

# FISHERY ASSESSMENT REPORT

## IFFO GLOBAL STANDARD FOR RESPONSIBLE SUPPLY OF FISHMEAL AND FISH OIL



R1

<b>FISHERY:</b>	<b>Peru Anchovy (<i>Engraulis ringens</i>)</b>
<b>LOCATION:</b>	<b>Northern Border Of The Peruvian EEZ To 16° South</b>

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<b>DATE OF REPORT:</b>	<b>April 2018</b>
<b>ASSESSOR:</b>	<b>Deirdre Hoare</b>

1. APPLICATION DETAILS AND SUMMARY OF THE ASSESSMENT OUTCOME			
<b>Name: Austral Group S.A.A- Pisco.IFFO103f. 20/07/2018. Austral Group S.A.A- Coishco. IFFO103c. 14/07/2018. Austral Group S.A.A- Chancay. IFFO103b. 15/07/2018. Pesquera Diamante S.A- Malabrigo.</b>			
<b>Address:</b>			
<b>Country:</b> Peru		<b>Zip:</b>	
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<b>Email address:</b>		<b>Applicant Code</b>	
<b>Key Contact:</b>		<b>Title:</b>	
Certification Body Details			
<b>Name of Certification Body:</b>		Global Trust Certification Ltd.	
Assessor Name	Peer Reviewer	Assessment Days	Initial/Surveillance/ Re-certification
Deirdre Hoare	Conor Donnelly (14.05.18) Virginia Polonio (25.07.18)	2	Surveillance
<b>Assessment Period</b>	2017		
Scope Details			
<b>1. Scope of Assessment</b>		IFFO Global Standard for Responsible Supply	
<b>2. Fishery</b>		Anchovy ( <i>Engraulis ringens</i> )	
<b>3. Fishery Location</b>		Northern Border Of The Peruvian EEZ To 16° South	
<b>4. Fishery Method</b>		Purse seine	
Outcome of Assessment			
<b>5. Overall Fishery Compliance Rating</b>		Medium/High	

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<b>6. Sub Components of Low Compliance</b>	None
<b>7. Information deficiency</b>	Stock modelling; unaccounted catch, by-catch mortality
<b>8. Peer Review Evaluation</b>	Written comments and assessor’s replies are in a separate attachment. Maintain approval.
<b>9. Recommendation</b>	Maintain approval

<b>2. QUALITY OF INFORMATION</b>
<b>Good; primarily government reports and websites</b>
<b>3. COMPLIANCE LEVEL ACHIEVED</b>
<b>Medium/High</b>
<b>Recommendation</b>
<b>Maintain fishery approval</b>
<b>4. GUIDANCE FOR ONSITE ASSESSMENT</b>
Confirm that landings contain no bycatch species, particularly jack mackerel and chub mackerel. Total bycatch is estimated at 3% of landings; individual species making up more than 0.1% of the total catch must be assessed.
<b>Based on HIGH compliance findings</b>
<b>Based on MEDIUM compliance findings</b>
<b>Based on LOW compliance findings</b>
<b>5. ASSESSMENT DETERMINATION</b>
In general, there have been no substantial changes to the management of the Peruvian north-central anchovy fishery since the time of the previous IFFO RS reassessment report. The fundamental management and research frameworks and systems remain in place and appear to be effective. At the last surveillance assessment in 2018 new information on the reference points was used by IMARPE to inform these recommendations, which has led to an upgrading of the compliance rating in sections A1, A2, B1, C1, D1 and D3 from medium to high.
The main issues with the fishery are the lack of evidence of formal predictions of the stock status, there is no model and no future prediction. The fishery cannot get high level of compliance as rebuilding of the stock should be planned in the Harvest Strategy and Harvest Control Rules; there are no measures clearly established.
<b>HIGH Compliance</b>
<b>A1, B1, D1, D3</b>
<b>MEDIUM Compliance</b>
<b>A2, A3, C1, D2, E1, E2</b>
<b>LOW Compliance</b>
<b>NONE</b>

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:                     

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6. RATIONALE OF THE ASSESSMENT OUTCOME	
A. THE MANAGEMENT FRAMEWORK AND PROCEDURE	
LEVEL OF COMPLIANCE	
<i>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.</i>	
<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.
<p><b><i>Determination: 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</i></b> <span style="float: right;">H</span></p> <p>Fisheries management in Peru falls under the jurisdiction of the Vice-Ministry of Fisheries in the Ministry of Production (PRODUCE). PRODUCE was created in 2002 by Peruvian Law number 27779 and its responsibilities include the development and implementation of policies and management plans, conducting fisheries research, establishing the regulatory framework for fisheries management, and issuing and administering regulations. PRODUCE also has the final say on annual catch limits, dictated through the publishing of Ministerial Resolutions.</p> <p>Within PRODUCE, the Instituto del Mar del Peru (IMARPE) is a specialised technical agency with responsibility for designing and conducting the scientific research necessary to ensure informed fisheries management decisions. IMARPE is responsible for conducting stock assessments and recommending annual catch limits to PRODUCE. Anchoveta is managed by an adaptive system to account for highly ecosystem variability and consequent uncertainty and rapid fluctuations in biomass, typical of this resource and the Humboldt ecosystem (EUR-OCEANS, 2008).</p> <p>Stock assessment reports do not appear to be made publicly available, a conclusion supported by the FishSource profile of the fishery. However, in March 2015 IMARPE published their methodology for generating total permissible catch recommendations. When considered alongside regular reports summarising the outcomes of hydro-acoustic research cruises and others detailing the process by which the results of these cruises and length-frequency sampling are used to generate catch recommendations, the process appears to now be fairly transparent. The results of the decision-making process are provided on the PRODUCE website in the form of Ministerial Resolutions.</p> <p>Other statutory management controls for the industrial fleet include :i) spatial (industrial fishing operations off 10 nautical miles from the coast), ii) temporal closures (to protect juveniles when the proportion is more than 10% of landings in numbers); iii) minimum mesh size (13 mm), iv) minimum landing size of 12cm;v) landings from artisanal fleets only for human consumption; vi) effort control (one trip per day, satellite positioning system on board and vii) a discard ban of fishing resources at sea (PRODUCE, 2012), with incidental catches limited to 5% of total landings, viii) closed entry for new fishing boats in both the industrial and the artisanal, ix) monitoring by third-party operators to verify landing statistics at 134 unloading points.</p>	

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Management measures regulating the artisanal and small-scale vessels ( $\leq 10 \text{ m}^3$  and  $10\text{-}32.5 \text{ m}^3$  tonnage capacity, respectively) include: spatial restriction allowing only artisanal boats to operate within five nautical miles of the coast and small-scale boats from 5 to 10 nautical miles); landings exclusively destined for direct human consumption; and mandatory vessel monitoring system (Supreme Decrees N°10/2010, N°5/2012 and N°01/2013). The electronic/radio log is required as well for these component of the fishery (PRODUCE 2016a).

A specific quota of 3.3 million tones was set in 2018 for the first time the bigger one since 24 years. North-central anchoveta biomass is estimated around 10.86 million tons, 33% higher than the average of all the summer observations made from 1994 to the present. Part of this quota shall be intended for direct human consumption, concretely 300,000 tones has been designated for this propose (PRODUCE 2018).

For the 2017 first fishing season, catch advice was 2.8 million tonnes, based on expected neutral to favorable environmental conditions. As well, IMARPE highlighted the importance of protecting the juvenile fraction of the stock (IMARPE 2017b). A low biomass was observed in August-July, thus IMARPE recommended to delay the beginning of the 2017 second fishing season to the third week of November, but no catch explicit advice was provided (IMARPE 2017a; IMARPE 2017c; IMARPE 2018; IMARPE 2017c). IMARPE recommended closing this fishing season earlier than expected due to the detection of the summer spawning peak (IMARPE 2018). A high biomass and low reproductive status was observed in the February-April acoustic survey, thus IMARPE recommended to start the 2018 first fishing season immediately, with catch levels between 3 and 3.5 million tonnes (IMARPE 2018). IMARPE highlighted the need to report discards - including estimates of gillnetted fish in fishing nets.

A specific quota for the artisanal component of the anchoveta fishery was set in 2017 for the first time (PRODUCE 2017). The same catch limit was set for 2018, taking into account the results from the last acoustic survey (PRODUCE 2018).

Fishery stakeholder delegates can participate in the evaluation cruises and comment on evaluations (pers. Com. Luis Alfredo Icochea Salas).

Therefore the fishery has been stable in recent years, also the biomass index is one of the biggest in recent years, and therefore the fishery can be scored at high level of compliance.

R2 – 10, 38, 39, 41

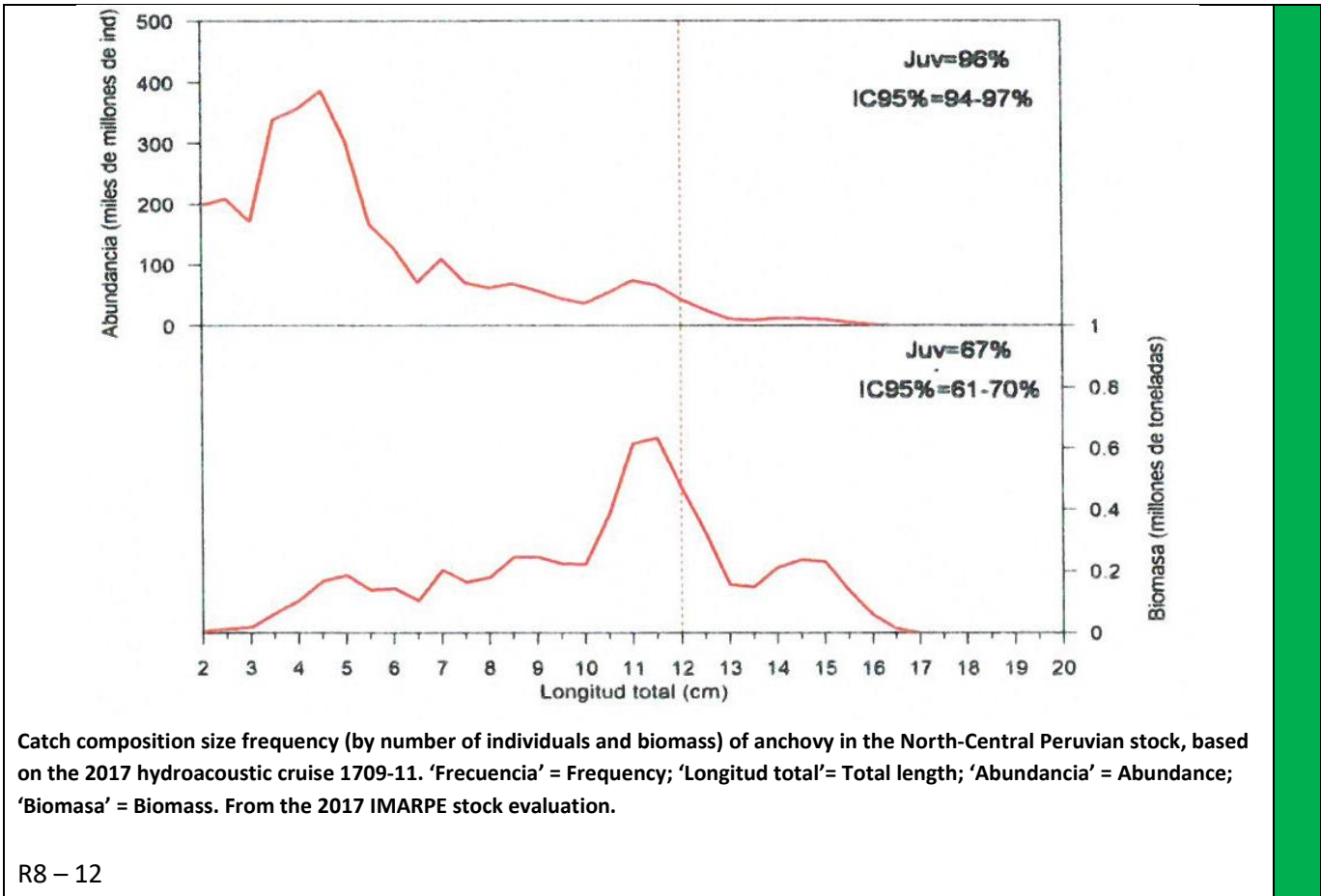
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LEVEL OF COMPLIANCE	
<i>A2. Fisheries management should be concerned with the whole stock unit over its entire area of distribution and take into account fishery removals and the biology of the species.</i>	
<b>LOW</b>	Fisheries management is not concerned 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>
<p><b><i>Determination: Fisheries management should be concerned with the whole stock unit over its entire area of distribution and take into account all fishery removals and the biology of the species.</i></b></p> <p>Anchovy in the South-eastern Pacific is widely distributed, ranging the full length of the South American coastline. This assessment is concerned with the northernmost stock, the Peruvian North-central anchovy fishery which extends from the northern end of the Peruvian EEZ down to 16°S. That this represents a single biological stock is well documented in the scientific literature. The stock has been expanding in recent warmer years up to Gulf of Guayaquil (3°00' S), in Ecuador (Instituto Nacional de Pesca, 2009), where it is captured by a small pelagics purse seine fishery. The status of north-central anchovy as a single biological stock is confirmed by Cahuin <i>et al</i> 2015.</p> <p>After carrying out the regular biannual hydroacoustic surveys, IMARPE gives out the maximum total permissible catch advice for each fishing season following a protocol (IMARPE, 2015a) which implies: 1) estimation of stock size structure and biomass using data from acoustic survey, 2) projection of size structures under different scenarios (exploitation, growth and mortality, which vary according to expected environmental conditions within the projection period) and 3) elaboration of a decision table. When abundance is low and environmental conditions are unstable, extra surveys are conducted (EUR-OCEANS, 2008; IMARPE, 2014d; 2015d). Discards are not directly recorded, but rather incorporated into stock assessments indirectly via acoustic surveys and population length frequency data.</p> <p>R 4, 7</p>	



LEVEL OF COMPLIANCE	
<i>A3. Management actions should be based on long-term conservation objectives</i>	
<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.
<p><b><i>Determination: Management actions are based on long term management objectives, and actions are science based. However, there is some uncertainty regarding the official reference points</i></b></p> <p>The Peruvian North-central anchovy fishery is subject to both generic and stock-specific management objectives. The generic objectives include “ensure the sustainability of fisheries and of aquatic resources, by managing fisheries with an ecosystem approach, based on the best scientific evidence and including consideration of economic and social aspects”, and “maintain environmental quality by implementing the National Environmental Policy for ecosystem conservation”.</p> <p>Considering 40 years of observations, the range of remnant spawning stock biomass for the next spawning event is between 4 and 6 million tonnes (IMARPE, 2014). The most recent version of the protocol establishes also a target exploitation rate at 0.35, the historical average level for defining the quotas (IMARPE 2016).</p> <p>Adaptive management is used for this stock due to its strong dependence on environmental variables and rapid fluctuations in biomass (EUR-OCEANS, 2008). Some precautionary measures have been taken to allow the recovery of the stock from adverse environmental conditions, such as closure of the second fishing season in 2014, a lower TAC in second fishing season of 2015 and early closing of first fishing season in 2016 to protect the spawning peak (IMARPE, 2014c-e; IMARPE, 2015b-d; <i>PRODUCE 2016c</i>).</p> <p>Several authors and most recently, (Hervás and Medley 2016) have raised concerns about the justification of the thresholds used by IMARPE in relation to the impact on predators and the need to analyze if these reference points are sufficient, taken also into account the role of anchoveta in the ecosystem. Recommendations have been included in a fishery improvement project that will be undertaken within the next year (SNP and CeDePesca 2017).</p> <p>R8 – 13, 41</p>	
<b>M</b>	

B. STOCK ASSESSMENT PROCEDURES AND MANAGEMENT ADVICE	
LEVEL OF COMPLIANCE	
<i>B1. Research in support of fisheries conservation and management should exist.</i>	
<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
<p><b><i>Determination: 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.</i></b></p> <p>IMARPE is responsible for the assessment of Peruvian anchovy populations based on direct and indirect methods. Fishery-dependent data are collected when catch is landed and on board vessels at sea, and include effort data. Fishery-independent hydro-acoustic surveys are also carried out regularly. The stock is assessed at least twice per year by real monitoring estimating biomass in the surveys and using integrated population models. Spawning areas are identified and Spawning Stock Biomass (SSB) is estimated using the Egg-Production Method (EPM).</p> <p>A range of fishery-dependent and fishery-independent data are collected in support of the management of the stock. Landings data are collected by the international surveillance company SGS, and include date and location of catch, plus size frequency sampling. IMARPE publishes anchovy landings data for every individual day on its website, plus is planning to provide fortnightly summaries. IMARPE also conducts an observer programme to collect further data during fishing activity and now there are two FIP projects in place to increase the data available regarding non-target species among other factors that can be affected by the fishery.</p> <p>In addition to the fishery-dependent data collected at landing, IMARPE conducts regular hydro-acoustic cruises, during which size frequency data are also collected. Due to the short-lived nature of the species and the tendency of the population to rapidly fluctuate in size, the results of these cruises are essential components of the quota-setting process. In particular, the results of the cruises are used to estimate the total biomass of the stock, broken down into 16 latitude-based regions. IMARPE has published the biomass estimates for every cruise conducted since 1985; however, it is not clear what methodology was used to arrive at these estimates, or whether that methodology has changed over time. As a result of the most recent cruise, number 1709-11 conducted in 2017, total stock biomass was estimated to be 7.78 million tonnes.</p>	



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 comprehensive manner.

***Determination: Scientific advice is taken into account, when designing conservation and management measures, in a comprehensive manner.*** H

The north-central anchovy fishery is subject to a range of scientifically-advised technical measures, based on best available scientific understanding of the stock via advice provided by IMPARPE. The dates of fishing seasons are specified to protect the anchovy during the main spawning periods in January-March and July – October. Additional management measures in place include:

- Seasonal quotas, with closure of the fishery occurring if the quota is reached (see section D1).
- All vessels must have a valid fishing permit
- Minimum mesh size is 13 mm
- Minimum landing size of 12cm, although up to 10% of individuals may be smaller
- If the presence of juveniles exceeds 10% in the daily landings at a port, fishing will be prohibited from this port for a minimum of three days
- No fishing within 5 miles of the coast
- All vessels must have an operating satellite positioning system on board
- Daily lists published on the PRODUCE website of permitted and prohibited fishing vessels

IMARPE also recommends actions through real-time monitoring of oceanographic conditions, size structure and reproductive conditions of anchoveta during the fishing season (IMARPE 2016). When abundance is lower than historical averages and environmental conditions are unstable, intensified monitoring, e.g. extra surveys are requested (EUR-OCEANS, 2008; IMARPE, 2014; 2015). A strong El Niño affected the Peruvian coast during 2015 and early 2016, thus, three hydroacoustic surveys were conducted in 2016. In May, warm unfavourable conditions still remained and low biomass was observed, thus IMARPE recommended to delay the first fishing season. In June, normalization of oceanographic conditions, higher biomass estimates and wider spatial distribution of the stock allowed the IMARPE to recommend the opening of the season. In November, normal to colder conditions and average biomass estimate allowed IMARPE to recommend the opening of the second fishing season (IMARPE 2016).

In 2016, IMARPE recommended localised fishery closures due to the high incidences of juvenile anchovy in the catch. These closures affected holders of all types of licence, including artisanal, small-scale and industrial. An additional measure implemented in the same legislation restricted all vessels to one fishing trip per day throughout the north-central region. There were similar localised fishery closures during the April – September season, also due to the high incidence of juveniles in the catch. These instances provide strong evidence that in-season advice from scientists is followed closely by fishery managers, even where that advice recommends closure.

R2, 3, 14-18

C. THE PRECAUTIONARY APPROACH	
LEVEL OF COMPLIANCE	
<i>C1. The precautionary approach is applied in the formulation of management plans.</i>	
<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).
<p><b><i>Determination: The process by which quotas and other management measures are determined appears precautionary and conservative, however not all uncertainties are taken into account. As it is not clear if the significant unreported catches are factored into the scientific advice, TAC setting or long term management measures are in place.</i></b></p> <p>According to IMARPE, landings and exploitation rates have been decreasing since 1994, due to more precautionary fishing policies (IMARPE, 2014). Fishing mortality or exploitation rates are not regularly published, however, fishing effort and CPUE are informed for each fishing season (IMARPE, 2016). Landings peaked in 1970 (around 12 million tonnes), dropped to a minimum in 1983 (100,000 tonnes), peaked again in 1994 (around 9 million tonnes). Over the past decade, landings peaked at 8 million tonnes in 2000 and 2004, since 2006 have stabilized around 5 million tonnes and dropped in 2010 to 3 million tonnes, recovering to 4 million tonnes in 2013. In 2014 only the first fishing season was opened, landings were low, 1.7 million tonnes (68% of set TAC). In the first fishing season of 2015 landings were higher than in 2014; 2.56 million tonnes were caught (99% of set TAC).</p> <p>Adaptive management is used for this stock due to its strong dependence on environmental variables and rapid fluctuations in biomass (EUR-OCEANS, 2008). Some precautionary measures have been taken to allow the recovery of the stock from adverse environmental conditions, such as closure of the second fishing season in 2014 and lower TAC in second fishing season of 2015 (IMARPE, 2014; IMARPE, 2015). When abundance is lower than historical averages and environmental conditions are unstable, intensified monitoring, e.g. extra surveys are requested (EUR-OCEANS, 2008; IMARPE, 2014; 2015). A strong El Niño affected the Peruvian coast during 2015 and early 2016, thus, three hydroacoustic surveys were conducted in 2016. In May, warm unfavorable conditions still remained and low biomass was observed, thus IMARPE recommended to delay the first fishing season. In June, normalization of oceanographic conditions, higher biomass estimates and wider spatial distribution of the stock allowed IMARPE to recommend the opening of the season. In November, normal to colder conditions and average biomass estimate allowed IMARPE to recommend the opening of the second fishing season (IMARPE 2016).</p> <p><i>(Mendo and Wosnitza-Mendo 2014)</i> estimated correction factors for unreported catches in Peru, from 1950 to 2010, including discards of excess catch and juveniles, loss of fish blood, underestimation through misreporting by processing plants; illegal landings and irregular sales. Industrial anchoveta catches correction factor varied mostly between 15% and 35%, peaking in the early 1970s well over 30%.</p> <p>In 2010, estimate for undeclared anchoveta catches by fishing companies was 10%, confirming that the data gathering system needs improvement. Small and artisanal fleets' correction factor is on average 35%, and it has been reported that catches are also illegally sold for indirect human consumption, to reduction fishmeal</p>	

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plants. The DS 005 report has shown that the indirect CHI has increased and the CHD has decreased, hence the illegal catches are bigger than before this measures was implemented therefore it's not working as a precautionary approach tool.

The first fishing season in 2017 (April-July) for the industrial fleet had a TAC of 2.8 million tonnes (*PRODUCE 2017b*) and during the fishing season, 94 transitory fishery closures were set to protect juvenile anchoveta (*PRODUCE 2017d*).

R4,7, 8, 9,14-18, 28

**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: The level of fishing permitted is set according to management advice given by research organisations.** H

Total fishing mortality is restricted using a system of TAC and Catch Limit per Vessel. The catch restrictions cover the entire industrial fleet, and lump both Peruvian anchovy (*Engraulis ringens*) and Longnose anchovy (*Anchoa nasus*) into a single management unit. Longnose anchovy account for only a few percent of total landings.

Although artisanal landings had not been included within the quota system, however they were thought to represent a negligible percentage of total mortality. A specific quota of 300,000 tonnes was set in 2017 for the first time in history for the artisanal fleet and also it has been established for the first fishing season in 2018 (PRODUCE 2017a and PRODUCE 2018).

Vessel Quotas were originally awarded to steel and wooden hull vessels which held licenses in the fishery prior to 2008 when the programme was introduced. A combination of catch history and vessel capacity was used to determine the size of these initial shares, which can be temporarily or permanently transferred between vessels owned by the same quota holder. Shares can also be revoked for non-compliance with the scheme’s rules.

Each share represents a fixed proportion of the total national TAC (or *Maxima Captura Total Permissible*, MCTP), with 2.2% of the total reserved as a ‘contingency stock’. The TAC is largely based on the recommendations provided by IMARPE, up to and including the closure of the fishery when biomass is too low to support removals. The table below lists the recommended TAC, actual TAC, and estimated landings for each fishing season in the last 4 years. In the first 2015 season, the TAC was set around 2% higher than recommended, and final landings were estimated to exceed the original advice by around 1.5%. In all other recent years for which data are available, landings have been at or below the advised level. Although the specific harvest control rules are uncertain (see A2), it is clear that fishery removals are reduced to reflect estimated biomass, and that they cease entirely when the stock falls below a certain level.

**Scientific recommendation, actual quota, and final estimate of landings for anchovy fishery seasons from 2013 - 2017. Summarised from a variety of references, provided below.**

Season	IMARPE recommendation	Actual TAC	Estimated Landings
2017 1 <sup>st</sup> Season	2,800,000t	2,800,000t	2,370,000t
2016 2 <sup>nd</sup> Season	2,000,000t	2,000,000t	1,730,000t
2016 1 <sup>st</sup> Season	1,800,000t	1,800,000t	917,246t
2015 2 <sup>nd</sup> Season	1,110,000t	1,110,000t	1,083,617t
2015 1 <sup>st</sup> Season	2,520,000t	2,580,000t	2,560,000t

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2014 2 <sup>nd</sup> Season	No 2 <sup>nd</sup> season	Fishery remained closed	0t
2014 1 <sup>st</sup> Season	2,530,000t	2,530,000t	1,720,000t
2013 2 <sup>nd</sup> Season	2,304,000t	2,304,000t	Approx 2,300,000t

R13 – 22, 41

LEVEL OF COMPLIANCE		
<i>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.</i>		
<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.	
<p><b><i>Determination: 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.</i></b></p> <p>Seasonal quotas and vessel licensing are the primary management mechanism used to restrict excess fishing capacity. The fishery is closed to new vessels, and there is 24-hour monitoring of all 130 landing locations to ensure that only those vessels with a permit are allowed to land catch. There is substantial evidence that these mechanisms have been successful in the limiting of fishing effort, the most important of which is that seasonal landings have not exceeded quotas.</p> <p>However, the artisanal fleets have not been managed under a catch limit program until 2017 when a specific quota of 300,000 tonnes was set for the first time in history. The current artisanal quota is set on an annual basis, and is not fractioned by stock. There is no evidence that the quota is supported by a clear scientific recommendation (<i>PRODUCE 2017a</i>). A new set of management measures for this component of the fishery has been proposed by PRODUCE and submitted to a public comment period (<i>PRODUCE 2016</i>), including change in fleet definition, a 3 nm coastal reserve, mandatory satellite positioning system and an annual total allowable catch limit for direct human consumption.</p> <p>R4, 19</p>		<b>M</b>



LEVEL OF COMPLIANCE	
<i>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.</i>	
<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.
<p><b><i>Determination: 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.</i></b> <span style="float: right; border: 1px solid green; padding: 2px;">H</span></p> <p><b>Bycatch</b></p> <p>There is an on-board observer program in the industrial anchoveta fleet, which covers about 4-6% of the overall fishing effort. Peruvian law allows just up to 5% of non-target species bycatch in weight in this fishery (e.g. PRODUCE, 2015). IMARPE reports bycatch species and frequency of occurrence in hauls per fishing season (e.g. IMARPE, 2015); although no quantitative weight estimates are available.</p> <p>Chilean jack mackerel (<i>Trachurus murphyi</i>), Chub mackerel (<i>Scomber japonicus</i>), squid and Carrot squat lobster (<i>Pleuroncodes monodon</i>) are mentioned as the main incidental species in the anchoveta industrial fishery (IMARPE 2014, 2015). In the artisanal and small-scale fleets, there are numerous species, including: silverside (<i>Odontesthes regia</i>), bonito (<i>Sarda chilensis</i>), squid (<i>Loligo gahi</i>), Jack mackerel (<i>Trachurus murphyi</i>), flounder (<i>Paralichthys adspersus</i>), Lorna drum (<i>Sciaena deliciosa</i>), red squat lobster (<i>Pleuroncodes monodon</i>), butterflyfish (<i>Trachinotus paitensis</i>), mahi mahi (<i>Coryphaena hippurus</i>), eagle rays (<i>Myliobatis</i> spp. among others, (CeDePesca 2010). Around 98 - 99% of the observed catch in the small-scale fishery was anchoveta (nearly 100% for the artisanal fleet) in recent fishing trips and bycatch species were Lorna drum (<i>Sciaena deliciosa</i>), longnose anchoveta (<i>Anchoa nasus</i>), chub mackerel (<i>Scomber japonicus</i>) and silverside (<i>Odontesthes regia</i>).</p> <p><b>ETP</b></p> <p>National legislation, based on the IUCN Red List, prohibits the capture of protected species (seabirds, turtles and marine mammals) for commercial purposes, including Peruvian Diving Petrel, Humboldt penguin, Guanay cormorant, pelican, Peruvian booby, green sea turtle, South American sea lion and Southern fur seal. Commercial catch, processing and marketing of small cetaceans is prohibited by a national law since the mid-1990s (PERU 1996).</p> <p>FishSource reports that the main threat posed by the fishery to ETP species is via a reduction in food availability; anchovy is an important prey for a range of ETP species including Humboldt penguin, Peruvian diving petrel, Guanay cormorants, and also the non-ETP fur seals and sea lions. IMARPE highlights the difficulties to predict environmental variability and notes that focus should be on preservation of resilience of key species in the ecosystem, such as anchoveta.</p>	

Efforts taken to protect ETP species include the establishment of three major Marine Protected Areas (MPAs), covering a total area of 6,305km<sup>2</sup>, the National Reserve System of Guano Islands, Isles and Capes; the Paracas National Reserve; and the San Fernando National Reserve. These areas correspond to IUCN category VI protected areas and represent important refuges for seabirds and marine mammals.

**Ecosystem**

There is no direct impact on bottom habitats from purse seine, unless it is used in waters shallower than the nets height. Since 2012, industrial vessels can only operate outside the 10 nm from the coast; small-scale vessels (10 to 32.3 m<sup>3</sup>) between 5 and 10 nm, while the artisanal fleet (less than 10 m<sup>3</sup>) can operate from the coastline. The aim of this regulation is to protect coastal habitats and breeding zones for several species (PRODUCE, 2012; IMARPE, 2014). Recently, a permanent spatial closure of 3 nm along the Peruvian coastline for all fleets has been established (PRODUCE 2017c). On the other hand, management authorities are keen to allow the industrial fleet to fish in coastal areas (IntraFish 2016) and temporary permissions to operate within the 5-10 nm zone were given in 2016 and 2017, as exploratory fishing activities to collect data on species distributions patterns (PRODUCE 2016a; PRODUCE 2017b). The morphology of the platform along the Peruvian coastline and associated habitats vulnerable to fishery impacts are not well known, and concerns have been raised (Hervás and Medley 2016).

Anchoveta is highly dependent on environmental events; periodically, the upwelling that drives the Humboldt Current Large Marine Ecosystem’s productivity, where the fishery operates, is disrupted by El Niño-Southern Oscillation (ENSO) events. Spatiotemporal variability affecting anchoveta at different temporal scales has been studied by several authors (Ballón et al., 2011; Bertrand et al., 2011; IMARPE, 2012; Espino and Yamashiro, 2012; Espinoza and Bertrand, 2014; etc). During ENSO events, fish abundance and distribution are significantly affected, often leading to stock crashes and cascading social and economic impacts. These events cause regime shifts where anchovies and sardines alternate as the dominant species in the ecosystem. Still, both anchovy and sardine fisheries’ collapses can be attributed to a combination of El Niño events, decadal shifts towards less productive conditions and overfishing (Bertrand et al., 2011).

Prolonged warm anomalous conditions since late 2013 have led to higher diversity in the pelagic ecosystem, higher mixture of juvenile and adult organisms in anchoveta schools, diet change by anchoveta (from euphasids to copepods), more coastal distribution and increased consumption of anchoveta by coastal species due to its accessibility. These changes seem to increase risk upon the anchoveta stock (IMARPE, 2014; 2015). IMARPE highlights that difficulties to predict environmental variability are more evident in recent years, and indicates that focus should be on preservation its resilience by protecting coastal areas, spawning events and juveniles (IMARPE 2016; PRODUCE 2016)

However, in recent years, the reporting has been improving, there is no impact on ecosystems caused by purse seine and there are measures in places to protect juveniles that can be involved in the trophic chain of predators considered ETP. The fishery does not have a high levels of bycatch, main species are chub mackerel and jack mackerel. Further, there are two FIP projects in developing and in March 2017 the result of the new Observer program showed the bycatch was less than 1%. Therefore, the fishery can be upgraded at high level of compliance.

R4, 8, 12, 20 - 27

E. IMPLEMENTATION		
LEVEL OF COMPLIANCE		
<i>E1. There should be a framework for sanctions of violation of Laws and regulations.</i>		
<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.	
<p>Determination: A framework for sanctions of violation of Laws and regulations do exist but do not work efficiently.</p> <p>PRODUCE publishes lists of sanctions invoked and the relevant laws, fines, and fishing suspensions on the ministerial website, as required by Regulations of the Organization and Functions of the Ministry of Production. Other regulations relevant to fisheries sanctions include:</p> <ul style="list-style-type: none"> <li>• Ley 25977 Ley General de Pesca (Artículos del 76° al 83°)</li> <li>• Decreto Supremo 012-2001-PE Reglamento de la Ley General de Pesca (Artículos del 126° al 150°)</li> <li>• Decreto Supremo 016-2007-PRODUCE Reglamento de Inspecciones y Sanciones Pesqueras Acuícolas</li> </ul> <p>Mendo and Wosnitza-Mendo (2014) estimated correction factor for unreported catches, including discards of excess catch and juveniles, loss of fish blood, underestimation through misreporting by processing plants; illegal landings and irregular sales. In 2010, the estimate was 10%, confirming that the data gathering system needs improvement. Artisanal and small-scale fleets' correction factor is on average 35%. These two fleets by law target anchoveta only for direct human consumption, however, the catches are also illegally sold for reduction fishmeal plants.</p> <p>Monitoring and compliance regarding discards and zone invasions (industrial vessels operating within the 10nm from the coastline, or small-scale vessels entering in the 5 nm) are expected to increase with the electronic log system and mandatory positioning system on board for all fleets. As well, intensive inspections are being conducted at landing points and on-board; with most infractions related to excess of juveniles without prior notification (Diario Gestión 2017).</p> <p>Since 2010, monitoring and inspection has increased significantly (PRODUCE 2016b; PRODUCE 2017c; PRODUCE 2017d) however, as usually the quota is almost completely attained, the correction factor for unreported catches should be reassessed and taken into account in the quota limit setting process. Intensive monitoring and inspection is being conducted at landing and weighing points and on-board; in the 2017 first fishing season of industrial fleet most infractions related to excess of catches of hold capacity and misreporting ((PRODUCE 2017d).</p> <p>R28,29</p>		<b>M</b>

LEVEL OF COMPLIANCE		
<i>E2. A management system for fisheries control and enforcement should be established.</i>		
<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.	
<p><b><i>Determination: A management system for fisheries control and enforcement is established but does not work efficiently</i></b></p> <p>The implementation and enforcement of fisheries laws and regulations is one of the stated functions of the Ministry of Production, through the Directorate General of Supervision and Control (DGSF), although landings are monitored and recorded by the international surveillance company SGS. The DGSF publishes and regularly updates a list of vessels prohibited from operating on the fishery, and also lists a significant number of ‘featured inspections’ and prosecutions on its website. The most recent of these involving anchovy was the confiscation of 7.5t of anchovy landed illegally by the artisanal fleet at the end of March 2016; however there are many examples of inspection and sanctioning available. An IFFO industry news update reports that there are up to 650 inspectors conducting daily control operations across Peru during periods of heavy fishing activity.</p> <p>Industrial vessels are required to operate a Satellite Tracking System (SISESAT), a law which is designed to ensure they remain further than 5nm from the coast. In 2016, a mobile app introduced by the DGSF and incorporated into the SISESAT system won third place at the second Stop IUU Fishing Awards. PRODUCE states that the app allows accredited PRODUCE inspectors to check location, speed, direction and distance to coast with more accuracy than the traditional satellite systems.</p> <p>R32-37</p>		M

<b>7. KEY STAKEHOLDERS</b>

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