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Global Standard for Responsible Supply of Marine Ingredients

Fishery Assessment Methodology and Template Report V2.0

Fishery Under Assessment	**Sardina Austral /Falkland sprat (*Sprattus fueguensis*) Región X (de los lagos), FAO 87.3.3**
Date	**May 2019**
Assessor	**Jim Daly**

Application details and summary of the assessment outcome				
Name: Fjordo Austral				
Address:				
Country: Chile		**Zip:**		
Tel. No.:		**Fax. No.:**		
Email address:		**Applicant Code**		
Key Contact:		**Title:**		
Certification Body Details				
Name of Certification Body:		**SAI Global Ltd**		
Assessor Name	**Peer Reviewer**	**Assessment Days**	**Initial/Surveillance/Re-approval**	**Whole fish/ By-product**
Jim Daly	Vito Romito	5	Surveillance 2	Whole fish
Assessment Period	2018			

Scope Details	
Management Authority (Country/State)	Subsecretariat de Pesca (SUBPESCA); Chilean Fisheries Development Institute (IFOP); Chilean Ministry of Economy, Development and Tourism (MINECON); Servicio Nacional de Pesca (National Fisheries Service, (SERNAPESCA); Comité Científico Técnico de Pesquerías de Pequeños Pelágicos (CCT-PP); South Pacific Regional Fisheries Management Organisation (SPRFMO).
Main Species	Sardina Austral /Falkland sprat (*Sprattus fueguensis*)
Fishery Location	Chile Region X (de los lagos), FAO 87.3.3
Gear Type(s)	Purse Seine, artisanal
Outcome of Assessment	
Overall Outcome	PASS
Clauses Failed	NONE
Peer Review Evaluation	Approve
Recommendation	Pass

Assessment Determination

The Patagonian/Falkland sprat (*Sprattus fuegensis*) is a small pelagic clupeid with similar spatial distribution in both South Pacific and Atlantic Oceans. In Chile, this species occurs from far south in the fjords and channels to approximately 42ºS. The population in Chile, encompasses a single genetic stock with significant reproductive cohesion. This assessment focusses exclusively on the Sardina austral stock in Region X where the species is currently managed as a component of the multispecies small pelagic fishery.

In Chile commercial fishery removals are not prohibited when a stock has been estimated to be below limit reference point or proxy. B_{lim} or Proxy reference points are used to inform management decisions rather than prohibit fishery removals. The Fisheries Act (LGPA) does not currently establish catch restrictions when stocks are below limit biomass (for social and economic reasons and also to facilitate further research). Landings data are collected such that the fishery-wide removals of this species are known.

The LGPA includes commitments to develop management plans for any fishery with restricted access. However, the development of a management plan for the small pelagic fishery in Region X, or any of its component species, is still in development. The latest management meeting for Sardina austral (2019) made reference to a proposed Fishery Improvement Project (FIP) that would include this species in the assessment area, with the ultimate goal of achieving MSC Certification. This is a positive development which should be followed closely.

Management strategies currently in place include the obligatory use of vessel monitoring systems (VMS), temporal closures; recent mandatory use of on-board cameras to identify and quantify discards and a maximum catch limit per vessel owner (industrial sector) and an artisanal extraction regime (artisanal sector). Correction factors are applied in both industrial and artisanal fisheries to account for under-reporting. There is a framework allowing for the application of sanctions ranging from monetary fines to revocation of licence. There is however a lack of evidence regarding its effectiveness. The assessment team

have requested stakeholders to provide information on numbers of infringements detected and actions taken by the competent authority for fisheries control to ensure compliance to regulations in force. These data will be added as an annex to this report when received.

Additional research which would improve the reliability of future stock assessments could include an improved understanding of population structure and migration patterns, known location of spawning and nursery grounds, growth and age parameters, discards and under-reported catches, fishing effort/CPUE, and environmental influence on stock parameters.

A program for the reduction of discards and mitigation of ETP species catch (Areas V-X) is underway. Compliance with discard reduction plans will be monitored by electronic monitoring systems (EMS) on board all vessels of the industrial fleet, while artisanal boats larger than 15m in length will be required to carry EMS by 2022.

A program for evaluating the impact of the fishery in the ecosystem under an ecological risk assessment (ERA) is still under development within the framework of the SPRFMO (Regional RFMO). The results of this program, when available, should be included in future assessments of this fishery.

Sardina Austral /Falkland sprat has been assessed for the IUCN Red List as a species of least concern and is not on the current list of CITES endangered species (websites accessed 26.04.19)

Sardina Austral /Falkland sprat is approved by the assessment team for the production of fishmeal and fish oil under the IFFO-RS v 2.0 whole fish standard.

Peer Review Comments

The Sardina Austral /Falkland sprat (*Sprattus fuegensis*) population in Chile encompasses a single genetic stock with significant reproductive cohesion. This assessment focusses exclusively on the Sardina austral stock in Region X where the species is currently managed as a component of the multispecies small pelagic fishery.

Associated landings (Area V-X) of Anchovy (*Engraulis ringens*) and Common Sardine (*Strangomera bentincki*) have also been assessed here.

The Chilean institutional structure governing the fisheries and aquaculture sector centres around three key organisations, with a number of other institutions providing additional research and enforcement support (such as the Navy). These three organizations have a degree of operational independence while performing a crucial and interlinked function within the broad institutional framework. Since February 2013, the primary legal instrument for fisheries management in Chile has been Law 20.657 (LGPA).

A commitment to develop management plans for any fishery with restricted access, and the review and updating of these plans every five years. The LGPA states that all stocks should be exploited around the MSY level, and that MSY is the objective to be considered when quotas are established. In general, both scientific advice and management measures are based on these generic objectives.

In 2005, a National Action plan was approved with the aim of preventing, deterring and eliminating Illegal, unreported and unregulated (IUU) fishing. Enforcement of fisheries legislation is the responsibility of SERNAPESCA. Industrial fishing vessels operate under mandatory VMS monitoring and a maximum catch limit per vessel owner. An artisanal extraction regime (artisanal sector) is in place. Compliance with laws and regulations is actively monitored, through a regime which may include at-sea and portside inspections, observer programmes, and VMS.

Although all landings of Sardina austral are recorded, information provided by IFOP indicates that there are issues with underreporting and misreporting of species. Correction factors are applied in both industrial and

artisanal fisheries to account for under-reporting. There is a no-discard policy in place. Since 2008, the catch in this area has been regulated through an annual TAC, and since 2009 IFOP has performed annual stock assessments and has estimated annual allowable catches through a size-structured model. Total fishery removals of this species do not regularly exceed the level indicated or stated in the stock assessment.

SSB reference points were recently set for the fishery and have been used as the basis for TAC advice. The sardine austral SSB target reference point acts as a proxy for B_{MSY} and is equal to 55% SSB_0 (55% of unexploited biomass). The limit reference point is 27.5%SSB0. The proxy for F_{MSY} is set at $F_{60\%}$.

Spawning stock biomass (2017 data) exceeded SSB_{MSY} by 9% while fishing mortality exceeded F_{MSY} by 3%. The stock assessment and management approach used undergoes detailed peer review through the Scientific Committee (SC) and Management Committees.

Anchovy

The CCT-PP (SUBPESCA Management Committee) met in October 2017 (reported in April 2018) on an assessment of the state of the anchovy stock (V-X) and to determine a Biologically Acceptable Catch (BAC) for the 2018 fishery. Spawning stock biomass was calculated at 50% below SSB_{MSY} i.e. at SSB_{BLIM}. Anchovy (Area V-X) remains at the limit of over-exploitation. Figures reported by IFOP showed that, for Area X, just 2% of the global (V-X) quota for anchovy was landed (Jan - 02 Apr 2018) in Area X with most of landings taking place in Areas V, VIII and XIV. Fishery removals are included in the assessment,

Working groups were established to prioritise issues within the fishery and to establish corrective actions aimed at improving the status of the stock (V-X). Methods were proposed to improve data collection and to revise current biological reference points which in the opinion of the working group did not take into account annual changes in species productivity.

Indicators from the latest PELACES acoustic evaluation and stock assessment (August 2019 meeting minutes, provided by client) have shown that, based on IFOP and INPESCA reports, the stock of anchovy (V-X) is in the overexploitation zone and has moved away from the limit level of collapse (8% chance of being depleted). Anchovy biomass has advanced in its recovery and is now close to target biomass and indicators. The species is considered, in its most recent stock assessment, to have a biomass above the limit reference point.

Common Sardine

Catches are reported every year; the annual catch limit is modified in an adaptive way during the year as a result of updated scientific data and has been in accordance to recommendations. Reference points were established during a working group (October 2017, updated and published April 2018) during which a BAC (Biologically Acceptable Catch, based on F_{MSY}, was calculated for the 2018 fishery. Fishery removals of common sardine in the fishery under assessment are included in the stock assessment process. The species passes Clause C1.1.

Spawning stock biomass was estimated (2017 assessment) at 5% below management objectives (BD_{MSY}) with Fishing Mortality (F) slightly above F_{MSY}. The species is considered, in its most recent stock assessment, to have a biomass above the limit reference point (or proxy) and passes Clause C1.2.

Habitat and ecosystem effects

A manual of good practices (INPESCA) to avoid discarding and incidental capture of ETP species has been provided to all stakeholders active in the fishery. A manual of good practices and treatment of ETP species is also under development in the artisanal fisheries (for sea lions). Workshops have been undertaken to present manuals and best practice training to stakeholders in the fishery. 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.

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 the predation of these species models have been adapted and in recent years ecosystem consideration has been taken into account to set up total fishery removals to ensure no impact on key roles of these species in the ecosystems. The Peer Reviewer agrees that Sardina Austral /Falkland sprat should approved by the assessment team for the production of fishmeal and fish oil under the IFFO-RS v 2.0 whole fish 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	Sardina Austral /Falkland sprat *Sprattus fueguensis*	90%	A1	PASS
			A2	PASS
			A3	PASS
			A4	PASS
Category B				
Category C	Anchovy (*Engraulis ringens*)	<5%	PASS	
Category C	Common Sardine (*Strangomera bentincki*)	<5%	PASS	
Category D				

[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
Sardina Austral /Falkland sprat	*Sprattus fueguensis)*	Area X de los Lagos	90%	SUBPESCA; IFOP; MINECON; SERNAPESCA; CCT-PP; SPRFMO.	A
Anchovy	*Engraulis ringens*	Area X de los Lagos	<5%	SUBPESCA; IFOP; MINECON; SERNAPESCA; CCT-PP; SPRFMO.	C
Common sardine	*Strangomera bentincki*	Area X de los Lagos	<5%	SUBPESCA; IFOP; MINECON; SERNAPESCA; CCT-PP; SPRFMO.	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.

M1	Management Framework – Minimum Requirements		
	M1.1	There is an organisation responsible for managing the fishery	PASS
	M1.2	There is an organisation responsible for collecting data and assessing the fishery	PASS
	M1.3	Fishery management organisations are 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
		Clause outcome:	**PASS**

Evidence

M1.1 – M1.4:

The Chilean institutional structure governing the fisheries and aquaculture sector centres around three key organisations, with a number of other institutions providing additional research and enforcement support (such as the Navy). These three organizations have a degree of operational independence while performing a crucial and interlinked function within the broad institutional framework.

- MINECON**:** Chilean Ministry of Economy, Development and Tourism in accordance with DL 2442 of 1978, its responsibilities include establishing the basic policies for managing and coordinating the State's activities relating to the fisheries sector. Actions involve promoting the development of the fisheries sector, along with the protection, conservation, and full use of the resource and the marine environment. The fishing law establishes that the MINECON should establish the fishing law regulations and establish administrative measures based on the SUBPESCA report. The Ministry states that sustainable growth is part of its mission on its website.
- The Subsecretariat de Pesca (Undersecretariat of Fisheries, SUBPESCA or SSP) is positioned within the Chilean Ministry of Economy, Development and Tourism and was created under Law No. 1.626 on the 21st of December 1976. It provides the policy settings and regulatory framework for the domestic management of the sector. It also manages policy direction and provides input into international fisheries issues. Law 20.657 created eight scientific-technical fisheries committees within SUBPESCA, to act as advisory bodies in the formulation of all reference points, quotas, and other technical measures. The law also rendered their technical recommendations mandatory – thus there is a legal requirement for scientific advice to be adopted. The mission statement has a 'participatory and territorial approach aimed at the sustainable development of the national fisheries and aquaculture activity.'
- The Servicio Nacional de Pesca (National Fisheries Service, SERNAPESCA) is also based within the Ministry of Economy, Development and Tourism. It is responsible for executing national fisheries policy, for supervising its enforcement and for ensuring proper application of the legal rules and regulations on fishing. SERNAPESCA also administer the fishery registries, with registration enabling extractive activities to take place, as well as collect and process fish landing and hydrobiological resource processing data. In practice, compliance is checked by Intertek Caleb Brett Chile SA, acting on behalf of SERNAPESCA.
- The Instituto de Fomento Pesquero (Fisheries Development Institute, IFOP**)** is the research arm of the institutional framework. A non-profit organisation created in 1964 under a joint agreement between the Chilean government, the FAO, and the UN Development Program, it is the primary source of scientific advice to the SSP on fisheries and aquaculture agreement issues. Its work includes stock assessment, advising on total allowable catch levels for the wild fisheries, and the environmental and health aspects of aquaculture production. It draws a proportion of its funding from SUBPESCA but also has to compete for funding from a range of public funding sources. According to its website The Fisheries

Development Institute (IFOP) is a non-profit Private Law Corporation whose public role is to support the sustainable development of the country's fishing & aquaculture sector'.

- 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 IFOP's updates on stock status and catch projections and make official recommendations to the Chilean authority on TAC's.

South Pacific Regional Fisheries Management Organisation (SPRFMO):

As a widely distributed species, international management of Chilean small pelagics (including Jack mackerel) is coordinated by the South Pacific Regional Fisheries Management Organisation (SPRFMO). Currently overall TAC's are agreed by the SPRFMO for certain stocks, with part of that under Conservation and Management Measures (CMM's) applying to international waters under SPRFMOs jurisdiction. SPRFMO also provide advice on TAC's in Chilean national waters (Jack mackerel *Trachurus murphyi*) due to its (Chile's) express consent.

Legal instruments:

Since February 2013, the primary legal instrument for fisheries management in Chile has been Law 20.657 (LGPA). The LGPA is a modification of the previous fisheries legislation, and includes:

- A commitment to the sustainable use and conservation of marine resources.
- A commitment to make key decisions on conservation measures on the basis of scientific information above all other considerations. To this end, the recommendations of SUBPESCA's scientific-technical committees have been made mandatory.

A commitment to develop management plans for any fishery with restricted access, and the review and updating of these plans every five years. The LGPA states that all stocks should be exploited around the MSY level, and that MSY is the objective to be considered when quotas are established. In general, both scientific advice and management measures are based on these generic objectives. Regional Government Areas in Chile correspond to fishery management units offshore (**Figure 1**):

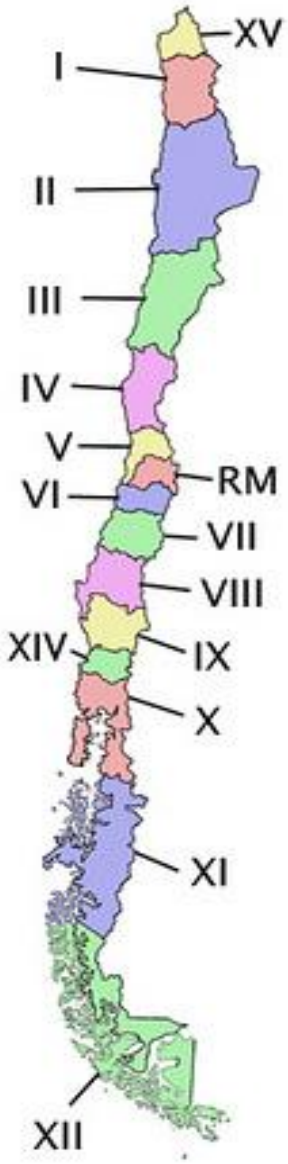

Figure 1 Regional Government Areas in Chile corresponding to fishery management units. Adapted from https://pepeschile.com/es/regiones-chilenas-de-que-son-todos-estos-numeros/ **R1**

There is an organisation responsible for managing the fishery; there is an organisation responsible for collecting data and assessing the fishery; fishery management organisations are publically committed to sustainability and fishery management organisations are legally empowered to take management actions.
R1- R7

References

R1 Pepe's Chile Mapa de las Regiones Chilenas: https://pepeschile.com/es/regiones-chilenas-de-que-son-todos-estos-numeros/

R2 Ministerio de Economía, Fomento y Turismo MINECON
http://out.easycounter.com/external/minecon.gov.cl

R3 SUBPESCA http://www.subpesca.cl/portal/616/w3-channel.html

R4 SERNAPESCA www.sernapesca.cl

R5 IFOP https://www.ifop.cl/en/

R6 Law on Fisheries and Aquaculture No 20.657:
http://www.subpesca.cl/normativa/605/articles-764_documento.pdf
R7 South Pacific Regional Fisheries Management Organisation https://www.sprfmo.int/
R8 Comité Científico de Recursos Dehesarles Zona Sur Austral http://www.subpesca.cl/portal/616/w3-propertyvalue-51145.html
R9 Nacional Miserees Council Consejo Nacional de Pesca (CNP) http://www.subpesca.cl/portal/616/w3-propertyvalue-38005.html
R10 SUBPESCA Noticeboard**:** http://www.subpesca.cl/portal/615/w3-channel.html

M1.5-M1.6:
Fisheries council
The National Fisheries Council was created by the Fisheries and aquaculture Law 18.892 for the purpose of managing the participation of all stakeholders in the fisheries and aquaculture sector. It is a ruling, advisory and consultative body for dealing with Fisheries and Aquaculture plans and Laws as well as for development proposals for small scale fishing. Five Zonal Fisheries Councils contribute to the decentralization of management measures to be taken by authorities and enhance regional participation of fisheries and aquaculture stakeholders. They communicate new and amended regulations through regional bulletins and acts published several times a year to stakeholders.

Regional Fisheries Councils study fisheries and aquaculture problems affecting their zones and propose solutions and management measures to SUBPESCA. Until 2013 these Councils were responsible for approving the SUBPESCA-recommended TAC; however, the introduction of Law 20.657 (February 2013) adjusted this arrangement to render the Council as a purely consultative body for the purposes of TAC-setting. This results in a decision-making process that is very transparent with the results being publicly available on-line.

Fisheries rules, decisions and regulation updates are posted on the SUBPESCA website. Chilean Law No. 20.285 "on transparency of the Civil Service and access to information on the state administration," was put into force in 2009. Its two main principles are "active transparency" and "passive transparency'':

- Active transparency means the administrative bodies of the state must make available to the general public a long list of information, to be posted permanently on their web sites and updated at least once a month.
- Passive transparency is the term used for the right of all citizens to request and receive information contained in minutes, resolutions, files, contracts and agreements, and to all information reports that have been paid for from the public purse. The information requested must be provided within 20 working days. Dissatisfied citizens can complain to the Transparency Council, an autonomous body under public law created to ensure enforcement of the law.

There is a consultation process through which fishery stakeholders are engaged in decision-making. The decision-making process is transparent, with processes and results publically available.
R8-R10, R12

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
		Clause outcome:	**PASS**

Evidence:

M 2.1 – M 2.3:

Enforcement of fisheries legislation is the responsibility of SERNAPESCA. Industrial fishing vessels operate under mandatory VMS monitoring and a maximum catch limit per vessel owner. An artisanal extraction regime (artisanal sector) is in place.

The guiding instrument of fisheries management in Chile is the General Law on Fisheries and Aquaculture (LPGA). No. 18.892 (1989) Act. This Act, as amended (Decree 430), plus other intermediate laws, regulated the activities of fisheries and aquaculture until February 9, 2013 when the new Law on Fisheries and Aquaculture No. 20,657, was published; amending the previous one in the fields of sustainability of aquatic resources, access to industrial fisheries and regulations for the research and monitoring of fishing activity.

SERNAPESCA:

- Carry out audits of capture fisheries; implement the surveillance and control of compliance with legal provisions relating to the fisheries.
- Health and environmental monitoring of aquaculture, surveillance. Developing strategies and procedures for prevention, surveillance and control of high-risk diseases.
- Information and sectoral statistics. Managing fisheries and aquaculture records.
- Within the Exclusive Economic Zone, the Chilean Navy also monitors an area covering approximately 4,542,990 km^2 ensuring the prevention of depredation of natural resources in an effort to protect the ecosystem from unauthorized activities.
- In 2014 Chilean fishing trips carried observers on 9.1% of high seas trips and 15.2% of trips within the Chilean EEZ.

In 2005, a National Action plan was approved with the aim of preventing, deterring and eliminating Illegal, unreported and unregulated (IUU) fishing. There are some instances of non-compliance with SPRFMO's Conservation and Management Measures (CMM) particularly as to timely reporting. A final list of (IUU) vessels was adopted at the 3rd SPRFMO Commission meeting in 2015 comprised two vessels. In 2016 three IUU vessels were reported for conducting unauthorized activities. The fleet in this fishery has varied in number (2006 to the present) from 27 to 29 vessels. There is no substantial evidence of widespread non-compliance in the fishery.

There is a framework allowing for the application of sanctions ranging from monetary fines to revocation of licence. There is however a lack of evidence regarding its effectiveness. The LGPA defines a range of sanctions for offences including fishing with an unlicensed vessel, discarding, incorrect logbook use, failure to report landings, fishing in a region or fishery other than the one for which the vessel is licenced, and for industrial vessels which land more fish than they have quota for. Depending on the offence sanctions can include one or

a combination of monetary penalties dependant on tonnage; suspension of fishing licence; and revocation of licence entirely.

All in all, there is an organisation responsible for monitoring compliance with fishery laws and regulations. There is a framework of sanctions which are applied when laws and regulations are discovered to have been broken. There is no substantial evidence of widespread non-compliance in the fishery, and no substantial evidence of IUU fishing.

R4, R6, R11-R13

M2.4:
Industrial vessels operate under mandatory VMS monitoring. Also, Sernapesca carry out audits of capture fisheries and implement surveillance and control of compliance with those legal provisions relating to the fisheries.

Within the Exclusive Economic Zone (EEZ) the Chilean Navy monitor an area covering approximately 4,542,990 km^2 ensuring the prevention of depredation of natural resources in an effort to protect the ecosystem from unauthorized activities.

Compliance with laws and regulations is actively monitored, through a regime which may include at-sea and portside inspections, observer programmes, and VMS. The assessment team have requested stakeholders to provide information on numbers of infringements detected and actions taken by the competent authority for fisheries control to ensure compliance to the regulations in force. These data will be added as an annex to this report when received.
R11-R14

References
R11 Chile Law Fisheries, Aquaculture No 20.657: http://www.subpesca.cl/normativa/605/articles-764_documento.pdf
R12 Chile Law on Fisheries and Aquaculture No 20.285: http://www.subpesca.cl/normativa
R13 Chilean Navyhttp://www.armada.cl/armada/site/edic/base/port/nuestra_armada.html
R14 Port state measures to prevent, deter and eliminate illegal, unreported and unregulated fishing. FAO 2016 http://www.fao.org/3/a-i5469t.pdf

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		**Sardina Austral /Falkland sprat (*Sprattus fueguensis*)**	
A1	**Data Collection - Minimum Requirements**		
	A1.1	Landings data are collected such that the fishery-wide removals of this species are known.	PASS
	A1.2	Sufficient additional information is collected to enable an indication of stock status to be estimated.	PASS
		Clause outcome:	**PASS**

Evidence

A1.1:

Although all landings of *Sardina austral* are recorded, information provided by IFOP indicates that there are issues with underreporting and misreporting of species. Correction factors are applied in both industrial and artisanal fisheries to account for under-reporting. There is a no-discard policy in place (**Figure 2**):

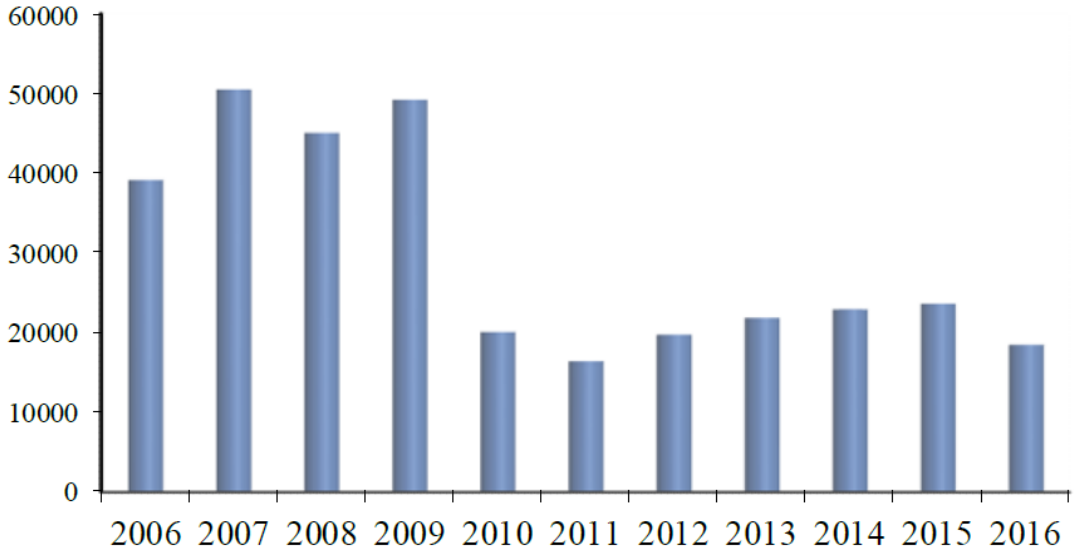

Figure 2 Official annual landings (t) of *Sardina austral* in the interior waters of the Mar de Chiloé (Area X) from 2006-2016 **R17**

The fleet has varied in number (2006 to the present) from 27 to 29 vessels with an overall length restriction of 17.99m and a maximum allowable capacity in the hold of 100m^3. Since 2010 landings have consistently been around the quota set (approximately 20,000t). Several fishery-independent surveys have been, and are still, carried out (A1.2).

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

A1.2:

Since 2008, the catch in this area has been regulated through an annual TAC, and since 2009 IFOP has performed annual stock assessments and has estimated annual allowable catches through a size-structured model.

Several fishery-independent surveys have been, and are still, carried out. These include acoustic biomass surveys (2006-2017); the most recent of which were:

- Evaluación Hidroacústica de Pequeños Pelágicos en aguas interiores de la X y XI Regiones, año **2015.** IFOP
- Evaluación hidroacústica de pequeños pelágicos en aguas interiores de la X y XI Regiones, año **2017 IFOP**

Results of acoustic surveys undertaken in 2017 were published in February 2018 (**R15**). *Sardina austral* abundance was estimated at 10.376 billion individuals (CV=16.4%) of which 9.624 billion corresponded to individuals smaller than average size at sexual maturity (13cm) amounting to 92.7% of stock evaluated.

Total biomass (Area X) was estimated at 66,882t of which 78.2% were juveniles. In comparison with the 2016 assessment this represents a decrease of 8% in abundance and 37% in terms of biomass. Reasons given for this decrease in biomass included the response of the stock to rapid changes in environmental conditions associated with local el Niño and la Niña events affecting species distribution in the areas surveyed.

Additional data collected from the small pelagic fishery include total landings, age and size estimates from sampling. Information collected at landing sites and also directly from fishing vessels included location and time of catch, length, weight, sex, and age data, and size frequency distribution data.

Additional research which would improve the reliability of the stock assessment could include an improved understanding of population structure and migration patterns, known location of spawning and nursery grounds, growth and age parameters, discards and under-reported catches, fishing effort/CPUE, and environmental influence on stock parameters: (**Figure 3**):

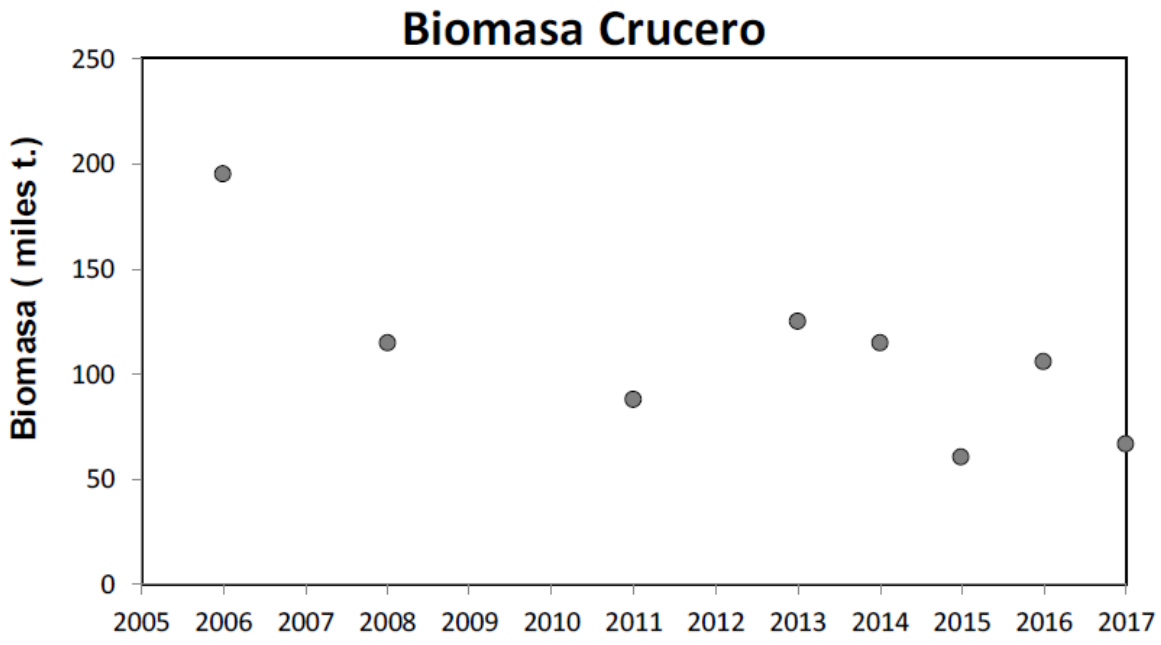

Figure 3: Total estimated biomass from research surveys (2006-2017) in the sardine austral fishery in Region X **R 15**

Landings data are collected such that the fishery-wide removals of this species are known. Sufficient additional information is collected to enable an indication of stock status to be estimated.
R15-R17

References

R15 IFOP INFORME FINAL Convenio Desempeño 2017:Evaluación hidroacústica de pequeños pelágicos en aguas interiores de la X y XI Regiones, año 2017" SUBSECRETARÍA DE ECONOMÍA Y EMT / Febrero 2018 241pp

R16 SEGUNDO INFORME DE ESTATUS Convenio de Desempeño 2016 Estatus y posibilidades de explotación biológicamente sustentables de los principales recursos pesqueros nacionales, 2017: Sardina austral X Región SUBSECRETARÍA DE ECONOMÍA Y EMT / Junio 2017 101pp http://www.ifop.cl/wp-content/contenidos/uploads/RepositorioIfop/InformeFinal/P-483253_sardina_austral_X_region.pdf

R17 SUBPESCA ESTADO DE SITUACIÓN DE LAS PRINCIPALES PESQUERÍAS CHILENAS, AÑO 2017 pdf pp77-79 Sardina austral.

Standard clause 1.3.2.1.1

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 outcome:	**PASS**

Evidence

A2.1:

Several fishery-independent surveys have been, and are still, carried out. Stock biomass has been estimated yearly in the past 5 years (2013-2017) (**Figure 3**). Management committees are convened annually. The latest meeting (Sardina austral 2019) referred to a proposed Fishery Improvement Project (FIP) for the species in the assessment area, with the ultimate goal of achieving MSC Certification in the assessment area. The stock is largely managed in accordance with scientific advice produced using implicit management objectives based on scientifically-derived reference points. Additionally, there are generic commitments to long-term sustainability in the legislation (LGPA).

A2.2:

SSB reference points were recently set for the fishery and have been used as the basis for TAC advice. The sardine austral SSB target reference point acts as a proxy for B_{MSY} and is equal to 55% SSB_0 (55% of unexploited biomass). The limit reference point is 27.5%SSB0. The proxy for F_{MSY} is set at $F_{60\%}$. (**Figure 4**):

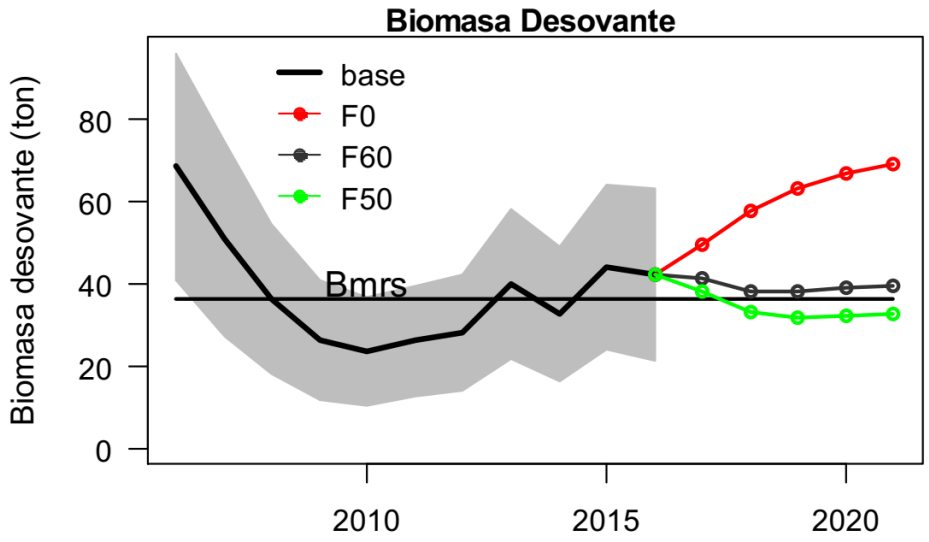

Figure 4 Sardine austral spawning stock biomass, confidence bands (shaded area) and stock projection until the year 2021. Different exploitation strategies are presented. The F60 corresponds to the management objective. The horizontal line corresponds to the target biomass (Bmrs). **R17**

The LGPA includes a commitment to develop a management plan for any fishery with restricted access; however, the development of a management plan for the small pelagic fishery in Region X, or any of its component species, appears to be still in development. The LGPA also includes commitments to manage fisheries sustainably.

A2.3:

Figures from the 2017 stock assessment show that spawning stock biomass (SSB) was equal to 60% of unexploited SSB (in excess of the reference point). The uncertainty in the evaluation shows a probability $P_{BD2017>BDOBJ}$ of 90% that the stock is fully exploited. Fishing mortality was calculated as being within stated reference point with a 55% probability of the risk of overfishing: $P_{F>FOBJ = 0.55.}$ Spawning stock biomass (2017 data) exceeded SSB_{MSY} by 9% while fishing mortality exceeded F_{MSY} by 3%: (**Figure 4b):**

CCT-PP provide diagrams summarising the state of each small pelagic stock with regard to F ($F/F_{RMS=MSY}$) and SSB ($BD/BD_{RMS=MSY}$):

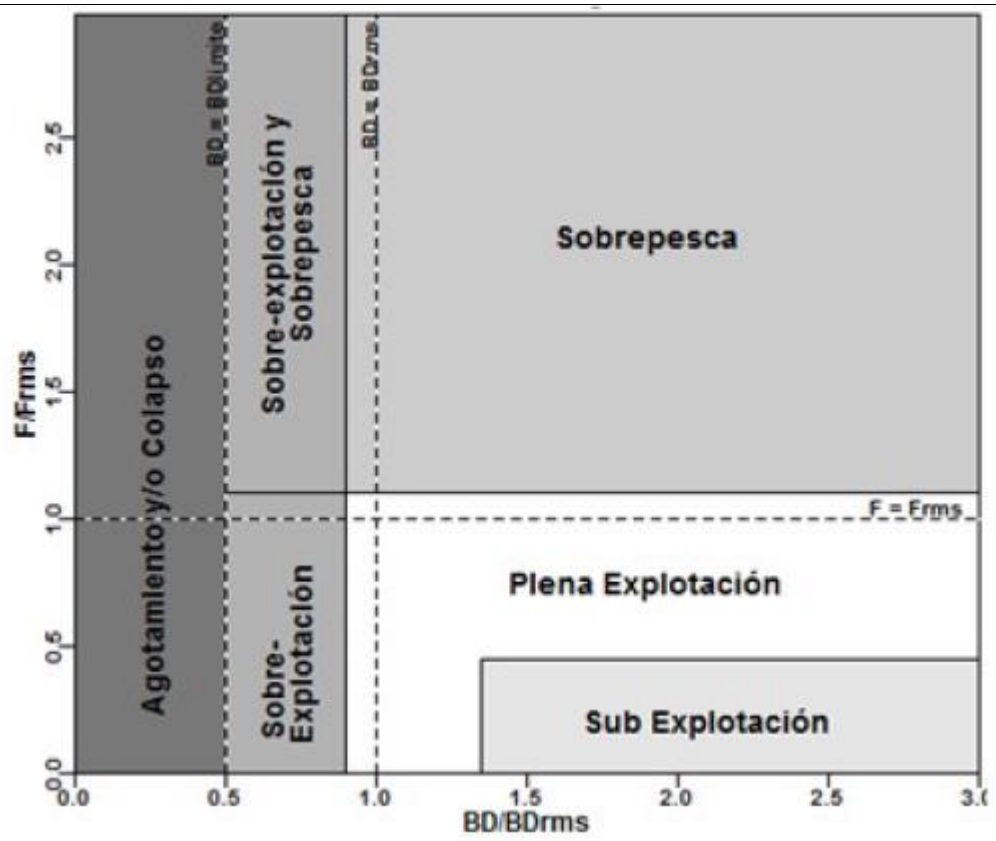

Figure 4a CCT-PP diagram used to describe small pelagic fisheries **R16**

Where:

Sobrepesca = overfishing; Plena Explotación = fully exploited; Sub Explotación = under exploited
F/F_{rms} = $F/_{Fmsy}$; BD/BD_{rms} = SSB/SSB_{msy}

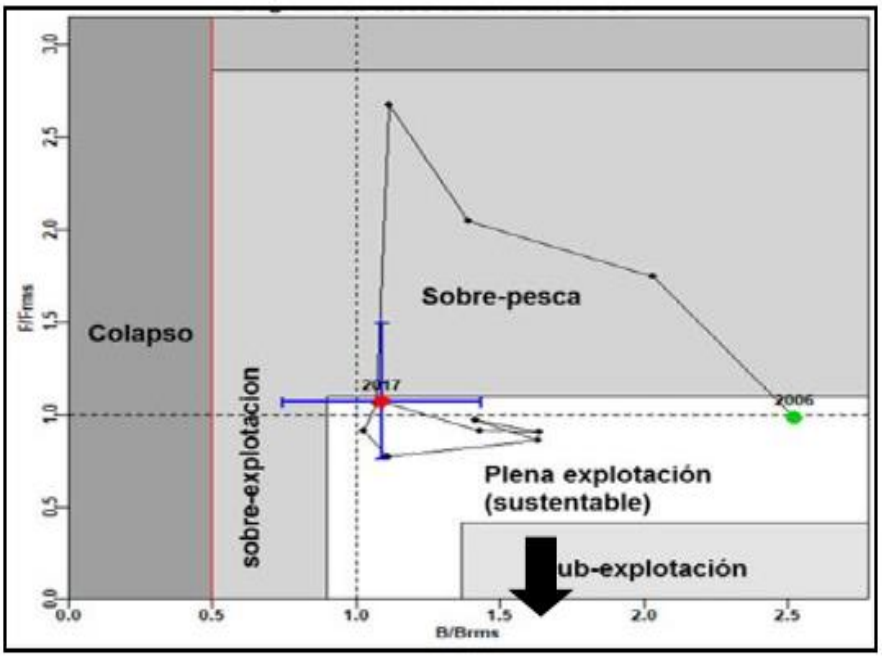

Figure 4b IFOP Summary of the 2017 Sardina austral assessment, with reference points **R17**

Taking into account the results of the 2017 assessment the 2018 Quota allocation for the fishery (Internal waters, Region de los lagos Area X) was published by SUBPESCA on 09.11.2017:

Table 2: 2018 Quota Allocation Sardina austral **R16**

Sardina Austral A. I – X Región	Toneladas
Cuota 2018	17.200
Reserva de investigación	65
Consumo humano (1%)	172
Fauna acompañante	50
Total Cuota Objetivo	16.913
Ene-Oct (90%)	15.222
Nov-Dic (10%)	1.691

A BAC (Biologically Acceptable Capture, based on an F_{MSY} proxy) range of between 13,760t-17,200t was announced, in conformance with Article 154 c) of the LGPA. This decision has a probability of 20% that management objectives and recruitment objectives would not be achieved during the 2018 fishery.

A Global Quota of 295,680t (all waters, Area V-X) was published (March 2018) by SUBPESCA (**R17**):

- Cuota de investigación: 180 t (Research purposes)
- Cuota de imprevistos: 2.957 t (Unforeseen quota)
- Cuota de consumo humano:2.957 t (Human consumption)
- Cuota remanente: 289.586 t (Remaining quota)
    - Sector artesanal 255.877 t (Artisanal)
    - Sector industrial 63.709t (Industrial)

A2.4:

The stock assessment and management approach used undergoes detailed peer review through the Scientific Committee (SC) and Management Committees. This peer review can be considered to be both internal and external as members of the committees may be part of the outside the assessment process. Both IFOP and SUBPESCA have commissioned external peer reviews. For a series of workshops convened with Peru, invited international experts evaluated the setting of biological reference points within the MSY framework for a number of small pelagics.

A2.5:

The main scientific advice for the fishery is the recommendation for the annual TAC, which is given in three stages each year. A pre-season recommendation is followed by an initial in-season recommendation, which makes use of landings data and an April/May survey. The results of two surveys are also used to produce the pre-season TAC estimate for the following year. These TAC recommendations are made by IFOP to SUBPESCA, and do not appear to be made publicly available. SUBPESCA then passes on its own recommendations, which are publically available, to CNP and SERNAPESCA. At that stage reports can be found on IFOP and SUBPESCA websites. All the information is available.

References

R15-R17

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 outcome:	**PASS**

Evidence

A 3.1:

Access to the fishery is restricted, in recognition of the state of full exploitation of the fishery. Since 2008, the catch in this area has been regulated through an annual TAC. New entrants to the fishery are prohibited until June 2020. There are gear restrictions in place for the artisanal fleet, for which derogations exist when in waters in excess of 40m. The fishery is closed during spawning and recruitment. All technical measures are published in *Normativas* and are made available to all stakeholders.

A3.2:

From 2006-2011 spawning stock biomass decreased from a high of 89,000t to 36,000t. Assessments from 2007-2010 indicated the resource was overfished during this time. Since 2010 enforced reductions in fishing mortality resulted in the fishery being upgraded to a state of full exploitation. In 2017 spawning stock biomass (SSB) was equal to 60% of the unexploited SSB (reference point). Total fishery removals of this species do not regularly exceed the level indicated or stated in the stock assessment (**Figure 2**).

A3.3:

The stock is currently above the established biomass reference point (Bmrs). The LGPA does not establish this type of restrictions (fishing prohibition) on catches when stock biomass is below limit biomass. A resource recovery plan must be implemented; the management committee of the fishery is required to elaborate and implement such plan of recovery (Article 9 LGPA).

According to the Chilean Fishery Act (LGPA), fisheries are not closed below this limit because of social and economic reasons, and to monitor the recovery of the resource according to a recovery plan. This implies reductions in fishing mortality at levels below or equal to the F_{RMS} (selecting multipliers of the F_{RMS}) according to the expected time of recovery established by the management committee.

The assessment team will monitor proposed changes in the legislation following a report (compiled by a team of independent scientists and experts from the FAO) submitted to Government in 2018.

References

R16-R17

Standard clause 1.3.2.1.3

A4	Stock Status - Minimum Requirements		
	A4.1	The stock is at or above the target reference point, OR IF NOT: The stock is above the limit reference point or proxy and there is evidence that a fall below the limit reference point would result in fishery closure OR IF NOT: The stock is estimated to be below the limit reference point or proxy, but fishery removals are prohibited.	PASS
		Clause outcome:	**PASS**

Evidence

A 4.1

Figures from the 2017 stock assessment show that spawning stock biomass (SSB) was equal to 60% of unexploited SSB. The uncertainty in the evaluation shows a probability $P_{BD2017>BDOBJ}$ of 90% that the stock is fully exploited. Fishing mortality was calculated as being within the stated reference points with a 55% probability of the risk of overfishing: $P_{F>FOBJ = 0.55}$

Fishing mortality (2017 assessment) was almost within management objectives although the probability that current levels would result in overfishing was at 55% P(F> Fobj = 0,55).

References

R16

Standard clause 1.3.2.1.4

CATEGORY B SPECIES

Category B species are those which make up greater than 5% of landings in the applicant raw material, but which are not subject to a species-specific research and management regime sufficient to pass all Category A clauses. If there are no Category B species in the fishery under assessment, this section can be deleted.

Category B species are assessed using a risk-based approach. The following process should be completed once for each Category B species.

If there are estimates of biomass (B), fishing mortality (F), and reference points

It is possible for a Category B species to have some biomass and fishing mortality data available. When sufficient information is present, the assessment team should use the following risk matrix to determine whether the species should be recommended for approval.

Table B(a) - F, B and reference points are available

Biomass is above MSY/target reference point	Pass	Pass	Pass	Fail	Fail
Biomass is below MSY/target reference point, but above limit reference point	Pass, but re-assess when fishery removals resume	Pass	Fail	Fail	Fail
Biomass is below limit reference point (stock is overfished)	Pass, but re-assess when fishery removals resume	Fail	Fail	Fail	Fail
Biomass is significantly below limit reference point (Recruitment impaired)	Fail	Fail	Fail	Fail	Fail
	Fishery removals are prohibited	**Fishing mortality is below MSY or target reference point**	**Fishing mortality is around MSY or target reference point, or below the long-term average**	**Fishing mortality is above the MSY or target reference point, or around the long-term average**	**Fishing mortality is above the limit reference point or above the long-term average (Stock is subject to overfishing)**

If the biomass / fishing pressure risk assessment is not possible

Initially, the resilience of each Category B species to fishing pressure should be estimated using the American Fisheries Society procedure described in Musick, J.A. (1999). This approach is used as the resilience values for many species and stocks have been estimated by FishBase and are already available online. For details of the approach, please refer to Appendix A. Determining the resilience provides a basis for estimating the risk that fishing may pose to the long-term sustainability of the stock. Table B(b) should be used to determine whether the species should be recommended for approval.

Table B(b) - No reference points available. B = current biomass; Bav = long-term average biomass; F = current fishing mortality; Fav = long-term average fishing mortality.

$B > B_{av}$ and $F < F_{av}$	Pass	Pass	Pass	Fail
$B > B_{av}$ and F or F_{av} unknown	Pass	Pass	Fail	Fail
$B = B_{av}$ and $F < F_{av}$	Pass	Pass	Fail	Fail
$B = B_{av}$ and F or F_{av} unknown	Pass	Fail	Fail	Fail

B > B_{av} and F > F_{av}	Pass	Fail	Fail	Fail
B < B_{av}	Fail	Fail	Fail	Fail
B unknown	Fail	Fail	Fail	Fail
Resilience	**High**	**Medium**	**Low**	**Very Low**

Assessment Results

Species Name		
B1	Species Name	
	Table used (Ba, Bb)	
	Outcome	
Evidence		
References		
Standard clauses 1.3.2.1		

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		**Anchovy (*Engraulis ringens*) Area V-X**	
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
		Clause outcome:	**PASS**

Evidence

C 1.1:

The CCT-PP (SUBPESCA Management Committee) met in October 2017 (reported in April 2018) on an assessment of the state of the anchovy stock (V-X) and to determine a Biologically Acceptable Catch (BAC) for the 2018 fishery. Spawning stock biomass was calculated at 50% below SSB_{MSY} i.e. at SSB_{BLIM}. Anchovy (Area V-X) remains at the limit of over-exploitation (Figure 5). Figures reported by IFOP (2018 fishery to 02 April 2018) showed that, for Area X, just 2% of the global (V-X) quota for anchovy was landed in Area X with most of the landings taking place in Areas V, VIII and XIV.

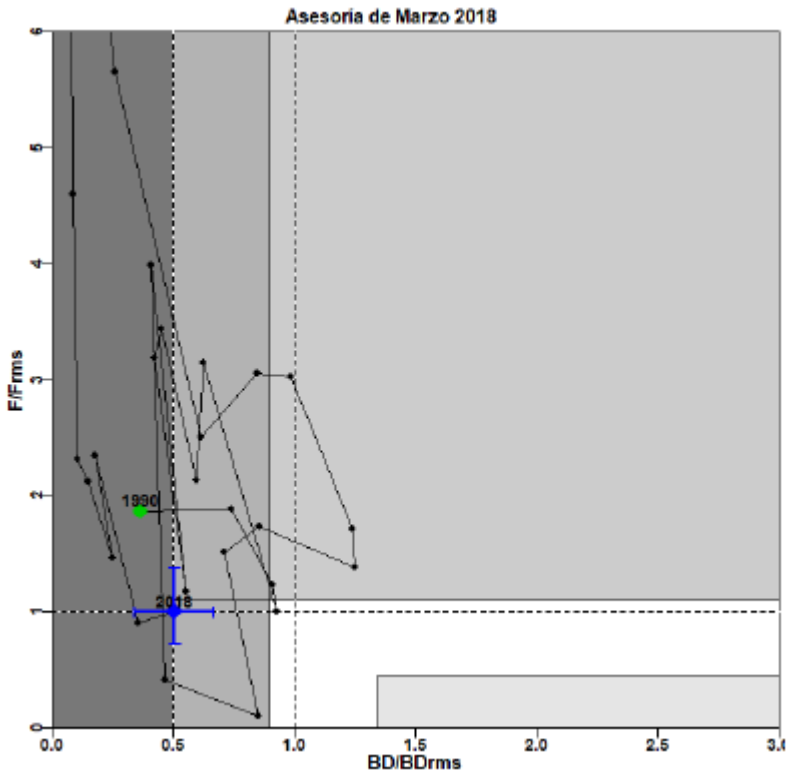

Figure 5: IFOP Summary of the 2018 Anchovy (V-X) assessment, reference limits represented as horizontal and vertical dotted lines (See also Fig 4a). **R18**

Working groups were established to prioritise issues with the fishery and to establish corrective actions. Methods were also proposed to improve data collection in the fishery and to revise current biological reference points which in the opinion of the working group did not consider annual changes in species productivity.

Fishery removals of the species in the fishery under assessment are included in the stock assessment process. The species passes Clause C1.1.

C1.2:

The CCT-PP recommended a Biologically Acceptable Catch (BAC) for 2018 (V-X) of 49,440t in conformance with Article 153 c) of the LGPA. This catch was to be divided between the industrial (10,626t) and artisanal (37, 676t) fleets. This range was precautionary as it considers established biological reference points (BDRMS = 55%BDo (BMSY); FRMS =F60% BDPR (FMSY) and the probability of exceeding these reference points.

The CCT-PP have also recommended a revision of the model used to evaluate the stock and noted that information from the commercial sector on recruitment values did not match data received from the acoustic surveys. The fishery has been declared as being fully exploited. New entrants to the fishery are prohibited. Closures are in operation to protect spawning stock and new recruits to the fishery.

<u>2019 Update on State of the Stock:</u>

Indicators from the latest PELACES acoustic evaluation and stock assessment (August 2019 meeting minutes, provided by client) have shown that, based on IFOP and INPESCA reports, the stock of anchovy (V-X) is in the overexploitation zone and has moved away from the limit level of collapse (8% chance of being depleted). Anchovy biomass has advanced in its recovery and is now close to target biomass and indicators.

The species is considered, in its most recent stock assessment, to have a biomass above the limit reference point and passes Clause C1.2.

R17-R18

References

R18 CCT-PP Technical Report No 1 (April 2018): Update on ANE, SAR V-X stock assessments, 2018 BAC's http://www.subpesca.cl/portal/616/articles-100409_documento.pdf

Standard clauses 1.3.2.2

Species Name	**Common sardine (*Strangomera bentincki*)**		
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
		Clause outcome:	**PASS**

Evidence

C1.1:

Catches are reported every year and the annual catch limit is modified in an adaptive way during the year in result of updated scientific data and has been in accordance to recommendation. Also, 1998-2001 landings were amended due to indications of under-reporting and models updated to avoid uncertainties in the models.

Input data to the most recent assessments included: 1991-June 2017 landings from SERNAPESCA; 1997-June 2017 catch-at-age and weight-at-age data from the Monitoring Program of the Main National Fisheries (Pelagic Fisheries); biomass time series of acoustic surveys performed in summer (2000-2017) and autumn (2003-2017), from the IFOP scientific research cruises conducted annually; and other relevant information related to the species' life cycle from scientific articles.

Reference points were established during a working group (October 2017) during which a BAC (Biologically Acceptable Catch, based on F_{MSY}) was calculated for the 2018 fishery.

Fishery removals of the species in the fishery under assessment are included in the stock assessment process. The species passes Clause C1.1

C1.2:

Recruitment in 2016/2017 increased by 56% from the previous year, especially of age 0 individuals. Total biomass increased by 15% in 2016/2017 from the previous year. SSB decreased and was slightly below BMSY at 741,410 tonnes. The model (SSB) considers the biological year so the 2017 value represents the beginning of the biological year (August 2016) which is a lower figure due to a weaker recruitment in 2016.

Spawning stock biomass was estimated (2017 assessment) at 5% below management objectives (BD_{MSY}) with Fishing Mortality (F) slightly above F_{MSY} (**Figure 6 blue cross**). F had increased by 24% in respect to the previous year and was currently at (2017 assessment) at 0.263; 4.4% above FMSY (F2016/2017/FMSY=1.04).

Reference points defined during the last stock assessment are listed below:

a) BDRMS = 60%BDPR ó 55%Bdo (BMSY)

b) BD límite = 27,5%Bdo (BLIM)

c) FRMS =F60% BDR (FMSY)

Based on these reference points and the data from the last report the stock status was considered healthy and in a good condition.

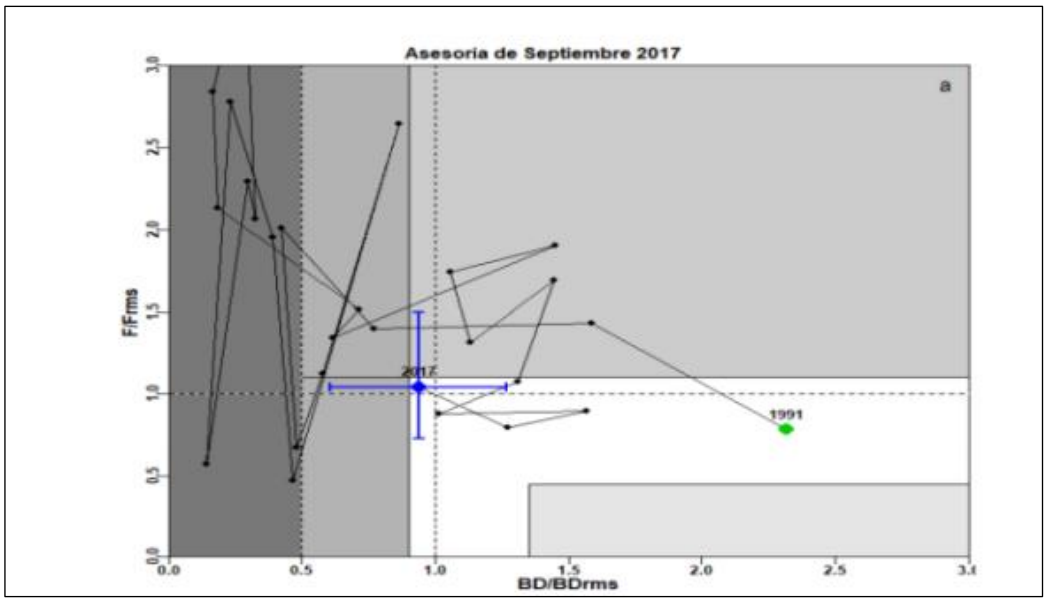

Figure 6: IFOP Summary of the Common Sardine (V-X) assessment, reference limits represented as horizontal and vertical dotted lines (See also Fig 4a). **R17**

The working group recommended a Biologically Acceptable Catch (BAC) for 2018 between 236,544t and 295,680t as laid down in Article 153c) of the LGPA.

The precautionary approach is applied. The species is considered, in its most recent stock assessment, to have a biomass above the limit reference point (or proxy) and passes Clause C1.2.

References

Standard clauses 1.3.2.2

CATEGORY D SPECIES

In a whole fish assessment, Category D species are those which make up less than 5% of landings and are not subject to a species-specific management regime. In the case of mixed trawl fisheries, Category D species may make up the majority of landings. In a by-product assessment, Category D species are those which are not subject to a species-specific management regime. In both cases, the comparative lack of scientific information on the status of the population of the species means that a risk-assessment style approach must be taken.

The process for assessing Category D species involves the use of a Productivity-Susceptibility Analysis (PSA) to further subdivide the species into 'Critical Risk', 'Major Risk' and 'Minor Risk' groups. If there are no Category D species in the fishery under assessment, this section can be deleted.

Productivity and susceptibility ratings are calculated using a process derived from the APFIC document "Regional Guidelines for the Management of Tropical Trawl Fisheries, which in turn was derived from papers by Patrick *et al* (2009) and Hobday *et al* (2007). Table D1 should be completed for each Category D species as follows:

- Firstly, the best available information should be used to fill in values for each productivity and susceptibility attribute.
- Table D2 should be used to convert each attribute value into a score between 1 and 3.
- The average score for productivity attributes and the average for susceptibility attributes should be calculated.
- Table D3 should be used to determine whether the species is required to meet the requirements of Table D4. A species which does not need to meet the requirements of D4 is automatically awarded a pass.
- Table D4 should be used to assess those species indicated by Table D3 to determine a pass/fail rating.
- Any Category D species which has been categorised by the IUCN Red List as Endangered or Critically Endangered, or which appears in the CITES appendices, automatically results in a fail.

D1	Species Name:		
	Productivity Attribute	**Value**	**Score**
	Average age at maturity (years)		
	Average maximum age (years)		
	Fecundity (eggs/spawning)		
	Average maximum size (cm)		
	Average size at maturity (cm)		
	Reproductive strategy		
	Mean trophic level		
	Average Productivity Score		
	Susceptibility Attribute	**Value**	**Score**
	Overlap of adult species range with fishery		
	Distribution		
	Habitat		
	Depth range		
	Selectivity		
	Post-capture mortality		
	Average Susceptibility Score		
	PSA Risk Rating (From Table D3)		
	Compliance rating		
References			
Standard clauses 1.3.2.2			

Table D2 - Productivity / Susceptibility attributes and scores.

Productivity attributes	Low productivity/ High risk	Medium productivity/ Medium risk	High productivity/ Low risk
	Score 3	Score 2	Score 1
Average age at maturity (years)	>4	2 to 4	<2
Average maximum age (years)	>30	10 to 30	<10
Fecundity (eggs/spawning)	<1 000	1 000 to 10 000	>10 000
Average maximum size (cm)	>150	60 to 150	<60
Average size at maturity (cm)	>150	30 to 150	<30
Reproductive strategy	Live bearer, mouth brooder or significant parental investment	Demersal spawner "berried"	Broadcast spawner
Mean trophic level	>3.25	2.5–3.25	<2.5

Susceptibility attributes		High susceptibility/ High risk	Medium susceptibility/ Medium risk	Low susceptibility/ Low risk
		Score 3	Score 2	Score 1
Availability	1) Overlap of adult species range with fishery	>50% of stock occurs in the area fished	Between 25% and 50% of the stock occurs in the area fished	<25% of stock occurs in the area fished
	2) Distribution	Only in the country/ fishery	Limited range in the region	Throughout region/ global distribution
Encounterability	1) Habitat	Habitat preference of species make it highly likely to encounter trawl gear (e.g. demersal, muddy/sandy bottom)	Habitat preference of species make it moderately likely to encounter trawl gear (e.g. rocky bottom/reefs)	Depth or distribution of species make it unlikely to encounter trawl gear (e.g. epi-pelagic or meso-pelagic)
	2) Depth range	High overlap with trawl fishing gear (20 to 60 m depth)	Medium overlap with trawl fishing gear (10 to 20 m depth)	Low overlap with trawl fishing gear (0 to 10 m, >70 m depth)
Selectivity		Species >2 times mesh size or up to 4 m length	Species 1 to 2 times mesh size or 4 to 5 m length	Species <mesh size or >5 m length
Post capture mortality		Most dead or retained Trawl tow >3 hours	Alive after net hauled Trawl tow 0.5 to 3 hours	Released alive Trawl tow <0.5 hours

Note: Availability 2 is only used when there is no information for Availability 1; the most conservative score between Encounterability 1 and 2 is used.

D3		Average Susceptibility Score		
		1.00 – 1.75	1.76 – 2.24	2.25 – 3.00
Average Productivity Score	1.00 – 1.75	PASS	PASS	PASS
	1.76 – 2.24	PASS	PASS	TABLE D4
	2.25 – 3.00	PASS	TABLE D4	TABLE D4

D4	Species Name		
	Impacts On Species Categorised as Vulnerable by D1-D3 - Minimum Requirements		
	D4.1	The potential impacts of the fishery on this species are considered during the management process, and reasonable measures are taken to minimise these impacts.	
	D4.2	There is no substantial evidence that the fishery has a significant negative impact on the species.	
		Outcome:	
Evidence			
References			
Standard clause 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-F1.2:

A manual of good practices (INPESCA) to avoid discarding and incidental capture of ETP species has been provided to all stakeholders active in the fishery. A manual of good practices and treatment of ETP species is also under development in the artisanal fisheries (for sea lions). Workshops have been undertaken to present manuals and best practice training to stakeholders in the fishery.

The Fisheries Research Institute (INPESCA), together with all the companies (8) has records of:

- Specific logbooks for bycatch, incidental and ETP species according to FAO and ORP protocol (2017-2018)
- A software platform developed for the registry of incidental fishing in the operation of the industrial fleets XV-X
- On board protocols for the release and treatment of ETP fauna
- Training programs in place for crews of fishing vessels.

F1.3:

In the jack mackerel fishery, the research program on discard and incidental catch of the industrial jack mackerel fishery was extended until April 2019. Results so far show a low impact and few specific situations of interaction with ETP fauna.

A program for the reduction of discards and mitigation of ETP species within the framework of the Management Plan for the Sardina Austral fishery is under development.

References

R18 INPESCA (March 2018) Manual de ingreso de datos pesqueros flota de cerco de la octava región (Software platform for the registry of incidental fishing. 5pp

R19 IFOP, 2015. Estatus y posibilidades de explotación biológicamente sustentables de los principales recursos pesqueros nacionales año 2016": Anchoveta V-X Regiones. September 2015. 118 pp.

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
		Clause outcome:	**PASS**

Evidence

F2.1-F2.3:

In Chile, 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). 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.

A program for evaluating the impact of this and other fisheries n the ecosystem under an ecological risk assessment (ERA) is still under development within the framework of the SPRFMO. Industrial fishing for small pelagic stocks is prohibited from the foreshore for a distance of five nautical miles. It extends over 5 nautical miles measured from the coast from the I Region to 41º28,6'S (located in the first third of the X Region) and from south of 41°28,6' up to 5 nm west of the straight baselines.

There are five marine reserves: La Rinconada in the II Region, Isla Chañaral in the III Region, Isla Choros-Damas in the IV Region, Putemún and Pullinque in the X Region. The main objective of these reserves is to conserve natural banks of northern scallop (*Argopecten purpuratus*), Chilean oyster (*Tiostrea chilensis*) and giant mussel (*Choromytilus chorus*) among others, and also to protect aquatic vertebrates such as dolphins and penguins. Measures are in place to manage and monitor these reserves.

The broader ecosystem within which the fishery occurs is considered during the management decision-making process. The level of interaction of the fishery with Protected, Endangered and Threatened (PET) species appears to be low.

References

R6-R7

Standard clause 1.3.3.2

F3	Ecosystem Impacts - Minimum Requirements		
	F3.1	The broader ecosystem within which the fishery occurs is considered during the management decision-making process.	PASS
	F3.2	There is no substantial evidence that the fishery has a significant negative impact on the marine ecosystem.	PASS
	F3.3	If one or more of the species identified during species categorisation plays a key role in the marine ecosystem, additional precaution is included in recommendations relating to the total permissible fishery removals.	PASS
		Clause outcome:	**PASS**

Evidence

F 3.1 – F 3.3:

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 the predation of these species' models have been adapted and in recent years ecosystem consideration has been considered to set up total fishery removals to ensure no impact on key roles of these species in the ecosystems.

The introduction of the five-mile artisanal-exclusive zone near the shoreline has provided significant protection to spawners and other shallow-water organisms from industrial fishing activities.

The 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,

Also, since the enactment of the General Law on Fisheries and Aquaculture in 1991, a Reserve Zone for Artisanal Fishing has been established by law. This regulation is also in force around the oceanic islands and in inland waters.

This measure prevents the industrial fleet from entering the coastal zone to carry out extractive fishing operations. Compliance measures recently introduced to the artisanal fishery (artisanal extraction regime) should be monitored during future assessments to verify that this sector is complying with allocated quota regimes. The bulk of the catch of this fishery is from the artisanal sector (**A2.3 Table 2**).

The regulation has also become a conservation measure for the bulk of fishery resources that spawn near the coast and in inland waters. This regulation is directly related to the opportunities of protecting and recovering coastal pelagic resources, being of benefit mainly to anchovy and common sardine. The regulation may be temporarily suspended through authorizations for research fishing and dredging that allow the temporary entry of industrial vessels into the reserve zone, in specific areas and during specific periods.

References

R6

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 rm. If users have independent r_m or fecundity estimates, they can refer to Table 1 for using this information*."

Parameter	**High**	**Medium**	**Low**	**Very low**
Threshold	0.99	0.95	0.85	0.70
t_{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]

Appendix B – Background on the 5% catch rule

The proposed fishery assessment methodology uses a species categorisation approach to divide the catch in the assessment fishery into groups. These groups are:

- **Category A:** "Target" species with a species-specific management regime in place.
- **Category B:** "Target" species with no species-specific management regime in place.
- **Category C:** "Non-target" species with a species-specific management regime in place.
- **Category D:** "Non-target" species with no species-specific management regime in place

The distinction between 'target' and 'non-target' species is made to enable the assessment to consider the impact of the fishery on all the species caught regularly, without requiring a full assessment be conducted for each. Thus 'target' species are subjected to a more detailed assessment, while 'non-target' species are considered more briefly. For the purposes of the IFFO RS fishery assessment, 'target' and 'non-target' species are defined by their prevalence in the catch, by weight. Applicants must declare which species are considered 'target' species in the fishery, and the combined weight of these must be at least 95% of the annual catch. The remaining 5% can be made up of 'non-target' species. Note also that ETP species are considered separately, irrespective of their frequency of occurrence in the catch.

The proposed use of 5% as a limit for 'non-target' species is one area in which feedback is being sought via the public consultation. The decision to propose a value of 5% ensures consistency with other fishery assessment programmes, such as the MSC which uses 5% to distinguish between 'main' and 'minor' species (see MSC Standard, SA3.4 and GSA3.4.2); and Seafood Watch, which uses 5% when defining the 'main' species for the assessment (see Seafood Watch Standard, Criterion 2). The value is also consistent with the approached used in Version 1 of the IFFO RS Standard, in which up to 5% of the raw material could be comprised of 'unassessed' species.

Comments on this proposition are welcomed along with any other feedback on the proposed approach.