment provides an indication of the volume of fishery removals which is appropriate for the current stock status.	Pass
	A2.4	The assessment is subject to internal or external peer review.	Pass
	A2.5	The assessment is made publically available.	Pass

	Clause	PASS
<p>outcome:</p> <p>Evidence</p> <p>A2.1 A stock assessment is conducted at least once every 3 years (or every 5 years if there is substantial supporting information that this is sufficient for the long-term sustainable management of the stock), and considers all fishery removals and the biological characteristics of the species.</p> <p>The Committee for small pelagic fisheries meet annually to evaluate the information from the landings, acoustic surveys and observer programs that IFOP carried over a biological year. All the data are analysed in the committee where representative of several stakeholders are included. With the conclusion a TAC is set up and the stock status is presented annually. Therefore, together with fishery-dependent data IFOP conduct annual stock status assessments which are presented every year to SUBPESCA through meetings of the Scientific Committee for Small Pelagics (CCT-PP) following the long term management plan for fishery.</p> <p>A2.2 The assessment provides an estimate of the status of the biological stock relative to a reference point or proxy.</p> <p>Reference points are reviewed in the Scientific Committee for Small Pelagics (CCT-PP) when needed. For this species the reference points in place are as follows: BDRMS=60% BDPR or 55% BDo; BDLimit= 27.5 % BDo and FRMS= F60%BDR. Each annual assessment provides updates on reference points calculated relative to stock status. Stock status is referenced using Kobe plots</p> <p>A2.3 The assessment provides an indication of the volume of fishery removals which is appropriate for the current stock status.</p> <p>CCT-PP recommended a Biologically Acceptable Catch (BAC) for 2020 of 321,307t, assuming a discard rate of 2%. Following this BAC in the last stock status the biomass of Araucanian herring was defined at 46 % of the reference point BDRMS and the F was set at 0.218, slightly lower than the previous year. Therefore the removals have been considered appropriate as the results in the last stock assessment are above limits.</p> <p>A2.4 The assessment is subject to internal or external peer review.</p> <p>Stock assessments and the management approach used in the fishery undergo detailed peer review through annual CCT-PP meetings. These peer reviews can be considered both internal and external as members of committees' present may also be outside the assessment process. Both IFOP and SUBPESCA have also commissioned external peer reviews, for example, a series of workshops were convened with experts from Peru. The Chilean authorities have also invited international experts to evaluate their setting of biological reference points within the MSY framework.</p> <p>A2.5 The assessment is made publically available.</p> <p>The information is publically available in IFOP and SUBPESCA website, however, some information is under request.</p>		

R15-R28
References
See reference section at the end of the report
<i>Standard clause 1.3.2.2, 1.3.2.1.2, 1.3.2.1.4</i>

A3 Harvest Strategy - Minimum Requirements			
A3.1	There is a mechanism in place by which total fishing mortality of this species is restricted.		Pass
A3.2	Total fishery removals of this species do not regularly exceed the level indicated or stated in the stock assessment. Where a specific quantity of removals is recommended, the actual removals may exceed this by up to 10% ONLY if the stock status is above the limit reference point or proxy.		Pass
A3.3	Commercial fishery removals are prohibited when the stock has been estimated to be below the limit reference point or proxy (small quotas for research or non-target catch of the species in other fisheries are permissible).		Pass
Clause			PASS
outcome:			

Evidence

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

The BAC is set up every year following scientist recommendations and data from historical series of data and annual surveys. BAC's are divided into three categories: research, industrial and artisanal. The number of commercial landings permitted are subject to change depending on survey results. Normally BAC's are set up for two fishing seasons, effort may be controlled depending on the period of the year. By Chilean Law (LGPA Law No. 20.657) recommendations are provided as a BAC range with the lower limit 20% of actual BAC recommendations. Workshops have been provided by Government to demonstrate best fishing practice including minimising discards and bycatch. Therefore, as mentioned for Chilean anchovy and because of this species is part of the small pelagic management plan, the fishing mortality is controlled by different strategies that allow to keep F below reference points.

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

Landings of this species are keeping below upper advised BAC's and have been decreasing over the years. Mortality has been decreasing over the years so there is a compliance with the limits set up in the annual advice. SERNAPESCA landings statistics has shown that removals of the biological year

2019/20 including 6 % discards are corrected by reaching 289,779 tons, below the annual BAC, therefore, BAC are not regularly exceeded.

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

In Chile Blim or Proxy is used to inform management decisions rather than prohibit fishery removals. The Fisheries Act (LGPA) does not establish catch restrictions when stocks are below limit biomass (for social and economic reasons and to facilitate further research). Instead a resource recovery plan must be implemented. Management committees are required to elaborate and implement such recovery plans (Article 9 LGPA); implying reductions in fishing mortality at levels below or equal to FRMS. Therefore BAC's are set up to fit in these strategies that control the fishing pressure and allow the stock to be above references points.

References
See reference section at the end of the report
R15-R28

Standard clause 1.3.2.1.3

A4 Stock Status - Minimum Requirements		
A4.1	<p>The stock is at or above the target reference point, OR IF NOT:</p> <p>The stock is above the limit reference point or proxy and there is evidence that a fall below the limit reference point would result in fishery closure OR IF NOT:</p> <p>The stock is estimated to be below the limit reference point or proxy, but fishery removals are prohibited.</p>	Pass
Clause		PASS
outcome:		
Evidence		
<p>The trends of the population variables show that the recruitments have shown significant interannual fluctuations and in its known history there are three relevant periods (Fig. 22a), a) Average recruitment of the period 1991-2007 with the lowest levels of recruitment (113 mt), b) Average recruitment of the 2008-2012 period with the highest levels of recruitment (411 mt) and c) Average recruitment for the 2013-2020 period of around 173 mt. The 2020 recruitment is 49% lower than the Low recruitment (period 1991-2007), 85% lower than High recruitment (period 2008-2012) and 66% lower than the average Recruitment (2013-2020). Consequently, with low estimated recruitments for the last two years, for 2020 an estimated decrease in total biomass of 19% compared to the historical average of the series (average 1991-2020 = 1.64 million t.). The spawning biomass for the year 2019/20 was 18% lower than the average of the last 8 years. In relation to fishing mortality, has been rather low, in general less than natural mortality ($M = 1.0 \text{ year}^{-1}$), except for the year 2004 when biomass levels were low. From 2005 F has had a decreased trend, even more</p>		

since 2013 that the value was under the level of FRMS resulted of the application of F60%. For the year 2019/2020, $F = 0.32 \text{ year}^{-1}$ is estimated, which it found 7% on FRMS (Figure 3).

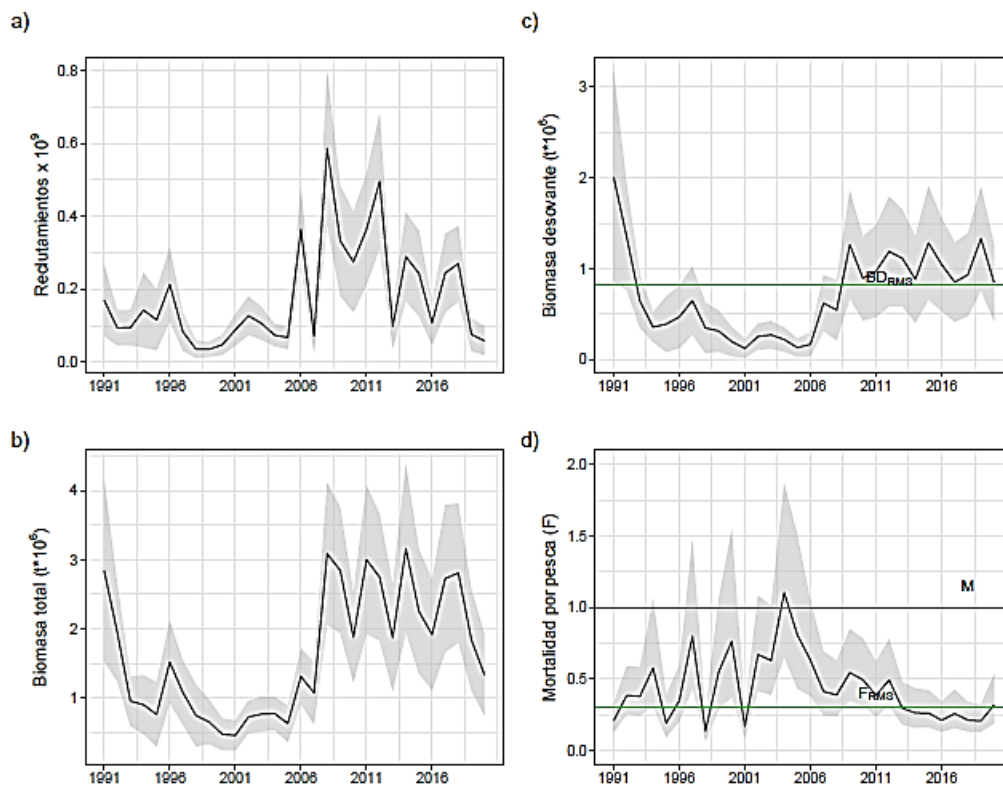


Figure 3. Stock status for 2019/2020 resulting of the acoustic surveys and landings data for this biological year. Source: IFOP 2020.

Therefore, the stock status is not overfished and overfishing is not happening (2% above BDRMS and 7% below FRMS).

R15-R21

References

See reference section at the end of the report

Standard clause 1.3.2.1.4

CATEGORY C SPECIES

In a whole fish assessment, Category C species are those which make up less than 5% of landings, but which are subject to a species-specific management regime. In most cases this will be because they are a commercial target in a fishery other than the one under assessment. In a by-product assessment, Category C species are those which are subject to a species-specific management regime, and are usually targeted species in fisheries for human consumption.

Clause C1 should be completed for **each** Category C species. If there are no Category C species in the fishery under assessment, this section can be deleted. A Category C species does not meet the minimum requirements of clause C1 should be re-assessed as a Category D species.

Species Name		Chilean Jack mackerel, <i>Trachurus murphyi</i>	
C1	Category C Stock Status - Minimum Requirements		
	C1.1	Fishery removals of the species in the fishery under assessment are included in the stock assessment process, OR are considered by scientific authorities to be negligible.	Pass
	C1.2	The species is considered, in its most recent stock assessment, to have a biomass above the limit reference point (or proxy), OR removals by the fishery under assessment are considered by scientific authorities to be negligible.	Pass
outcome:			Clause PASS
Evidence			
<p>C1.1 Fishery removals of the species in the fishery under assessment are included in the stock assessment process, OR are considered by scientific authorities to be negligible.</p> <p>Fisheries independent and dependent data from each fishing country in a statistical catch-at-age model performed by the South Pacific Regional Fisheries Management Organization (SPRFMO)' s Scientific Committee (SC). Further landings and CPUE from Chilean vessels are used by IFOP to run the models in Chilean EZZ. Therefore, fishery removals of the species in the fishery under assessment are included in the stock assessment process.</p>			
<p>C1.2 The species is considered, in its most recent stock assessment, to have a biomass above the limit reference point (or proxy), OR removals by the fishery under assessment are considered by scientific authorities to be negligible.</p> <p>Standardised CPUE along with European models has been used in last year stock status giving more optimistic results than previous years. The mortality has been decreased since 2008 and F has been corrected at 0.8 below FRMS. Consequently, BD2018/BDRMS is around 1.12 and F2018/FRMS at 0.66, therefore, the stock is not overfished and overfishing is not occurring as shown in figure 4.</p>			

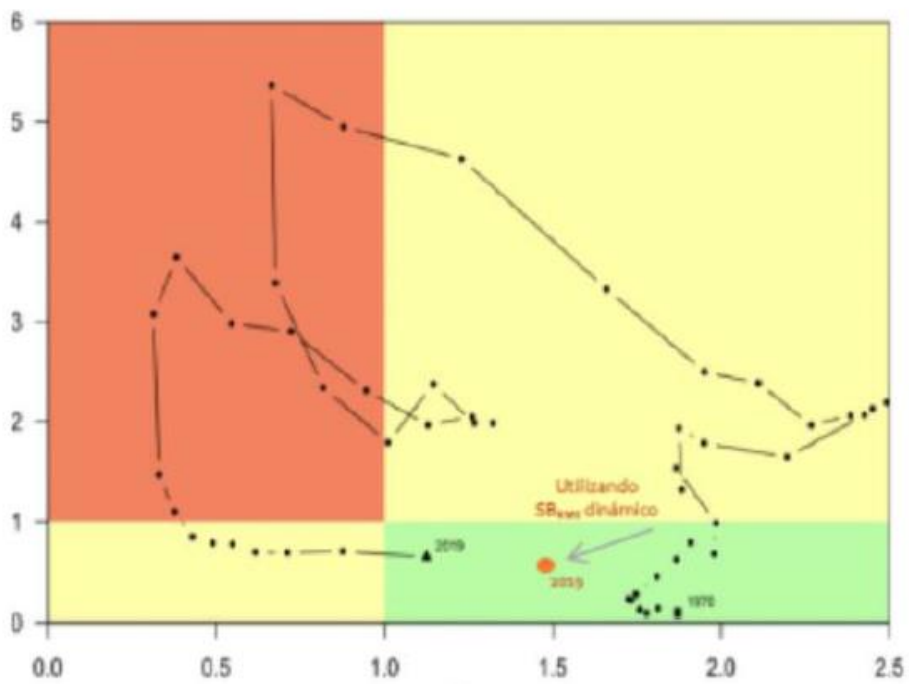


Figure 4. Stock status for Chilean jack mackerel in Chile EZZ for the biological year 2019/2020. Source: IFOP.

R15-R21

References

See reference section at the end of the report

Standard clauses 1.3.2.2

FURTHER IMPACTS

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

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

Evidence

F1.1 Interactions with ETP species are recorded.

The fishery is known to interact with several ETP species: sea turtles, marine mammals, seabirds and sharks, most of which are released just after being caught.

The availability of anchoveta as prey is one of the major threats to Humboldt Penguin *Spheniscus humboldti* (Vulnerable; 2014 IUCN Redlist) (Luna-Jorquera and Culik, 2003; UNEP/WCMC, 2003; BirdLife International, 2012).

Pink-footed shearwaters (*Ardenna creatopus*) are vulnerable seabirds that breed only in Chile and higher mortalities (i.e. >1,500 observed mortalities 2015-2017) were observed in central Chilean purse-seine fisheries (Carle et al. 2019).

The interaction of the fishery with ETP species is recently known after the analysis of the 2015-2017 time series (IFOP 2018). Species identified by the fleet are listed as follows: South American sea lions *Otaria byronia* (Least concern; 2015 IUCN redlist), Sooty shearwater *Ardenna grisea* (Near threatened; 2016 IUCN red list), Pink-footed Shearwater *Ardenna creatopus* (Vulnerable; 2016 IUCN red list), Peruvian pelican *Pelecanus thagus* (Near threatened; 2016 IUCN red list) and Kelp Gull *Larus dominicanus* (Least concern; 2016 IUCN redlist). The mortality was higher for the seabirds species (IFOP 2018).

Specific logbook data for recording bycatch, incidental and ETP species capture according to FAO and ORP protocol (2017-2018) are available.

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

The discarding reduction plan established that all marine mammals, reptiles, penguins and other seabirds should be returned to the sea if not severely injured (MEFT 2019).

In the last report of 2019 carried by CIAM, interactions with marine mammals were low. The main species that interact with the fishery is the sealion and the population is not decreasing due to fishing Activities in Chile. Further 2 species of dolphin were observed in 2017-2018 (48 hauls observed) showing that the main interaction was to feed during the fishing operation.

Anchoveta can be a main prey species for some seabird's population. Food availability is managed by defining Marine Protected Areas where breeding is located. Specific logbook data for recording bycatch, incidental and ETP species capture according to FAO and ORP protocol (2017-2018) are available therefore there is evidence that the fishery does not have negative effect on ETPs species.

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

The interaction of the fishery with ETP species is recently known after an analysis of the 2015-2017 time series. Several mitigation measures have been recommended in the recently published discard reduction plan. Developments to improve knowledge of potential impacts of the fishery on ETP species include:

- A software platform developed for the registry of incidental fishing in the operation of industrial fleets (XV-X).
- On-board vessel protocols for the release and treatment of ETP fauna.
- Training programs for crews of fishing vessels.
- Increase the coverage of on board observers

In the last ACAP review it was accepted that even though Chile need to improve the modelling of impacts on seabirds the measures implemented for all the fisheries is working on reducing the bycatch. The Chilean NPOA states that mitigation measures agreed or to be developed will be applied in any fishery where the mortality of seabirds is > 0.05 birds/1000 hooks (Chile, 2007). In the last report carried out by CIAM in 2019, it was shown that the main interaction of the seabirds identified in the fishery was feeding while fishing with a low percentage of dead individuals..

Mortality of ETPs species were rare observed however that is happening in very low percentage and for that reason mitigation measures are in place.

There is no substantial evidence that the fishery has a significant negative effect on ETP species. If the fishery is known to interact with ETP species, measures are in place to minimise mortality.

R25-R28

References

See the references section at the end of the report

Standard clause 1.3.3.1

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

Evidence

F2.1 Potential habitat interactions are considered in the management decision-making process.

Chile has established a great proportion of marine protected areas (MPAs), in 2018 Chile was one of the countries with more MPAs defined where fisheries activities take place, even above the international targets (SDGs and CBD- “Aichi target 11). All these areas are regulated under legislation and their effectiveness is monitored in the Technical Scientific Committee for Small Pelagics (CCT-PP) and managed by General Law on Fisheries and Aquaculture of 1991. To define these areas information from VMS is taken into account to enclose fishing grounds. Different information collected in surveys, observer program and directly from the fishery are further considered to define the closure areas for different seasons and fisheries. All the information is shared among the stakeholders involved in the CCT-PP where advices are given to SUBPESCA who finally decide the management strategies for all the component possible impacted by the fishery.

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

No direct habitat damage is known in purse seine fisheries. Such damage is unlikely due to the gear types used (Source SPRFMO 2014). Artisanal purse seines can reach dimensions of 30 fathoms depth by 240 fathoms length (approx. 55 m x 249 m) while industrial purse seines can reach up to 60 × 500 fathoms (approx. 110 m x 915 m). This assessment is focussed on industrial purse seine and in general, the impact of this fishing gear on the seafloor is not a subject under technical or scientific debate, since these nets are usually deployed at greater depths, where bottom contact does not occur.

Footprint of the fishery is also available due to the use of VMS therefore there is a monitoring system in place to avoid the entry in vulnerable and protected areas. Although as a pelagic fishery interaction with these areas are very rare.

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

General Law (Ley de Pesca (L.G.P.A 20.657)) is in charge of managing the impact of the fisheries in the habitats. Measures are in place to monitor and control MPAs in Chile and to prevents the industrial fleet from entering the coastal zone to carry out extractive fishing operations. It has also become a conservation measure for the bulk of fishery resources that spawn near the coast and inland waters. The regulation is designed to protect coastal pelagic resources, being of benefit mainly to anchovy and Araucanian herring fisheries. Reserve zones may be temporarily suspended through authorizations for research fishing and dredging that allow temporary entries of industrial vessels into zones only in specific areas and only during specific periods.

Therefore, there are mechanism in place to minimise the impact on habitats and mitigate the possible negative impacts that the fishing activities might create.

R19-R28

References
See references section at the end of the report
<i>Standard clause 1.3.3.2</i>

F3	Ecosystem Impacts - Minimum Requirements		
	F3.1	The broader ecosystem within which the fishery occurs is considered during the management decision-making process.	Pass
	F3.2	There is no substantial evidence that the fishery has a significant negative impact on the marine ecosystem.	Pass
	F3.3	If one or more of the species identified during species categorisation plays a key role in the marine ecosystem, additional precaution is included in recommendations relating to the total permissible fishery removals.	Pass
Clause			Pass
outcome:			
Evidence			
F3.1 The broader ecosystem within which the fishery occurs is considered during the management decision-making process.			
<p>Annual temporal closures for the anchovy and sardine fishery in V-X protects spawning stock and juveniles. These closures are mobile and depend on monitoring of the biological indicators. An introduction of a five mile artisanal-exclusive zone near the shoreline has provided significant protection to spawners and other shallow-water organisms from industrial fishing activities. A maximum catch limit per owner regime has been established for the industrial sector (Regions V, VIII and X). Chile has implemented five marine reserves (see below, figure 5) with the objective of conserving natural banks of scallops, oyster and mussel, but also of dolphins and penguins. Fish stocks are known to be highly dependent on recruitment which in turn changes with environmental conditions and oceanographic conditions in the Chilean upwelling ecosystems like the El Niño and La Niña. Therefore several components of the ecosystem are considered in the management of the fishery.</p>			

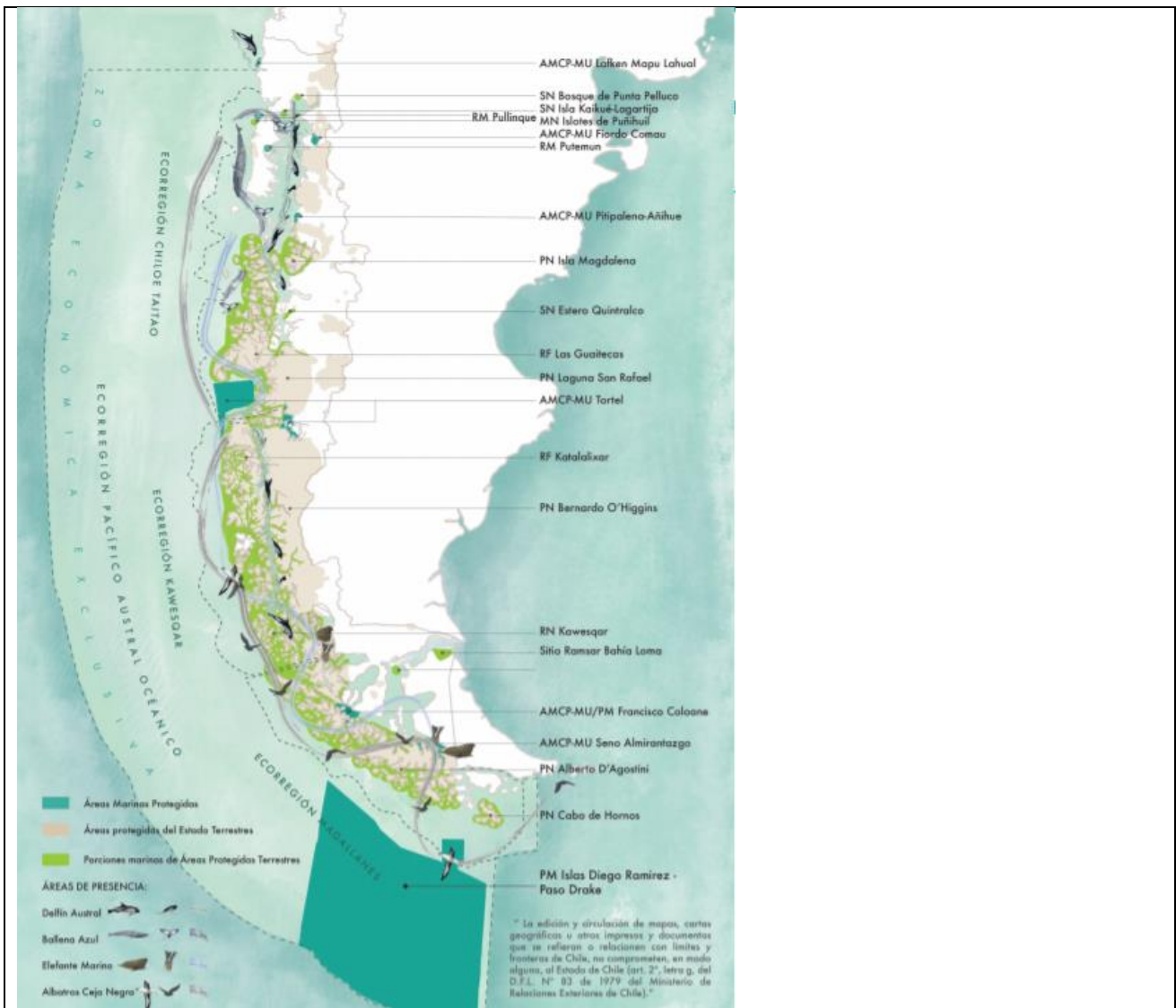


Figure 5. Distribution of all types of figure under Marine Protected Areas in Chile. Source: Wild Conservation society and Waitt Foundation under the project *Creación de una red de áreas marinas protegidas en la Patagonia – Chile 2019*.

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

Due to the low trophic level of the species under consideration there can be an effect on other species which prey on the species under assessment. To account for predation of these species' models have been adapted. Models are taken into consideration resource competition between the fishery and top-predators (e.g. seabirds) to better understand the ecosystem needs. BACs are calculated considering different scenarios depends on environmental condition where ecosystem needs are also integrated. The more precautionary approach is taken and reviews are in place over the year resulting in BACs modifications if needed. Therefore, the ecosystem needs are continuously presented in the management strategies and therefore there is no substantial evidence that the fishery has a significant negative impact on the marine ecosystem.

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

This stock is highly dependent on recruitment which in turn changes with environmental conditions and oceanographic conditions in the important Chilean upwelling ecosystem, like the El Niño and La Niña. Therefore to consider these environmental conditions, there have been set up different temporal closures for this fishery to protect spawning and juveniles over the year. These closures are mobile and depend on monitoring of the biologic indicators taking additional precaution in the allocation of the BACs every fishing season.

Further, the Ecosystem-based Fisheries Management (EBFM) concept has been integrated into the new Chilean Fisheries Act but many challenges are still preventing an ecosystem-level approach however new models are adopted to include ecosystems needs in the calculation of the BACs.

R19-28

References

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<http://out.easycounter.com/external/minecon.gov.cl>
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- R5 SERNAPESCA www.sernapesca.cl
- R6 IFOP <https://www.ifop.cl/en/>
- R7 Comité Científico de Pesquerías de Pequeños Pelágicos (CCT-PP): Técnica Report No 5 (Oct 2019)
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- R9 South Pacific Regional Fisheries Management Organisation <https://www.sprfmo.int/>
- R10 Management Plan: Plan de manejo (2016) para la anchoveta y sardina común Subpesca 2017
72pp
PDF
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- R12 SERNAPESCA (Jan 2019):
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- R14 Fishsource Common sardine (*Araucanian herring*) *S. bentincki*
https://www.fishsource.org/stock_page/1822
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- R16 ACTA CCT-PP: Biologically Acceptable Catches (2020) for Anchovy and Common sardine:pdf 10pp
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- R18 6th Scientific Committee Meeting Report SPRFMO 2018 <https://www.sprfmo.int/meetings/scientificcommittee/6th-sc-2018/> p 16 Kobe Plot.
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- R28 Porobic, J., E. A. Fulton, S. Frusher, C. Parada, M. Haward, B. Ernst, and D. Stram. 2018. Implementing Ecosystem-based Fisheries Management: Lessons from Chile's experience. Marine Policy 97:82-90.

Standard clause 1.3.3.3

SOCIAL CRITERION

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

Appendix A - Determining Resilience Ratings

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

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

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

Taken from the FishBase manual, "Estimation of Life-History Key Facts":

<http://www.fishbase.us/manual/English/key%20facts.htm#resilience>