



# FISHERY ASSESSMENT REPORT

IFFO GLOBAL STANDARD FOR RESPONSIBLE SUPPLY OF FISHMEAL  
AND FISH OIL



<b>FISHERY:</b>	Common Anchovy ( <i>Engraulis ringens</i> )
<b>LOCATION:</b>	Chile – Small Pelagic Fishery Regions V – X
<b>DATE OF REPORT:</b>	June 2017
<b>ASSESSOR:</b>	Deirdre Hoare

1. APPLICATION DETAILS AND SUMMARY OF THE ASSESSMENT OUTCOME			
Name:			
Address:			
Country:		Zip:	
Tel. No.		Fax. No.	
Email address:		Applicant Code	
Key Contact:		Title:	
Certification Body Details			
Name of Certification Body:		Global Trust Certification Ltd.	
Assessor Name	Peer Reviewer	Assessment Days	Initial/Surveillance/ Re-certification
Deirdre Hoare	Virginia Polonio	2	Surveillance
Assessment Period	2016		
Scope Details			
1. Scope of Assessment		IFFO Global Standard for Responsible Supply – Issue 1	
2. Fishery		Common Anchovy ( <i>Engraulis ringens</i> )	
3. Fishery Location		Chile (Chilean management areas V-X)	
4. Fishery Method		Purse seine	
Outcome of Assessment			
5. Overall Fishery Compliance Rating		Medium	
6. Sub Components of Low Compliance		None	
7. Information deficiency		None	
8. Peer Review Evaluation		Maintain approval	
9. Recommendation		Maintain approval	

**2. QUALITY OF INFORMATION**

Good; primarily government publications

**3. COMPLIANCE LEVEL ACHIEVED**

Medium

Recommendation

Approve

**4. GUIDANCE FOR ONSITE ASSESSMENT**

Based on HIGH compliance findings

Based on MEDIUM compliance findings

Based on LOW compliance findings

**5. ASSESSMENT DETERMINATION**

Chile has a robust legal and administrative framework for fisheries, where decisions are informed by annual surveys and fishery-dependent data. The available evidence continues to suggest that the fishery is well monitored and management actions are largely based on best available scientific advice.

In 2015 the fishery was approved based on the following conditions:

**C1**

*Determination: To date the management actions have not been sufficient to prevent excessive exploitation rates and the stock depletion. A management plan has been proposed for this fishery. The focus of the new plan is the precautionary approach. Based on this a medium compliance level has been awarded by the assessment team conditional on the proposed management plan being accepted and implemented by June 2016.*

**D1**

*Determination: In 2014 the level of fishing permitted was not set according to management advice given by research organisations. For 2015 and 2016 the total quota was reduced to 34,400t, based on the scientific advice. This was exceeded slightly in 2015 due to the mixed nature of the fishery. The assessment team has decided to grant medium compliance based on the reduction in quota and investigations taking place, this is conditional on the management plan being adopted by June 2016.*

In 2016 as the management plan was put into Law, these conditions were met and approval was maintained. D1 has been raised to high compliance as the quota has been set at the recommended level for the past two years. C1 remains at medium compliance as the stock is still in a state of collapse.

However, the 2017 surveillance found the continued exceeding of TACs by the artisanal fleet. The artisanal fishery accounts for much of the quota, 78% since 2014. In general, the industrial sector has fished within its assigned TAC levels, while the artisanal sector has repeatedly overpassed the quota share since 2006. In 2013, catches were significantly lower than set TAC, although higher than the precautionary recommended catch. In 2014, TAC was exceeded by 32%. No differentiation in fleets' landings is available for 2013 and 2014. The TAC has been exceeded by 80% in 2015 and 2016 by the artisanal fleet. It should be noted that this is a mixed fishery where anchovy and common sardine *Strangomera bentincki* are fished together. If one of the TACs for

these species is met and the other is not, 20% of incidental catch of the species with no remaining quota is allowed for each fishing trip.

There is clearly excess fishing capacity in the artisanal fleet, which needs to be dealt with in order to allow the stock to recover.

**HIGH Compliance**

A1, A2, A3, B1, B2

**MEDIUM Compliance**

C1, D1, D2, D3, E1, E2

**LOW Compliance**

SUMMARY OF LEVEL OF COMPLIANCE					
	The Management Framework and Procedures	Stock assessment procedures and management advice	Precautionary approach	Management measures	Implementation
legal and administrative basis	A1				
Fisheries management should be concerned with the whole stock unit	A2				
Management actions should be scientifically based	A3				
Research in support of fisheries conservation and management should exist		B1			
Best scientific evidence available should be taken into account when designing conservation and management measures		B2			
The precautionary approach is applied in the formulation of management plans			C1		
The level of fishing permitted should be set according to management advice given by research organisations				D1	
Where excess fishing capacity exist, mechanisms should be in established to reduced capacity				D2	
Management measures should ensure that fishing gear and fishing practices do not have a significant impact on non-target species and the physical environment				D3	
A framework for sanctions of violation of laws and regulations should be efficiently exists					E1
A management system for fisheries control and enforcement should be established					E2

KEY:                    Low Compliance:                               Medium Compliance:                               High Compliance:

## 6. RATIONALE OF THE ASSESSMENT OUTCOME

### A. THE MANAGEMENT FRAMEWORK AND PROCEDURE

#### LEVEL OF COMPLIANCE

A1. *The management of the fishery must include a legal and administrative basis for the implementation of measures and controls to support the conservation of the fishery.*

<b>LOW</b>	An administrative framework that ensures an efficient management of the fishery for its conservation is not established.
<b>MEDIUM</b>	An administrative framework that ensures an efficient management of the fishery for its conservation is somehow established, but there is evidence of not being efficient to ensure the conservation of the stock.
<b>HIGH</b>	A legal and administrative framework that ensures an efficient management of the fishery for its conservation is established and works efficiently toward the conservation of the stock.

**Determination: The 2015 reassessment described an extensive and robust fisheries management framework, which includes specific commitments to ensuring the sustainability of marine stocks. There have been no significant changes in the framework or fishery management organisations since that time.**

#### Primary institutional framework

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.

- The Subsecretariat de Pesca (Undersecretariat of Fisheries, SUBPESCA or SSP) is positioned within the Chilean Ministry of Economy, and provides the policy settings and regulatory framework for the domestic management of the sector.
- The Servicio Nacional de Pesca (National Fisheries Service, SERNAPESCA) is also based within the Ministry of Economy.
- The Instituto de Fomento Pesquero (Fisheries Development Institute, IFOP) is the research arm of the institutional framework.

#### Fisheries councils

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.

#### Legal instruments

Since February 2013, the primary legal instrument for fisheries management in Chile has been Law 20.657 (LGPA).

For more details on the fishery management in Chile please refer to the reassessment report.

R2, 4 – 8

#### LEVEL OF COMPLIANCE

A2. *Fisheries management should be concerned with the whole stock unit over its entire area of distribution and take into account fishery removals and the biology of the species.*

<b>LOW</b>	Fisheries management is not concerned with the whole stock unit over its entire area of distribution and do not take into account any of the matters listed in 'A1'.
<b>MEDIUM</b>	Fisheries management is concerned with matters listed in 'A1' but not entirely. Fisheries, in relation to 'A1' statement, should improve to ensure the long term conservation of the marine resource.
<b>HIGH</b>	Fisheries management should be concerned with the whole stock unit over its entire area of distribution and take into account: <ul style="list-style-type: none"> <li>• All fishery removals</li> <li>• The biology of the species</li> </ul>

**Determination: The small pelagic fisheries management in Chile is concerned with the whole stock unit over its entire area of distribution and takes into account; all fishery removals and the biology of the species.**

Anchoveta has a wide geographical distribution in the South Eastern Pacific Ocean, from Zorritos (4°30' S) in Northern Peru to Chiloé (42°30' S) in Southern Chile (Serra *et al.*, 1979). There are three different anchoveta (*Engraulis ringens*) stocks (Cahuin *et al.*, 2015):

1. the Northern-Central Peruvian stock, managed by Peru;
2. the Southern Peru/ Northern Chile stock, managed by both Peru and Chile, and,
3. the “Central-Southern Chile stock”, managed by Chile.

There is some evidence based on reproductive population parameters that two independent populations may exist in Central-Southern Chile (Canales and Leal, 2009), however it is more likely based on genetic and other studies that there is only one stock (Ferrada *et al.*, 2002; Cahuin *et al.*, 2015).

Chilean anchovy fisheries are divided into three management units;

- Regions XV – II
- Regions III and IV
- Regions V – X

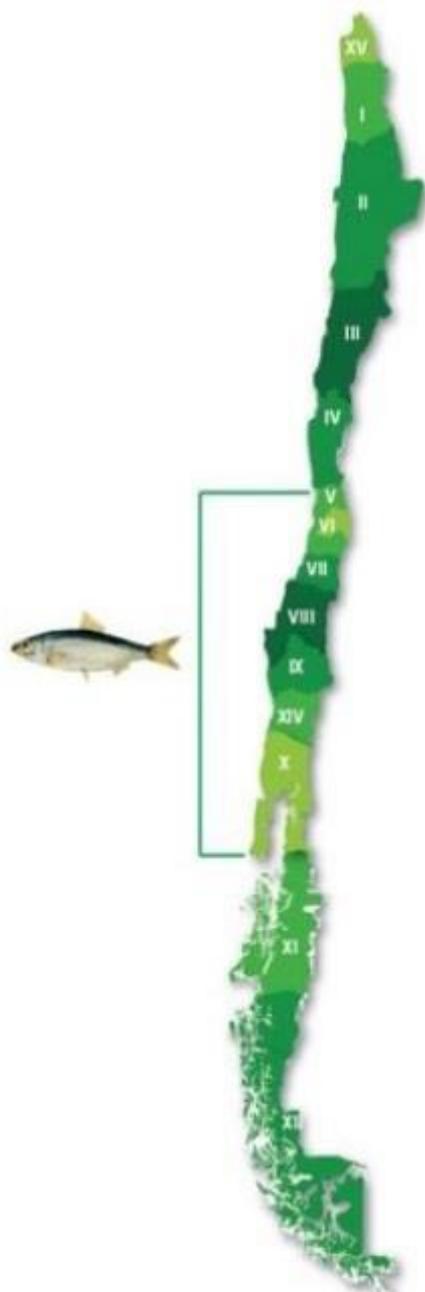
This report refers to the Anchoveta Regions V – X

Stock assessments are carried out separately for each management unit. The management units reflect the current best scientific understanding of the biological stocks. Section 3.1.1 of the management plan covers the development and implementation of a discard reduction plan for the fishery and a code of good practice.

The biology of the species is taken into account during assessments. IFOP utilises information associated with life history parameters, such as natural mortality, growth and maturity data. These are all factored into the modelling process for predicting potential future harvest rates.

The management of the Regions V-X fishery as a separate population assumes minimal interaction between this and the other anchovy populations. If evidence of significant interactions or interdependence were to arise, it may become unreasonable to consider the management regimes separately.

Figure 1. Map of Chile, indicating the location of administrative regions V to X (R13).



**LEVEL OF COMPLIANCE**

*A3. Management actions should be based on long-term conservation objectives*

<b>LOW</b>	Management actions are not based on long term management objectives.
<b>MEDIUM</b>	Management actions are based on long term management objectives. However the actions are not scientifically formulated.
<b>HIGH</b>	Management actions are based on long term management objectives, and actions are science based.

***Determination: A management plan based on long term management objectives and science based has been approved by the government and brought into force.***

An explicit management plan has been put in place for the fishery. Article 5 of the LGPA states that the Sub-secretary should determine the Biological Reference points. These have been laid out in the SUBPESCA resolution No:291/2015

The LGPA states that all stocks should be exploited around the MSY level, and that the MSY is the objective to be taken into account when quotas are established.

- Biomass limit reference point  $B_{lim}$ : 27.5% of  $SSB_0 = 281,000$  tonnes
- Biomass target reference point,  $B_{MSY}$  proxy: 55% of  $SSB_0$  (60%SSBPR) = 562,000 tonnes
- Fishing mortality target reference point,  $F_{MSY}$  proxy:  $F_{60\%SSBPR} = 0.396$

R5

**B. STOCK ASSESSMENT PROCEDURES AND MANAGEMENT ADVICE**

**LEVEL OF COMPLIANCE**

*B1. Research in support of fisheries conservation and management should exist.*

<b>LOW</b>	Research to support the conservation and management of the stock, non-target species and physical environment does not exist
<b>MEDIUM</b>	Research to support the conservation and the management of the stock, non-target species and physical environment exists, however research programmes could be significantly improved to decrease scientific advice uncertainty.
<b>HIGH</b>	Research to support the conservation and the management of the stock, non-target species and physical environment exist, and existent research is considered most adequate for the long term conservation of the target, non-target and physical environment

***Determination: Research and stock assessment activities are carried out in support of the management of the stock.***

Fisheries research at the national level is conducted by the Fisheries Development Institute (Instituto de Fomento Pesquero, IFOP) and also by some universities and private research institutes or centers such as the Fisheries Research Institute (Instituto de Investigación Pesquera, INPESCA and University of Concepcion). Through public bidding processes for projects, these bodies undertake state-commissioned monitoring of and research on the main fisheries resources under exploitation, Chilean anchovy among these.

Most recent IFOP reports are only available upon request, still executive summaries by the Scientific Technical Committee for the Small Pelagic Fisheries (Comité Científico Técnico de Pesquerías de Pequeños Pelágicos – are timely published (CCT-PP, 2015; 2016).

The 2016 stock assessment included as input data: data series of commercial fishing landings (1990-2015), spawning biomass surveys (MPDH 2002-2012), Summer (RECLAS 2000-2016) and Autumn (PELACES (2003-2016) acoustic surveys, and annual age and size composition estimates (from commercial fishing and scientific surveys) (1990-2016). IFOP conducts semester assessments (September 2015, March 2016 and July 2016) to monitor the progress of the stock taking into account the rapid growth and biomass fluctuations. Intra-annual update assessments are used to adjust the quota if needed (*SUBPESCA 2016*). Indirect stock assessments are carried out with Statistical Catch at Age Models, which allow the incorporation of such supplementary information as spawning stock biomass (SSB) and recruitment indices from cruises', fishing mortality (F) and Catch per Unit Effort (CPUE) indices. Uncertainties are related to annual variability of survey results and recruitment estimates.

A research program was initiated in 2014 to study discards and bycatch rates in the anchoveta fishery in the V-X Chilean regions (MEFT, 2014b; MEFT, 2016). Results from this project are not yet available and were not added in the assessment model of 2016.

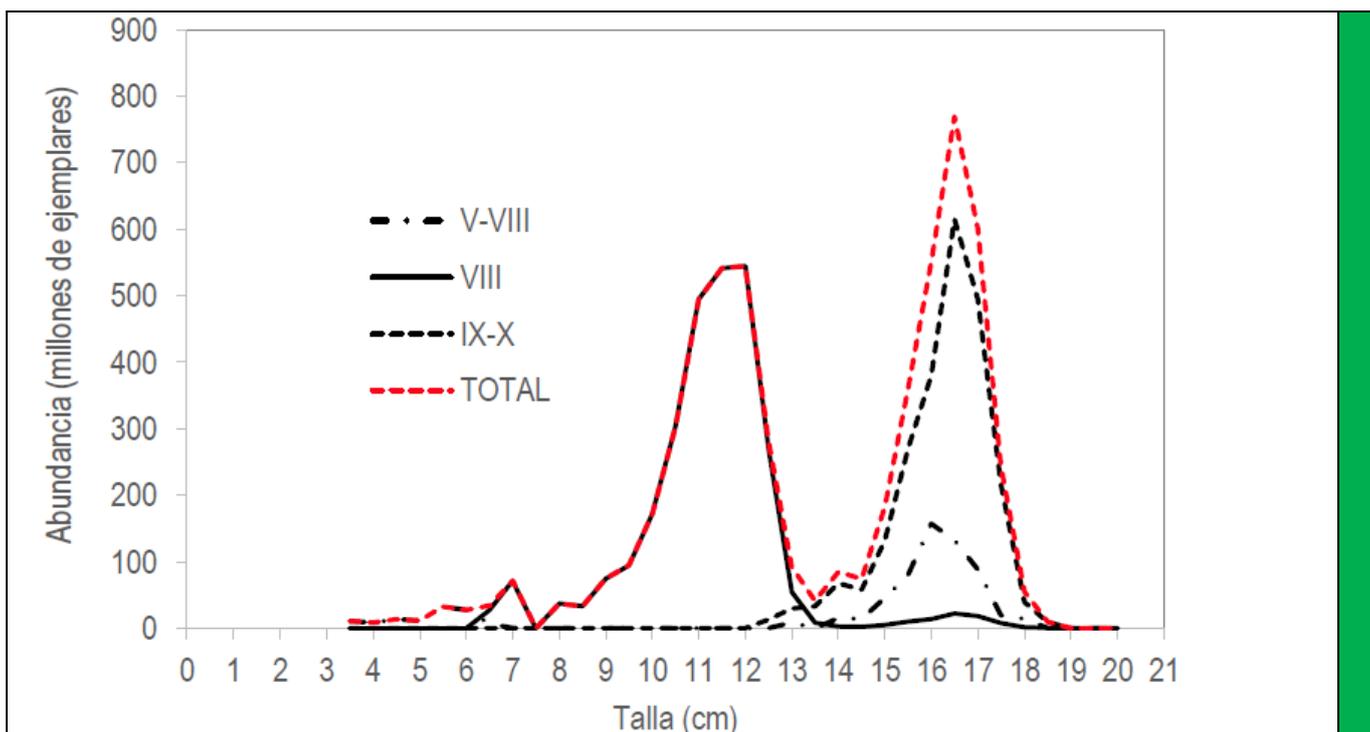


Figure 2. Composition of lengths (Talla) by zone of anchovy from the summer research cruise (January, 2015) From the 2015 stock assessment report.

R6, 7, 8,14

**LEVEL OF COMPLIANCE**

<i>B2. Best scientific evidence available should be taken into account when designing conservation and management measures.</i>	
<b>LOW</b>	Scientific advice is not taken into account when designing conservation and management measures.
<b>MEDIUM</b>	Scientific advice is taken into account, when designing conservation and management measures. However some areas of discrepancy are identified that could have a significant impact in the long term conservation of the marine environment.
<b>HIGH</b>	Scientific advice is taken into account, when designing conservation and management measures, in a comprehensively manner.

**Determination:** *Since 2013, there has been a legal requirement for SUBPESCA’s technical recommendations (including TAC) to be adopted. As the original IFOP advice is now available to the assessment team on request, it is now possible to determine that these recommendations do reflect the original scientific advice.*

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 a January survey. A third, final recommendation is made after a second survey is conducted in June; the results of the two surveys are also used to produce the pre-season TAC estimate for the following year.

The evaluation of anchoveta stocks is conducted by the Fisheries Development Institute (Instituto de Fomento Pesquero, IFOP) on an annual basis, but it does not include a scientific advised TAC (IFOP, 2015). A Scientific-Technical Committees for Small Pelagics ([‘Comité Científico-Técnico de Pequeños Pelágicos’](#), CCT-PP), formed by scientists from IFOP (and usually other research institutions) and SUBPESCA’s representatives, meets regularly and, after analysing IFOP’s update on stock status, makes the catch recommendations to SUBPESCA, which consists on an advised TAC range with a lower limit of 20% of the actual TAC recommendation, in accordance to the most recent fisheries law (Law N° 20.657, SUBPESCA, 2013b).

For 2017, IFOP provided catch options based on mid-term projections (5 years) under three different recruitment scenarios, exploitation strategies  $F_{60\%SSBPR}$  ( $F_{MSY}$  proxy),  $F_{50\%SSBPR}$  and  $F_{45\%SSBPR}$ , and 5 risk probabilities of exceeding the exploitation level (*IFOP 2016b*). Preliminary advised for TAC range for 2017 is 46,720-58,400 tonnes (*CCT-PP 2016b*), considering a low recruitment scenario and 20% risk of exceeding the target exploitation level ( $F_{60\%SSBPR}$ ).

Although current biomass is below  $B_{lim}$ , there is no harvest control rule that indicates reduction of fishing mortality for calculations of advice TAC. In fact, the CCT-PP noted the difficulties in managing mixed fisheries of sympatric species that share in the same geographic area and that seem to overlap in their ecological niche. Particularly, the presence of anchoveta in southern Chile is considered a population expansion due to the current inter-decadal regime that favors this family in the South Pacific. However, in this expansion process anchoveta is competing with the common sardine, an endemic species naturally adapted to the environmental conditions of the central-southern Chile. Therefore, the collapse state of this stock is restricted only to the area of spatial overlap with the Common sardine. In this scenario, the CCT-PP recognized that some flexibility in the anchoveta quota allocation criteria was required to make the Common sardine fishery viable, considering the mixed fishery situation (*CCT-PP 2014*). In 2016, the CCT-PP indicated that a 7-13% catch of anchoveta of the Common sardine quota coincides with the maximum sustainable yield, which is in accordance with the management objectives (*CCT-PP 2016c*).

Landings are highly dependent on the summer season recruitment pulse. This determines a strong seasonality in landings with highs between February and May, conditioned since 2001 by fishing quotas and temporal closures to protect spawning peaks and recruitment. These measures have defined an intensive extractive activity, by both the industrial and artisanal components. For this reason, it is imperative to update each year and diagnose the status of the anchoveta and to establish an ad-hoc management strategy for the conservation of the resource and the sustainability of the fishery (*IFOP 2016b*).

The update to the LGPA made it mandatory for the management recommendations of SUBPESCA's scientific/technical advisory boards to be adopted by fishery managers, including with regards to the setting of quotas. The LGPA also states that quotas should be established using MSY as the primary technical parameter.

R7,14

### C. THE PRECAUTIONARY APPROACH

#### LEVEL OF COMPLIANCE

*C1. The precautionary approach is applied in the formulation of management plans.*

<b>LOW</b>	The precautionary approach is not applied in the formulation of management plans.
<b>MEDIUM</b>	The precautionary approach is applied, however not all uncertainties are taken into account.
<b>HIGH</b>	The precautionary approach is applied, taking into account uncertainties relating to the dynamic of fish population (recruitment, mortality, growth and fecundity), and the impact of the fishing activities, such as discards and by-catch of non-target species as well as on the physical environment (Habitats).

***Determination: A management plan has been put in place for this fishery. The focus of the new plan is the precautionary approach. Based on this a medium compliance level has been awarded by the assessment team as the stock is still in a state of collapse.***

According to Article 1 B of the General Law on Fisheries and Aquaculture (LPGA) which states that "The objective of this law is the conservation and sustainable use of aquatic resources by applying the precautionary approach and ecosystem approach in fisheries regulation and safeguarding the marine ecosystems in which those resources exist. "

Similarly, in Article 1 ° C, letter b) states that when adopting conservation and management measures as the precautionary principle must be used, defined as: "i) There should be more caution in the management and conservation of resources when scientific information is uncertain, unreliable or incomplete, and ii) the absence of adequate scientific information, unreliable or incomplete, must not be used as a reason for postponing or failing to take conservation and management measures."

Biological reference points (PBR) are established by the Scientific and Technical Committee on Small Pelagic Fisheries and are based on the best available stock assessment. Similarly measures and / or management actions contained in the management plan are binding with the mechanisms and procedures established by the LPGA, ie its provisions are mandatory.

The specific objective in relation to anchovy is to maintain a spawning biomass equal to 60% of the level if the stock was unexploited, with a risk of failing this to be not more than 10%. Recruitment estimates show a slightly increasing trend since 2012, although the 2016 estimate is considered highly uncertain. The stock assessment model estimated a total 2016 biomass of 433,000 tonnes and represent a 66% increase compared to the 2015. Spawning stock biomass has also been increasing since 2012; a 13% increase compared to 2015 is observed, estimated at 204,000 tonnes (*IFOP 2016b*). However, as the biomass level is well below, only 36% of the target biomass reference point ( $55\%SSB_0 = 562,000$  tonnes), the stock is still collapsed (*CCT-PP 2016b*).

Fishing mortality (F) has been decreasing drastically in recent years, and has reached the target level in 2016.

R5, 8

**D. MANAGEMENT MEASURES**

**LEVEL OF COMPLIANCE**

*D1. The level of fishing permitted should be set according to management advice given by research organisations.*

<b>LOW</b>	The level of fishing permitted is not set according to management advice given by research organisations.
<b>MEDIUM</b>	The level of fishing permitted is higher than management advice given by research organisations. However, the difference is not considered to have a significant impact of the sustainability of the stock
<b>HIGH</b>	The level of fishing permitted is set according to management advice given by research organisations.

***Determination: For 2015 and 2016 the total quota was reduced to 34,400t, based on the scientific advice. For 2017, preliminary TAC was set at 58,400t in line with the upper limit of the advised TAC range.***

Once SUBPESCA receives IFOP’s scientific reports, it writes its own technical report, summarizing the status of the fishery and issuing its own TAC recommendation to the National Fisheries Council, along with a recommendation for the distribution of the quota. SUBPESCA’s reports, along with economic and social considerations, are discussed by the National Fisheries Council, where a final decision is made regarding the quota level and its distribution. Finally, the Minister of Economy, Development and Reconstruction proceeds to sign the TACs for each fishery unit and its distribution, in accordance with the Fisheries and Aquaculture Law.

TACs are in place since 2001 and are split to accommodate commercial (both industrial and artisanal sectors) and research purposes and are allocated to the industrial fishery in three periods (January-April, 85%, May-August 7% and September-December 7%) taking into account the seasonality of the catch and temporal closures to protect the spawning stock and recruits.

Currently, new access to this fishery is prohibited. Also, a Maximum Catch Limit per Vessel Owner regime has been established for the industrial sector and an Artisanal Extraction Regime for the artisanal sector, through which artisanal individual fishermen or associations may obtain catch quotas. For 2016, initial TAC was set at 34,400 tonnes, as in 2015 – 7,380 tonnes for the industrial sector and 26,160 tonnes for the artisanal sector; and the remaining volume for research purposes (MEFT, 2014a; 2015b). TAC was increased to 39,900 tonnes in May 2016. For 2017, preliminary TAC was set at 58,400 tonnes. Set TACs were in line with the upper limit of the advised TAC range (*CCT-PP 2016*).

Landings are highly dependent on the summer season recruitment pulse. This determines a strong seasonality in landings with highs between February and May, conditioned since 2001 by fishing quotas and

temporal closures to protect spawning peaks and recruitment. These measures have defined an intensive extractive activity, by both the industrial and artisanal components. For this reason, it is imperative to update each year and diagnose the status of the anchoveta and to establish an ad-hoc management strategy for the conservation of the resource and the sustainability of the fishery (IFOP 2016b).

Table 1. Total Quota for Anchovy 2016

CUOTA GLOBAL TOTAL	39.900
Reserva de Investigación	130
Cuota de Imprevistos	399
Cuota de consumo humano	399
Cuota Remanente	38.972
FRACCIÓN INDUSTRIAL	8.574
FRACCIÓN ARTESANAL	30.398

Table 2. Total Quota for Anchovy 2017

CUOTA GLOBAL TOTAL	58.400
Reserva de Investigación	150
Cuota de Imprevistos	584
Cuota de consumo humano	584
Cuota Remanente	44.524
FRACCIÓN INDUSTRIAL	12.558

Misreporting of catches may be considerable in the artisanal sector, but no estimates are still available. One of the action points in the new management plan is to update the Fishing Register for the Industrial and Artisanal fleet (RPI y RPA), this will be the responsibility of Sernapesca/SSPA-DZPA/Directemar.

R 5,7, 8 – 11, 14

#### LEVEL OF COMPLIANCE

*D2. Where excess fishing capacity exist, mechanisms should be in established to reduced capacity to allow for the recovery of the stock to sustainable levels.*

<b>LOW</b>	Mechanisms to allow for recovery of the stock to sustainable levels are not established.
<b>MEDIUM</b>	Mechanisms to allow for recovery of the stock to sustainable levels are somehow established. However there is no evidence of the efficiency of the methods used.
<b>HIGH</b>	Mechanisms are established to reduce capacity to allow for the recovery of the stock to sustainable levels and there are evidences of recovery.

***Determination: Mechanisms such as scientifically based quotas and limiting of the fleet thorough licensing and restricted access are used to manage fishing capacity. However, as the stock is in a state of collapse there is no evidence of the efficiency of the methods used. The TAC has been exceeded by 80% in 2015 and 2016 by the artisanal fleet.***

The artisanal fishery accounts for much of the quota, 78% since 2014. In general, the industrial sector has fished within its assigned TAC levels, while the artisanal sector has repeatedly overpassed the quota share since 2006. In 2013, catches were significantly lower than set TAC, although higher than the precautionary recommended catch. In 2014, TAC was exceeded by 32%. No differentiation in fleets' landings is available for 2013 and 2014. The TAC has been exceeded by 80% in 2015 and 2016 by the artisanal fleet. It should be

noted that this is a mixed fishery where anchovy and common sardine *Strangomera bentincki* are fished together. If one of the TACs for these species is met and the other is not, 20% of incidental catch of the species with no remaining quota is allowed for each fishing trip.

There is concern in the CCT-PP regarding the underreporting of anchoveta and common sardine in VIII Region, preliminary estimates indicate a bias of at least 40,000 tonnes of both species, representing about 10% of the joint TAC by 2015 (CCT-PP, 2015).

The management plan requires artisanal fishers to be registered on the National Registry for Artisanal Fishermen (NRAF) which is used to control their number per regional area. No new entrants are allowed. However, no evidence was found of the occurrence of such a restriction and the artisanal fleet's effort has not been effectively restricted to TAC-defined levels.

Industrial vessels require a licence to fish and, based on the repeated inability of the industrial fleet to fill its share of the quota, there does not appear to be an excess of capacity in this component of the fishery.

R5, 11

**LEVEL OF COMPLIANCE**

*D3. Management measures should ensure that fishing gear and fishing practices do not have a significant impact on non-target species and the physical environment.*

<b>LOW</b>	There are no management measures to prevent the impact of the fishing methods and fishing practices on non-target species and the physical environment.
<b>MEDIUM</b>	There are management measures to prevent the impact of the fishing methods and fishing practices on non-target species and the physical environment. However it is not science based.
<b>HIGH</b>	There are management measures to prevent the impact of the fishing methods and fishing practices on non-target species and the physical environment. Measures are based on scientific information.

***Determination: Some management measures are in place to minimise the impacts of the fishery on non-target species, but on the whole, there is limited available evidence to determine the extent of these impacts. In particular, there is a lack of data on bycatch, including bycatch of PET species.***

**Non-target species**

Anchovy and common sardine in the V-X Regions are harvested as part of a mixed fishery, in the sense that these resources are caught during the same period and area by an artisanal and industrial fleet that fishes for both species using the same fishing gear (which is non-selective).

No recent data on other non-targeted species for this fishery could be found. IFOP is currently developing a project related to bycatch and discards and in purse seine fisheries of anchoveta and sardine in the V and X Chilean regions, including both industrial and artisanal fleets. The research results are expected for 2017 (MEFT, 2016a).

**Ecosystems**

The availability of sardine and anchovy as a prey is considered to be one of the major threats to Humboldt Penguin. Chile has implemented five marine reserves, with the objective of conserving natural banks of scallop, oyster and mussel, but also dolphins and penguins. Additionally, 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 (Cury et al., 2000; Gatica et al., 2007; IFOP, 2015).

**ETP species**

The purse seine is a non-selective fishing gear in relation to fish size, since the mesh size used is small enough (1/2" or 9/16") to prevent a mass escape through the net, even of the smallest-sized juvenile

specimens of anchovy or common sardine found in summer (as small as 5 cm total length). There is a rather strong possibility that the species to be caught can be previously selected, since both fishermen’s experience and the use of state-of-the-art echo sounders and sonar allow the species to be identified with some accuracy before setting the net. However, on some occasions, the catch trapped in the sack is released by opening the net when necessary.

Unlike purse seine fishing in other regions, in Chile the incidence of dolphins in catches is considered infrequent. The Peruvian pelican (*Pelecanus thagus*, Near Threatened in IUCN Red List, 2014), among other 7 seabird species has been identified during sampling conducted on board artisanal purse seine boats.

Available information suggests impacts from purse seines are low (Arata and Hucke-Gaete, 2005), however there is limited research and no current information on the impact of this fishery on the species mentioned above.

**Physical environment**

Anchovy is a pelagic species distributed at water depths ranging between 15 and 70 m during the day and between 5 and 20 m at night. 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 x 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 (Chuenpagdee et al., 2003). However, it should be noted that in this particular fishery, “penetration windows” exist, where industrial operations within the first five nautical miles offshore is permitted.

R7,10

**E. IMPLEMENTATION**

**LEVEL OF COMPLIANCE**

*E1. There should be a framework for sanctions of violation of Laws and regulations.*

<b>LOW</b>	A framework for sanctions of violation of Laws and regulations do not efficiently exist.
<b>MEDIUM</b>	A framework for sanctions of violation of Laws and regulations do exist but do not work efficiently.
<b>HIGH</b>	A framework for sanctions of violation of Laws and regulations exists and is proven to be efficient.

***Determination: There is a framework allowing for the application of sanctions ranging from monetary fines to revocation of licence. Due to the lack of evidence regarding its effectiveness a medium compliance rating is appropriate.***

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. Punitive proceedings are the responsibility of the regional SERNAPESCA director. In 2005, a national action plan was approved with the aim of preventing, deterring and eliminating IUU fishing. There is no evidence available to determine the level of success this plan enjoyed.

**LEVEL OF COMPLIANCE**

*E2. A management system for fisheries control and enforcement should be established.*

<b>LOW</b>	A management system for fisheries control and enforcement is not established.
<b>MEDIUM</b>	A management system for fisheries control and enforcement is established but do not work efficiently.
<b>HIGH</b>	A management system for fisheries control and enforcement is established and work efficiently.

***Determination: There is evidence of a fisheries control and enforcement regime in place in Chile, but limited information to determine how effective this regime is.***

The guiding instrument of fisheries management in Chile is the General Law on Fisheries and Aquaculture (LPGA). No. 18.892 of 1989 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 in the Official Journal amending the previous one in the field of sustainability of aquatic resources, access to industrial, craft and regulations for research and monitoring fishing activity.

Enforcement of fisheries legislation is the responsibility of SERNAPESCA. Industrial vessels operate under mandatory VMS monitoring.

Sernapesca;

- Carry out audits of capture fisheries and 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<sup>2</sup> ensuring the prevention of depredation of natural resources in an effort to protect the ecosystem from unauthorized activities.

On the other hand, on May 2016 a new agreement between 30 countries was endorsed. Chile is now involved in an international program to avoid illegal fisheries. The agreement, “*Acuerdo sobre medidas del Estado rector del puerto*” (PSMA, English abbreviation). All the landings from other countries should be controlled and more effort to control the catches of these vessels will be realized. This regulation will apply only to foreign vessels; also new measures to enforce the national fisheries must be developed. Therefore, the assessment team can confirm that there are measures for fisheries control and enforcement but the new situation will be evaluated in future years.

R12, 13, 15

## 7. KEY STAKEHOLDERS

## 8. REFERENCES

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R3 – SERNAPESCA home: <http://www.sernapesca.cl/>

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