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IMO II 20.3.10 G-e Full Assessment Report MSC Fishery

Public Certification Report

**Chilean mussel fishery and suspended culture
Toralla S.A. and Cultivos Toralla S.A., Región X, Chile**



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Table of Contents

Table of Contents.....	1
List of Tables	3
List of Figures	4
1. Executive Summary	9
2. Authorship and Peer Reviewers.....	11
3. Description of the Fishery	14
3.1 Unit of Certification and scope of certification sought.....	14
3.1.1 Scope of Assessment in Relation to Enhanced Fisheries	15
3.1.2 Scope of Assessment in Relation to Introduced Species Based Fisheries (ISBF).....	15
3.2 Overview of the fishery	16
3.2.1 Toralla S.A and Cultivos Toralla S.A	16
3.3 Principle One: Target Species Background	24
3.3.1 The mussel (<i>Mytilus chilensis</i>) Life cycle.....	24
3.3.2 The harvest strategy for the mussel (<i>Mytilus chilensis</i>) stock of Chile`s X Region.....	26
3.4 Principle Two: Ecosystem Background.....	29
3.4.1 The aquatic ecosystem, its status and any particularly sensitive areas, habitats or ecosystems influencing or affecting the fishery	29
3.4.2 The retained, bycatch and endangered, threatened or protected (ETP) species including their status and relevant management history	33
3.4.3 Details of any critical environments or sources of concern and actions required to address them	34
3.5 Principle Three: Management System Background	35
3.5.1 Management of the wild stock.....	35
3.5.2 Management of the on-growing phase (the mussel farm)	37
4. Evaluation Procedure.....	40
4.1 Assessment Methodologies.....	40
4.2 Evaluation Processes and Techniques	40
4.2.1 Site Visits.....	40
4.2.2 Consultations	41
4.2.3 Evaluation Techniques.....	41
5. Traceability	45
5.1 Eligibility Date	45
5.2 Traceability within the Fishery	45
5.3 Eligibility to Enter Further Chains of Custody	46
5.4 Eligibility of Inseparable or Practically Inseparable (IPI) stock(s) to Enter Further Chains of Custody.....	46

6. Evaluation Results	47
6.1 Principle Level Scores	47
6.2 Summary of Scores	47
6.3 Summary of Conditions	48
6.3.1 Recommendations	49
6.4 Determination, Formal Conclusion and Agreement	49
References	50
Appendices	53
Appendix 1 Scoring and Rationales	53
Appendix 1.1 Performance Indicator Scores and Rationale.....	53
Appendix 1.2 Risk Based Framework (RBF) Outputs	103
Appendix 1.2.1 Scale Intensity Consequence Analysis (SICA).....	103
Appendix 1.2.2 Productivity-Susceptibility Analysis (PSA)	109
Appendix 1.3 Conditions.....	113
Appendix 2. Peer Review Reports.....	119
Appendix 3. Stakeholder submissions.....	151
Appendix 3.1.a Written submissions made by stakeholders during consultation opportunities	151
Appendix 3.2a Written submissions made by stakeholders about the public comment draft report	155
Appendix 4. Surveillance Frequency	158
Appendix 5. Client Agreement.....	159
Appendix 5.1 Objections Process	160

List of Tables

Table 1. Conditions MSC principle 2	10
Table 2. Conditions MSC principle 3	10
Table 3. Unit of Certification	14
Table 4. Mussel cultivation centers of Toralla S.A. and Cultivos Toralla S.A.	18
Table 5. AMERB in which <i>Mytilus chilensis</i> is the main targeted species with ropes used as gear type for the collection of mussel seed (Source: Subpesca)	28
Table 6. Distribution of <i>Mytilus chilensis</i> in natural condition along the area.....	30
Table 7. On-site visit schedule	40
Table 8. Personal meetings that have taken place during the on-site visit.....	41
Table 9. Final Principle Scores.....	<u>4748</u>
Table 10. Score at Performance Indicator level.....	<u>4748</u>
Table 11. Summary of conditions of certification	<u>4849</u>

List of Figures

Figure 1. Centres of capture (yellow) and grow out (blue) in the X region	16
Figure 2. Three areas of seed capture at the Maillen Island, Quillaípe Island and Punta Serapio	19
Figure 3. Ten growth centers at the Lemuy Island and the Quinchao Island in the Province of Chiloé	19
Figure 4. A typical longline double head-rope supported by plastic floats.....	21
Figure 5. <i>Mytilus spp.</i> production cycle.....	22
Figure 6. Chorito (<i>Mytilus Chilensis</i>).....	25
Figure 7. <i>Mytilus chilensis</i> life cycle.....	25
Figure 8. AMERB management areas in Region X	27
Figure 9. Circulation pattern in Chiloé's Interior Sea	29
Figure 10. Composition and spatial pattern of diversity of subtidal mollusc in the North of the Magellanic Province.....	30

Glossary

AAA	Appropriate Areas for Aquaculture
AMERB	‘Áreas de Manejo y Explotación de Recursos Bentónicos’ - Territorial Use Rights in Fisheries
AMICHILE	‘Asociación de Mitilicultores de Chile’ - Association of mussel farmers in Chile
ASC	Aquaculture Stewardship Council
ASI	Accreditation Services International GmbH
BSc	Bachelor of Science
C	Average clearance rate (litres/individuals species/day) at harvest size
CAG	Catch and grow
CAR	Environmental Qualification Resolution
CFP	Common Fishery Policy
CIMAR	Investigación Cruceros de Marina - Marine Scientific Research
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CONAMA	National Environment Commission
CR	Certification Requirements
CT	Clearance time
DEI	Declaration of Environmental Impact
DGTM	‘Dirección General del Territorio Marítimo y marina Mercante’ - General Directorate of Maritime Territory and Merchant Marine
DIA	‘Declaración de Impacto Ambiental’ - Declaration of Environmental Impact
DIRECTEMAR	‘Dirección General del Territorio Marítimo y Marina Mercante’ - General Directorate of Maritime Territory and Merchant Marine
D.S.	Supreme Decree
EC	European Commission
e.g.	“ <i>exempli gratia</i> ” – for example
Eh	Redox potential
EHN	‘Eletrodo Normal de Hidrogeno’ - Normal Hydrogen Electrode

ESBA	Base Situation Study
et al.	<i>“et alii / aliae / alia”</i> – and others
etc.	<i>“et certera”</i> – and so on
ETP	Endangered, Threatened and Protected species
EWOS	Norwegian Salmon Feed Factory
FAO	Food and Agricultural Organization of the United Nations
h	hour
HM	Habitat modified
ICES	International Council for the Exploitation of the Sea
i.e.	<i>“id est”</i> – this is
IFOAM	International Federation of Organic Agriculture Movements
IMO	Institute for Marketecology
INFA	Environmental Assessment on Habitat Impacts
LGPA	General Law for Fisheries and Aquaculture
m	meter
m ²	square meter
MINECON	Ministry of Economy
mm	millimeter
MLS	Minimum Landing Size
MRI	Martin Ryan Institute
MSC	Marine Stewardship Council
mV	Millivolt
N	Quantity
NHE	Normal Hydrogen Electrode
No	number
NA	not applicable
NAP	National Aquaculture Policy
NHE	Normal Hydrogen Electrode

OIE	World Organization for Animal Health
op. cit	<i>“opera citato”</i> – in the work cited
P1	MSC Principle 1
P2	MSC Principle 2
P3	MSC Principle 3
PI	Performance Indicator
PMEA	Plan of Management and Exploitation of the Area
PSA	Productivity Susceptibility Analysis
PSMB	Health Programme Bivalve Molluscs
RAMA	Environmental Regulation for Aquaculture
RAMALAB	Laboratory for the Environmental Regulation of Aquaculture
RAMERB	Reglamento Sobre Areas De Manejo y Explotacion De Recursos Bentonicos
RBF	Risk Based Framework
RE	‘Regulación Exenta’ - Exempt regulation
RESA	Protection, Control and Eradication of High Risk Diseases for Hydrobiological Species
S.A.	‘Sociedad Anónima’ - Incorporation
SEA	System Evaluation Impact
SEIA	System Environmental Impact Assessment
SICA	Scale Intensity Consequence Analysis
SG	Scoring Guidepost
SERNAPESCA	‘Servicio Nacional de Pesca’ - National Service for Fisheries
SESW	Ecuadorian sub superficial water
SUBPESCA	‘Subsecretaria de Pesca’ - Undersecretary for Fisheries
TED	Target Eligibility Date
TURF	Territorial Use Rights in Fisheries
UK	United Kingdom
Vt	Total volume (of water body at high tide)

WWF	World Wildlife Fund
X region	‘Región de los Lagos in Chile (Isla Grande de Chiloè)’ - Lake Region in Chile (Big Island of Chiloè)
Y/N	Yes/No
µM de S	Micro mol of sulfide

1. Executive Summary

This assessment was carried out by IMO, the Institute for Marketecology. The assessment team leader in this assessment is Michèle Stark, the expert responsible for MSC Principle 1 is Antonio Hervás, responsible for MSC Principle 2 is Hilda Castro and responsible for Principle 3 is Rod Cappell.

The full assessment of the Chilean mussel fishery and suspended culture Toralla S.A. and Cultivos Toralla S.A. started in mid December 2011. The actual eligibility date is defined as the 02.01.2013. Stakeholders were always informed about the current assessment status. The on-site visit in Chile took place in March 2012 with participation of all assessment team members. During the on-site visit the enhanced fishery was audited and stakeholder meetings were conducted.

The fishery is located in Region X de los Lagos under Chile's national jurisdiction with policy and planning the responsibility of Subsecretaria de Pesca (Subpesca) and regulated by Servicio Nacional de Pesca (Sernapesca) with additional elements regulated by Direccion General del Territorio Maritimo y Marina Mercante (Directemar).

This catch and grow fishery can be considered as operating under two management systems. The first relates to the management of the wild stock (this includes an artisanal wild catch fishery for adult mussels and the collection of seed). The second relates to the on-growing stage, which is managed under aquaculture regulations, also found in the General Law.

Client strengths

The fishery scored well, generally, and therefore certification is recommended. The client strength is related to administrative framework that ensures the fishery does not have a negative impact on the ecosystem. In particular the management strategies in place to ensure that habitats are not impacted negatively (i.e. Environmental impact assessment required as a condition for license).

Client weaknesses

Weaknesses of the fishery are related to conditions for certification (see below).

Determination

On completion of the assessment and scoring process, the assessment team concluded that the **Chilean mussel fishery and suspended culture Toralla S.A. and Cultivos Toralla S.A. should be certified according to the Marine Stewardship Council Principles and Criteria for Sustainable Fisheries.**

Rationale

MSC principle 1:

- The impact of the fishery on the blue mussel population was assessed using the Risk Based Framework methodology. For principle one, the fishery scored an average of 80.3, with no PI scoring less than 80, hence no conditions were set for principle 1.
- The harvest strategy incorporates spatial management measures that enable the fishery not to be highly susceptible to fishing. Management measures together with

the high productivity that characterises the biology of *Mytilus spp* determined a low risk score through the application of the RBF assessment method.

MSC principle 2:

- A number of fisheries and environmental regulations, made it possible for the fishery to meet the standard under principle 2. A condition of license includes regular monitoring of the impact of farming on the habitats (i.e. organic enrichment). Licenses are only given if the intensity of farming ensures that there is not an unacceptable habitat impact. For principle two, the fishery scored an average of 85.0, with the PIs 2.5.2 & 2.5.3 scoring less than 80, hence the following conditions were set for principle two:

Table 1. Conditions MSC principle 2

Condition number	Condition	Implementation Timeframe	Performance Indicator
1	Develop a partial strategy that take into account available information about the element of the ecosystem, based on carrying capacity for example, that expects to restrain the impact on the ecosystem, work based on plausible arguments and demonstrate with same evidence that the measures will be implemented successfully.	4 years	2.5.2
2	It should develop a research plan that define the variables that must be collected to detect any increase in risk level (e.g., due to changes in the outcome indicator scores or the operation of the fishery or the effectiveness of the measures).	2 years	2.5.3

MSC principle 3:

- A robust governance and policy framework provides this fishery with the base for a comprehensive fishery management. For principle three, the fishery scored an average of 80.1. Fishery specific management scored below the optimum level (i.e.80) in a number of PIs including: 3.2.1, 3.2.2., 3.2.4 & 3.2.5. Therefore the following conditions were set for Principle 3:

Table 2. Conditions MSC principle 3

Condition number	Condition	Implementation Timeframe	Performance Indicator
3	Clear, specific objectives designed to achieve the outcomes expressed by MSC's Principles 1 and 2 needs to be developed.	1 year	3.2.1
4	A mussel management plan is required that establishes research and management responses in a strategic and comprehensive manner. This would provide stakeholders with explanations of actions or non-action resulting from research or review activities.	2 years	3.2.2
5	A research plan that addresses the information needs of management needs to be developed	2 years	3.2.4
6	Effective and timely review of the fishery-specific management system is required.	1 year	3.2.5

2. Authorship and Peer Reviewers

Assessment team leader and MSC COC auditor: Ms Michèle Stark

Ms Michèle Stark is IMO's head of the aquaculture and fisheries department. She is based in Switzerland and is a marine biologist specialized in coastal sciences and management. From 2006 to today, she has worked at IMO as a lead auditor in both fisheries and aquaculture. She has been involved in the development of a number of major standards and has a large network and close connection to all major standard owners such as MSC and ASC, to the accreditation body ASI (she is a member of the advisory board) and a number of organic standards (she is a member of the IFOAM aquaculture expert group).

Expert team member for MSC principle 1: Dr Antonio Hervás

Dr Antonio Hervás is Food Certification International Fisheries Development Manager. He is an established Fisheries Scientist specializing in quantitative stock assessment methods and the design of management strategies for the sustainable exploitation of the fish resources. Dr Hervás holds a BSc in Marine Sciences, a Higher Diploma (postgraduate course) in Fisheries Management, Development and Conservation and a PhD in the development of stock assessment procedures. From 2001 to 2008 he worked as a fisheries scientist for the assessment on mollusc stock of Ireland at Trinity College Dublin and at the marine Science-MRI at the National University of Ireland, Galway. During this time Dr Hervás was an active member of the National Shellfish management Framework with responsibilities on providing scientific advice on the status of mollusc stocks for their management. During this time Dr Hervás published an extensive number of peer reviewed papers, technical reports and has acted as peer reviewer for the ICES Journal of Marine Science. From 2009, Dr Hervás acted as Team Leader and Principle 1 expert against the MSC standard. Dr Antonio Hervás has been fully trained in the use of the MSC's Risk Based Framework. Since 1st of August 2013 the remaining stages of the MSC full assessment are continued without the P1 and RBF expert Dr Antonio Hervás. A request for variation to the MSC CR was submitted to MSC on the 24th of July 2013 by IMO and variation was allowed on the 30th of July 2013. The variation request and the variation response are available on the assessment download section since 31st of July 2013.

Expert team member for MSC principle 2: Mrs Hilda Castro

Hilda is the founder and Executive Director of the RAMALAB (laboratory for the Environmental Regulation of Aquaculture) in Castro, Chile. Hilda has more than seven years' experience in the evaluation of environmental impacts of mussel fisheries and cultivations on aquatic ecosystems. During this time she prepared environmental reports for different aquaculture operations for presenting them to SUBPESCA (Undersecretary for Fisheries) and SERNAPESCA (National Service for Fisheries). She also developed environmental monitoring programmes for seafood processing operations.

Hilda is a Biologist and Technologist in Business Administration. Prior to her work at RAMALAB she has been working as a researcher in the Aquaculture department of the Development Fisheries Institute and she has also been the Head of the Environmental and Development Department in a Company with joint venture with EWOS (Fish Feed Factory). Hilda also worked as an independent consultant dealing with fish and shrimp nutrition.

Expert team member for MSC principle 3: Mr Rod Cappell

Mr Rod Cappell is the director of the fishery consultancy operation Poseidon based in Edinburgh. He has more than 15 years of experience in the marine sector and holds degrees in Marine Biology, Marine Resource Development and a post-graduate qualification in Environmental Economics.

Rod has worked on a variety of European fisheries projects including project managing a review of effort management in a number of Member States and contributing to Regulatory Impact Assessments of numerous EC policies, including CFP reform.

Rod's MSC experience includes a variety of UK and European fishery pre-assessments and full assessments.

The **Risk Based Framework (RBF)** was used in this assessment for MSC Principle 1 on all seed sources as required for this type of enhanced bivalve fisheries. Michèle Stark, Antonio Hervàs and Rod Cappell have had MSC training in the use of the RBF. Before starting the on-site visit Rod Cappell conducted another RBF training for Hilda Castro, and Michèle Stark attended this training session, too.

The Peer Reviewers are:

Mr Christian Díaz Peralta

Christian Díaz Peralta is Fishing Engineer and degree in Business and Administration, and works in investigation and as technical advisor in fisheries and aquaculture with 20 years' experience in technical, management and development projects in Chile.

He began working at university as academic, and as consultant for Undersecretaries for Fisheries of Chile, Fondo de Investigación Pesquera (FIP) and private companies. Recently, he has worked on productive project development in mussel culture, offshore technology, new strategies for use of areas for aquaculture, environmental and biological monitoring, among others. He has participated in different national and international conferences.

At present he works as academic for the Universidad Católica de la Santísima Concepción, working for national and international projects, and as advisor consultant for private companies and artisanal fishermen.

Mr José Carlos Macias

José Carlos Macias is degree in Marine Sciences, and works as a technical advisor on fisheries and aquaculture affairs with more than 15 years of experience in project development and especially as advisor to the Andalusia Regional Government (Spain).

He began working in private enterprise and has subsequently been more than 10 years working for the Fisheries Management in Andalusia as a coach and Head of Department. At this time has developed important lines of work on strategic issues for the consolidation of fisheries and aquaculture sectors, as the location of suitable areas, integrated aquaculture, fisheries monitoring, promotion campaigns, environmental monitoring, among others. Also, he has participated as an expert representative on national technical committees and a host of workshops and / or international meetings mainly in Europe.

He currently works as an International Advisor & Consultant in Fisheries and Aquaculture Affairs, for several national and international organizations among which is the Committee on Aquaculture (CAQ) of the General Fisheries Commission for the Mediterranean GFCM-FAO, Chilean Government (as an expert in artisanal fisheries),

various Spanish Aquaculture Foundations, specialized consultants, private companies in fisheries and aquaculture, and others.

3. Description of the Fishery

3.1 Unit of Certification and scope of certification sought

IMO confirms that the Chilean mussel fishery and suspended culture Toralla S.A. and Cultivos Toralla S.A., Región X, Chile is within scope of the MSC certification sought for the assessment as defined in Table 3.

Prior to providing a description of the fishery, it is important to be clear about the precise extent of potential certification. The MSC Guidelines to Certifiers specify that the unit of certification is **“The fishery or fish stock (biologically distinct unit) combined with the fishing method/gear and practice (=vessel(s) and/or individuals pursuing the fish of that stock)”**.

This clear definition is useful for both clients and assessors to categorically state what was included in the assessment, and what was not. The unit of certification for the fishery under consideration is as set out in Table 3.

Table 3. Unit of Certification

Species	Chilean mussel (<i>Mytilus chilensis</i>)
Geographical range of fishing operations	South East Pacific Ocean in the FAO statistical area 87. In the coastal sea of Chile within the limits of the X Region of “Lagos de Chile”. Seed mussel harvest in the area of Reloncaví, Puerto Montt. Grow-out operations in the Province of Chiloé.
Method of capture	Enhanced fishery: Seed mussels harvested by suspended substrates.
Stock	Wild caught seed from the coastal sea of Chile within the X Region of “Lagos de Chile”.
Management	Subsecretaria de Pesca (SUBPESCA) deals with the policy and planning of fisheries. Servicio Nacional de Pesca (SERNAPESCA) deals with regulation and enforcement
Client group	Toralla S.A. and Cultivos Toralla S.A.
Other Eligible fishers	There is no certification sharing mechanism in place and therefore there are no other eligible fishers

3.1.1 Scope of Assessment in Relation to Enhanced Fisheries

The following criteria are met by the fishery under assessment and therefore the fishery is within scope in relation to enhance fisheries (*CR paragraph 27.4.12*):

- The system relies upon the capture of fish from the wild environment.
- The species are native to the geographic region of the fishery and the natural production areas from which the fishery's catch originates.
- There are natural reproductive components of the stock from which the fishery's catch originates that maintain themselves without having to be restocked every year.
- The production system operates without augmentation of food supply
- The production during the captive phase does not require disease prevention involving chemicals or compounds with medicinal prophylactic properties.
- There are no irreversible modifications to the habitat that cause serious or irreversible harm to the natural ecosystem's structure and function.

The team assessed the fishery against the above criteria from the start of the evaluation process through the information gathering phase of the assessment. In particular the site visit and stakeholders consultation provided the team with the information needed to assess the fishery in relation to the enhance fisheries criteria required under the MSC CR 27.4.12.

The characteristics of the Chilean mussel fishery and suspended culture Toralla S.A. and Cultivos Toralla S.A. meet the scope criteria for enhanced fisheries. The fishery is a **catch-and-grow (CAG)** fishery as a wild harvest (seed collection) is followed by a grow-out phase. The fishery is also a **habitat modified (HM)** fishery during the grow-out phase. Toralla S.A. and Cultivos Toralla S.A. meets the characteristics of enhanced fishery scope criteria defined in Table C1 of the MSC Certification Requirement version 1.2. The system relies upon the mussel seed collection from the wild environment. The Chilean mussel is native to the concerned area. Neither feeding nor disease prevention takes place. The habitat modifications are reversible and do not cause serious or irreversible harm to the natural ecosystem's structure and function.

3.1.2 Scope of Assessment in Relation to Introduced Species Based Fisheries (ISBF)

There fishery in assessment is not an ISBF.

3.2 Overview of the fishery

3.2.1 Toralla S.A and Cultivos Toralla S.A

Species type

The target species for the fishery under certification is blue mussel (*Mytilus chilensis*). Section 3.3 presents relevant aspects of the biology of this species to the assessment.

Area under evaluation

South East Pacific Ocean in the FAO statistical area 87, in the coastal sea of Chile within the limits of the X Region of “Lagos de Chile”. Seed mussel harvest takes place in the area of Reloncaví, Puerto Montt. Grow-out operations in the Province of Chiloé (Figure 1).

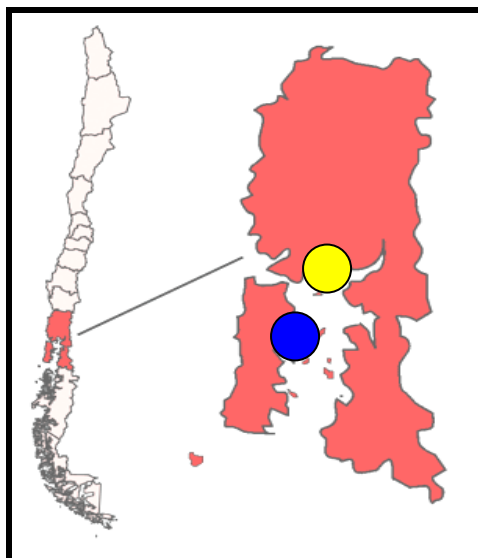


Figure 1. Centres of capture (yellow) and grow out (blue) in the X region

Fishery ownership and organisation structure

Toralla S.A. was founded in the year 2000 by the family Leiro from Galicia, Spain. The company shows a vertical integration in its organization. Toralla S.A. manages more than 400 hectares of cultivation in the sea through its subsidiary Cultivos Toralla S.A. in addition to its duties in processing and marketing. A part of this sea area is being operated under the cultivation system of the type "long-line" which so far has yielded approximately 20,000 tons of mussels per year.

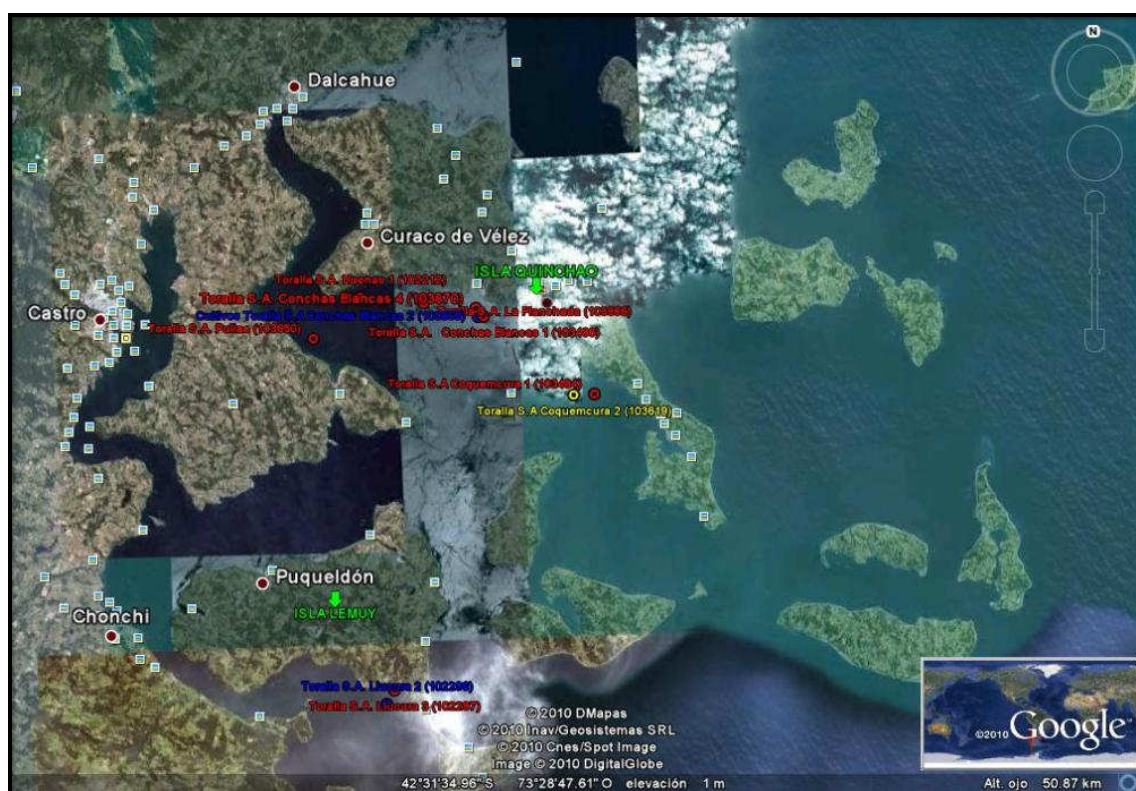
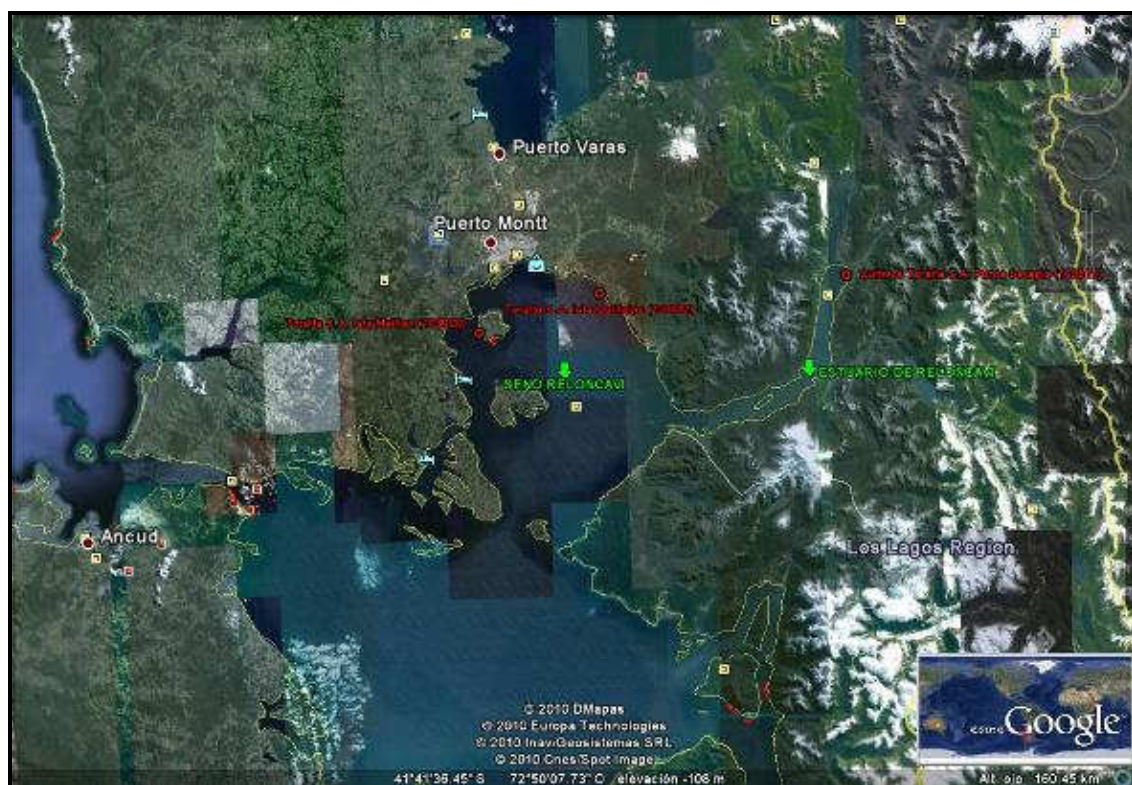
The headquarters of Toralla S.A. is located near the city of Chonchi which houses the processing plant. The canters of cultivation belong to both, the company Toralla S.A. and Cultivos Toralla S.A. which are at the X Región de los Lagos at the Isla de Chiloé relatively close to the processing plant, as well as in the area of Seno y Estuario de Reloncaví.

Currently, there are a total number of 13 sites where the company runs its own cultivations, of which eleven belong to Toralla S.A. and two belong to Cultivos Toralla S.A. as shown in Table 4. Ten cultivation centers are located in the Province of Chiloé (Isla Lemuy and Isla Quinchao) and three centers in the area of Reloncaví - Puerto Montt (Isla Quillaipe Maillén Island and Punta Serapio). The centers in Chiloé are primarily intended for growth and fattening of mussels while the objective of those in Reloncaví is the supply and seed production (see Figures 2 and 3). The company also purchases products from different suppliers that are mussel producers, either at the seed stage for grow-out cultivation or adult mussels for processing.

Different cultivation steps are involved in the activities conducted by Toralla S.A. and Cultivos Toralla S.A. These activities are the obtaining of natural seed supply, the suspending of collected and bought seeds, the growth and fattening of the mussels, thinning during the grow-out stage and the harvesting of mussels after reaching market size. The areas where the seed capture takes place are shown in Figure 2 and the location of the grow-out centres are shown in Figure 3.

Table 4. Mussel cultivation centers of Toralla S.A. and Cultivos Toralla S.A.

Cultivation center	Company	Code	Coordinate for reference
Conchas Blancas 1	Toralla S.A.	103486	E=620262,85 N=5295520,53
Conchas Blancas 2	Cultivos Toralla S.A.	103809	E=619972,06 N=5295520,53
Conchas Blancas 4	Toralla S.A.	103870	E=619887,41 N=5295967,02
Coquemcura 1	Toralla S.A.	103484	E=625796,45 N=5291193,79
Coquemcura 2	Toralla S.A.	103619	E=624721,72 N=5291205,15
Liucura 2	Toralla S.A.	102296	E=614132,08 N=5275752,79
Liucura 3	Toralla S.A.	102297	E=614563,96 N=5276461,96
Huenao 1	Toralla S.A.	102212	E=613900,23 N=5296847,14
La Planchada	Toralla S.A.	103866	E=617186,17 N=5296379,43
Pullao	Toralla S.A.	103650	E=611370,48 N=5294847,92
Isla Quillaipe	Toralla S.A.	103551	41° 31' 59,12" S 72° 46' 43,18" W
Punta Serapio	Cultivos Toralla S.A.	103582	E=726124,30 N=5400517,63
Isla Maillen	Toralla S.A.	103920	41° 35' 11,49" S 73° 01' 11,31" W



History of the fishery

Between 1938 and 1960 the intensive mussel fishery in the south of Chile almost caused extinction of the Giant mussel (*Choromytilus chorus* - Choro zapato) and depletion of the natural mussel beds of the Chilean blue mussel (*Mytilus chilensis* - Chorito) and the Ribbed mussel (*Aulacomya ater* - Cholga). Due to this situation experiments were conducted in 1961 in the Mitilicultura de Putemún at the Isla de Chiloé. The Mitilicultura de Putemún was developed in 1943 in order to repopulate and monitor the natural mussel beds. The aim of the experiments was to determine the conditions for the recruitment of larvae from the natural environment in order to supply seed cultivation centers for the growing of these species. Different types of collectors were tested and a peak time for replacement as well as the efficiency of replacement was determined. The success of the previous experiments led to the installation of a water basin of 4x6 m in the Mitilicultura de Putemún in 1965, where the first experiments of Giant mussel cultivations were conducted in pelagic. In 1967 and 1968 two water basins with mussel ropes with seed from the Giant mussel and the Chilean blue mussel were installed in the Mitilicultura de Putemún, one in Talca (16x16 m) and another one in Tubildad (18x18 m). In 1968 four water basins were installed in Putemún for the cultivation of the Giant mussel. At the same time research was conducted for the recruitment of mussel larvae for suspended cultivation at the island Puluqui (Calbuco Commune) and Isletilla (Commune of Chiloé). These experiments failed for the most part due to low uptake of larvae from the natural environment because the collectors used were not practical.

After the development of the cultivation technology substantial modifications of the technology were developed in Europe, mainly Spain and France, and then commercial production of the Giant mussel and the Chilean blue mussel started in Chile. In 1982 about 21 cultivations were already established, which harvested 1,389 tons of Chilean blue mussels and 240 tons of Giant mussels. Subsequently, the quantities decreased and then began to increase gradually in the late 80's. In the early 90's the Chilean blue mussel cultivation started to increase its importance relating to the decline of natural harvest levels. In 1995 the cultivations already represented 52% of the total landings of the species. Since 1996 the industry experienced significant growth and was projected as an activity with a great future. The stocking technique was modified by replacing the wooden water basins by ropes suspended on floating structures. Through the implementation of mussel cultivations manufacturing of the harvested mussels started in Chile and led to a growth and increase of local processing plants.

In the new millennium, Spanish companies were established in Chile due to the great natural advantages in the country to meet the European mussel demand. The interest in expanding in Chile was based on large extensions of sites available with a good water quality (oxygenation, circulation, no contamination).

History of the fishing practices

Catch and Growth fisheries are defined as fishery production systems that involve wild harvest followed by a grow-out phase. Mussel farming collects their own stock from the wild spat-fall and settled spat is grown on ropes suspended from longlines.

A typical longline in the production system under assessment would consist of a single or double head-rope supported by plastic floats at regular intervals (Figure 4). The overall dimension of each production area (number of sites and number of lines per site) is tailored to the license conditions. The length of the longline is generally around 400 m and is generally suspended at depth of approximately one meter. The spacing of the plastic floats (buoys) depends upon their buoyancy and the expected load upon the line. The separation between long lines is largely dependent upon the size of the servicing vessel or the productivity requirements. The overall dimension of each site is also tailored to the license condition.

Longline culture allows highly mechanized culture and can yield 18-20 tonnes/ha/yr (http://www.fao.org/fishery/culturedspecies/Mytilus_edulis/en#tcNA009D). The rope droppers, on which the mussels are grown, are usually 18 mm in diameter although there are a wide variety of designs available on the market. Droppers are generally between 6-24 m in length, depending on water depth (1-2 metres above the sea bed level). Droppers may be tied to the headlines at between 5-6 m apart, depending on local tidal conditions.

For harvesting each dropper is raised from the water and the mussels removed either by hand or by machine. They may then be transferred to a shore-based facility or the next stages may take place on-board the harvesting vessel. The mussels are separated, washed and graded, again by hand or automated line. Each dropper may yield around 120 kg of marketable mussels. Small mussels may be re-tubed and returned to the sea for further growth (Figure 5).



Figure 4. A typical longline double head-rope supported by plastic floats

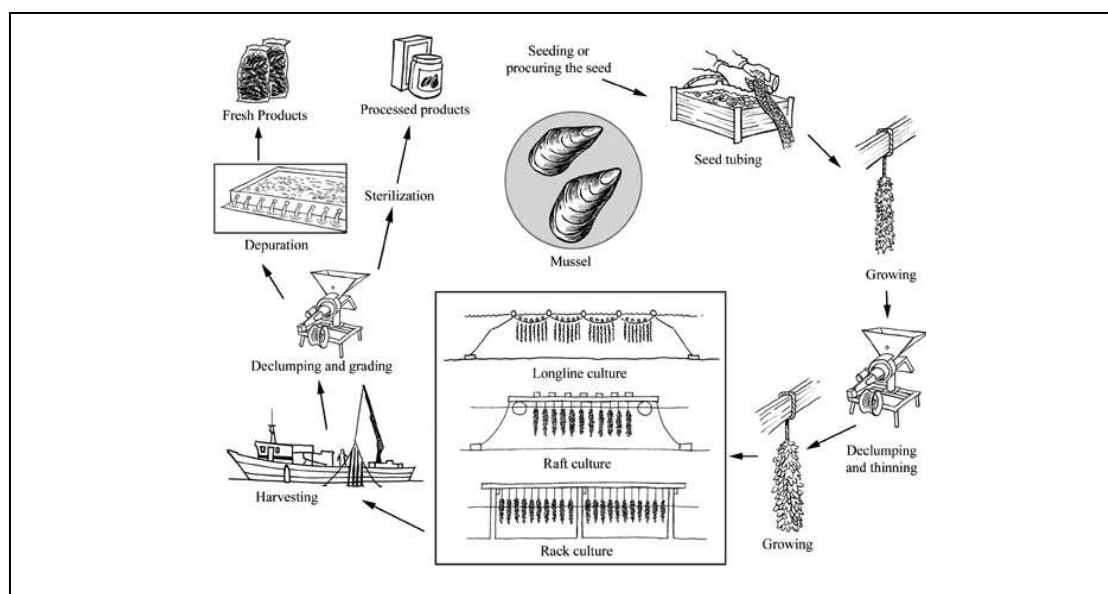


Figure 5. *Mytilus* spp. production cycle

(Source: http://www.fao.org/fishery/culturedspecies/Mytilus_galloprovincialis/en)

Administrative Framework

Toralla S.A. and Cultivos Toralla S.A. is under the control of the 'Subsecretaria de Pesca' (SUBPESCA) which deals with the policy and planning of fisheries in Chile and the 'Servicio Nacional de Pesca' (SERNAPESCA) that deals with regulation and enforcement.

All investment projects of this mussel cultivation and processing activity to which Toralla S.A. and Cultivos Toralla S.A. belong were previously evaluated and approved by the 'Sistema de Evaluación de Impacto Ambiental' (SEIA) supported by the 'Servicio de Evaluación Ambiental (SEA)' which belongs to the Ministry of Environment.

There is a 'Reglamento Ambiental para la Acuicultura' in the context of the 'Ley General de Bases del Medio Ambiente' which must be met by the operators on every stage of the system. Prior to the implementation of the cultivation project a 'Caracterización Preliminar de Sitio' (CPS) was performed. This provides among other things, a baseline for the development of the activity's future, and based on it an annual 'Informe Ambiental' (INFA) for the assessment of the environmental impacts produced by the cultivation project will be conducted.

In addition, all harvest areas of the company are incorporated in the 'Programa de Sanidad de Moluscos Bivalvos' (PSMB) approved and supervised by the 'Departamento de Sanidad Pesquera del Servicio Nacional de Pesca'. This programme was created for products destined for the European Union. The programme specifies weekly monitoring and control of oceanographic water quality parameters (temperature, dissolved oxygen, salinity, pH), microbiological investigations (E. coli, Salmonella, Vibrio parahemoliticus), chemical substances (mercury, cadmium, lead) and toxins (diarrhea toxins, anesthetics and paralytics of shellfish).

A semestral 'Emisario Submarino un Programa de Vigilancia Ambiental' (PVA) was applied in the surrounding area influenced by the processing plant for the evaluation of the water column and the sediment. Another fortnightly program for self-control of 'Residuos Industriales Líquidos' (RILES) in the framework of a wastewater treatment system was approved by the 'Superintendencia de Servicios Sanitarios' (SISS) and the 'Comisión Nacional del Medio Ambiente' (CONAMA), nowadays called SEA.

There is constant monitoring and survey of the environment of the cultivation systems to ensure full compliance with the governmental regulations concerning environment by the cultivation activity of Toralla.

3.3 Principle One: Target Species Background

3.3.1 The mussel (*Mytilus chilensis*) Life cycle

The mussel (locally termed 'chorito') *Mytilus chilensis* (Hupe, 1854) belongs to the class *Bivalvia* and family *Mytilidae* (Figure 6). *Mytilus chilensis* is a semi-sessile epibenthic bivalve that can tolerate wide variation in salinity, desiccation, and temperature and oxygen concentration, characteristic that result in the ability to occupy a large variety of microhabitats. Mussels are anchored to a secure substrate, which include rocks, stones, gravel, shingle and dead shells. These characteristics make mussel an ideal species to grow on ropes.

The bathymetric range of distribution covers, mostly, the littoral to sub littoral zones of oceanic and polyhaline to mesohaline estuarine environments. Mussels' bathymetric distribution extends up to depths of 100 meters and over (Ramajo & Osorio, 2006; Valdobinos *et al.* 2008). However highest densities are found in the littoral and sub littoral up to depths of 25 meters approximately (Maldonado, 2007). The life cycle can be divided into the free swimming larval phase and the largely sedentary juvenile and adult phase. The mussel is a filter feeder, drawing in seawater, which is filtered through the gills. Generally, the potential spawning season vary according to location, but the main spat-fall is generally in spring-summer (Litoral Austral, 2007).

Mytilus chilensis is dioecious, produce gametes and are generally ready to spawn during the first year of age (Litoral Austral, 2007). During spawning eggs and sperm are released to the water column and fertilization occurs externally. After fertilization occurs, the fertilized zygotes undergo several metamorphoses before settlement (Figure 7). Mussels settle after the larval stage, the planktonic life of *Mytilus chilensis* varies from 2-4 weeks depending on temperature, food supply and availability of suitable settlement substratum (Litoral Austral, 2007). The growth rate of mussel depends largely on the availability of food.

Stock structure and definition of stock unit

M. chilensis has a vast distribution range along Chile's coastline (Litoral Austral, 2007). The structure of the mussel stocks, or the connection between different mussel geographic areas, is determined by the dynamic of larval dispersal from spawning areas due to the sedentary nature of mussels. Ocean circulation patterns, couple with the behaviour of larvae, result in a given scale and direction of transport or dispersal and determines how connectivity between different mussels geographic areas should be taken into account for the definition of stock unit.

Oceanographic conditions coupled with the geography and marine morphology of Chiloé's interior sea determine that Chiloé's *Mytilus chilensis* population is self-contained (Avendaño *et al.*, 2011; Siever and Silva, 2006). The geography of region X's coastline makes interconnectivity between this region and adjacent regions difficult to occur. Sub Antarctic water currents moving from the South suggest that larvae from region XI could be transported into region X. However, mussels are not exploited in region XI (which is the only area that could provide larvae at some degree) and therefore in terms of fisheries management not to consider region XI in the definition of stock unit does not preclude the sustainability of the exploitation of the resource.



Figure 6. Chorito (*Mytilus Chilensis*)

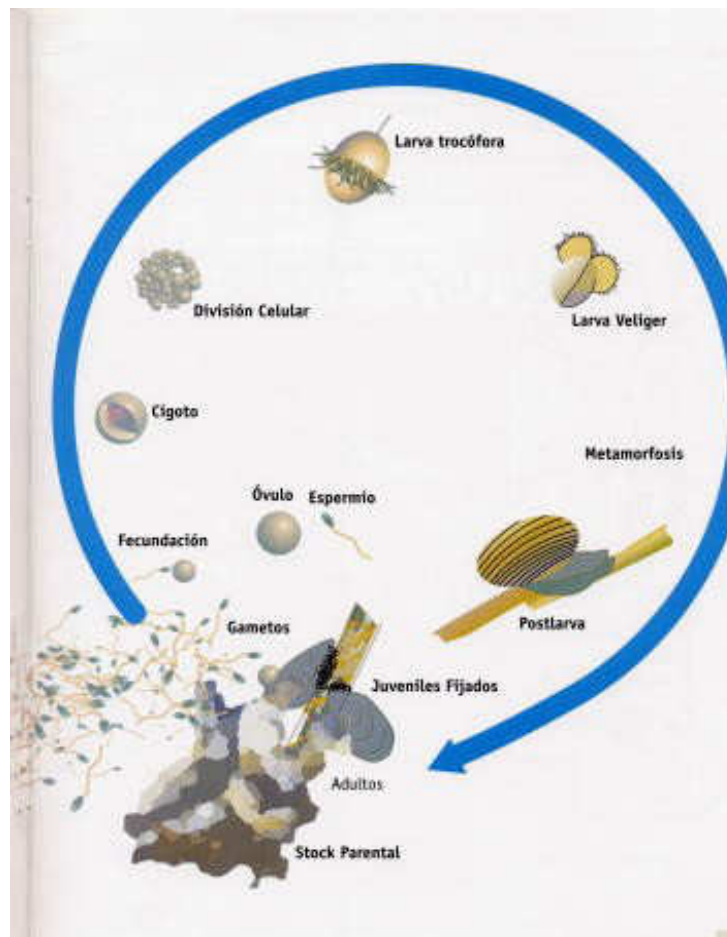


Figure 7. *Mytilus chilensis* life cycle

3.3.2 The harvest strategy for the mussel (*Mytilus chilensis*) stock of Chile's X Region

The exploitation of mussels (*Mytilus chilensis*) in the Chile's X Region is carried out mainly through the enhanced activity defined as catch and grow. Mussel seed is captured with the use of seed collectors (i.e. ropes) and the seed is on-grown until the minimum landing size is reached. Adult's beds are also exploited by divers. However, mainly species targeted by diving are loco (*Concholepas concholepas*) and choro zapato (*Choromytilus chorus*). Chorito is exploited as a secondary species by diving. In 2008 highest catches of chorito by divers were recorded at 78 tones, which are insignificant quantities when compared to aquaculture landings.

Three legal features can be distinguished for the exploitation of mussel under which the harvest strategy is defined:

Aquaculture granting (see also Management of the on-growing phase in Section 3.5.2)

Under the General Law for Fisheries and Aquaculture (Ley General de Pesca y Acuicultura) mussel farming licenses are granted subject to comply with a number of management measures:

Aquaculture licenses are only granted in Appropriate Areas for Aquaculture (AAA). The designation of AAA areas is part of the coastal zone management framework in place which excludes aquaculture activities from areas designated for other marine uses (e.g. maritime ship traffic routes).

Within AAA areas the following measures are in place:

Aquaculture structures for seed collection and on-growing cannot overlap with natural beds.

The minimum extent of farming structures to be installed is defined by a ratio of 1:50 (i.e. 1 culture line of 100 m in length for each 5,000 m²). This is a management measure designed to avoid large sea areas being occupied by longlines.

The maximum production intensity is controlled by SEA and related to the impact on habitats. Section 3.4 gives full detail of existent management strategies to minimize habitats impacts.

Buffer areas between concessions are also required; they must be at least 400 m away from existing salmon applications and 200 m away from other bivalve mollusk concessions. This is a management measure that relates to the potential environmental impact of aquaculture. It is generally understood that salmon farming has a greater impact on the environmental than mussel farming and therefore the distance to be maintained with salmon farming is greater.

Territorial use rights in fisheries (TURFs)

The Territorial use rights in fisheries (TURFs) or locally known by the Spanish acronym AMERBs ("Áreas de Manejo y Explotación de Recursos Bentónicos") give exclusive access rights to organizations of artisanal fishers which are entitled to co-manage parcels of seabed with the Chilean state.

In Region X there are over 250 AMERBs (Figure 8) and in 53 of those *Mytilus chilensis* is exploited as target species using seed collectors (Table 5). Measures under which the collection of seed operates include:

Spatial restrictions: A maximum of 40% of the area can be used by seed collectors (D.S. N° 355/95 of RAMERB).

Temporal restrictions: Seed collectors can be deployed for a maximum of eight months per year (D.S. N° 355/95 of RAMERB). There is a closed season from the 1st of November to the 31st of December designed to protect spawners.

Minimum Landing Size: A 50 mm MLS applies to the exploitation of *Mytilus chilensis* (decree 635 of 1948). This measure also applies to divers when exploiting the adult stocks.

A proportion of the seed collected should be returned to the seabed in order to protect the mussel population (D.S. N° 355/95 of RAMERB). Although the proportion to be returned is not defined under regulation a voluntary 10% of seed to be returned is being agreed under current management.

Areas of low importance

Some seed collection occurs in areas not under the AMERB system. Additional regulation has therefore been established to cover all seed collection under modification 297/2005 of the General Law. This establishes a number of management measures to avoid over-exploitation including:

License requirement: Seed collectors must be licensed.

Temporal restrictions: Seed collectors can be deployed for a maximum of six months per year. There is a closed season from the 1st of November to the 31st of December designed to protect spawners.

As in TURFs areas there is also a voluntary agreement by seed collectors to return 10% of seed to the seabed.

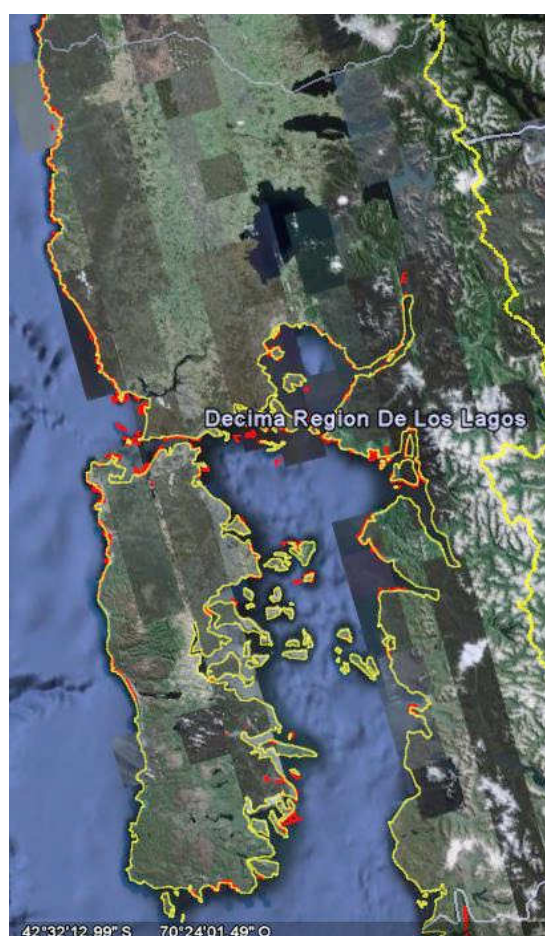


Figure 8. AMERB management areas in Region X

Table 5. AMERB in which *Mytilus chilensis* is the main targeted species with ropes used as gear type for the collection of mussel seed (Source: Subpesca)

Nro.	Comuna	Nombre AMERB
1	Ancud	Alto Lamecura
2	Calbuco	Isla Quenu B
3	Calbuco	Isla Quenu C
4	Chaitén	Caleta Ayacara B
5	Chaitén	Huequi B
6	Cochamó	Bahia Sotomo A
7	Cochamó	Bahia Sotomo B
8	Cochamó	Islote Poe
9	Cochamó	Marimelli A
10	Cochamó	Marimelli B
11	Cochamó	Pocoihuen B
12	Cochamó	Pocoihuen C
13	Cochamó	Pocoihuen D
14	Cochamó	Punta Relonhue
15	Cochamó	Relonhue
16	Hualaihue	Aulen
17	Hualaihue	Cholgo A
18	Hualaihue	Cholgo C
19	Hualaihue	Entre Rios
20	Hualaihue	Este Puntilla Pichicolu
21	Hualaihue	Isla Llanichid A
22	Hualaihue	Isla Llanichid B
23	Hualaihue	Isla Manzano
24	Hualaihue	Isla Toro B
25	Hualaihue	Mañihueico B
26	Hualaihue	Mañihueico C
27	Hualaihue	Norte Punta Calle
28	Hualaihue	Pichicolu A
29	Hualaihue	Pichicolu B
30	Hualaihue	Puerto Bonito A
31	Hualaihue	Puerto Bonito B
32	Hualaihue	Puerto Bonito C
33	Hualaihue	Puntilla Pichicolu
34	Hualaihue	Puntilla Quillon A
35	Hualaihue	Puntilla Quillon B
36	Hualaihue	Quiacas D
37	Hualaihue	Quiacas E
38	Hualaihue	San Pedro del Manzano
39	Hualaihue	Weste Isla Pelada A
40	Hualaihue	Weste Isla Pelada B
41	Puerto Montt	Bahia Chincui
42	Puerto Montt	Caleta La Arena
43	Puerto Montt	Isla Maillen
44	Puerto Montt	Montiel
45	Puerto Montt	Punta Cementerio
46	Puerto Montt	Punta Metri-Punta Lenca
47	Puerto Montt	Punta Puchegui
48	Puerto Montt	Punta Quillaiepe A
49	Puerto Montt	Punta Quillaiepe B
50	Puerto Montt	Punta Surgidero
51	Puerto Montt	Surweste Isla Maillen
52	Puerto Varas	Cululir A
53	Puerto Varas	Peninsula Rollizo

3.4 Principle Two: Ecosystem Background

3.4.1 The aquatic ecosystem, its status and any particularly sensitive areas, habitats or ecosystems influencing or affecting the fishery

The aquaculture of *Mytilus chilensis* is developed between Seno de Reloncaví and Quellon, in the protected bays and channels especially in the East coast. The circulation water pattern has been described in CIMAR Fiordos 10 Cruise, by Siever and Silva in 2006, describing two main currents flowing into Chiloé's Interior Sea by Boca del Huafo (Figure 9). The Subantarctic superficial waters which are modified by the mixture with freshwater to Subantarctic modified waters, and Ecuatorian sub superficial water. This area is characterized by estuarine water where the upper layer in general is separated to the lower layer by strong vertical gradient (pycnoclines, nutriclines and oxyclines).

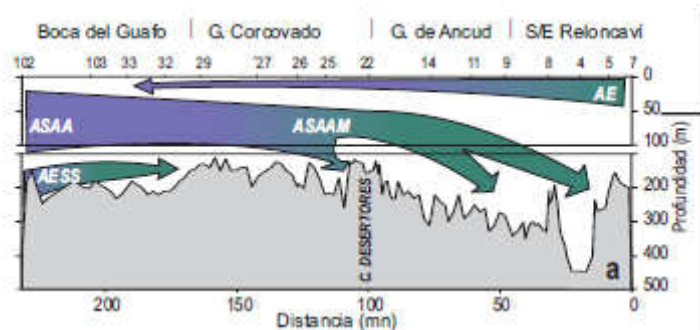


Figure 9. Circulation pattern in Chiloé's Interior Sea

In the same Cruise, Valdobinos *et al.* 2008 studied the composition and spatial pattern of diversity of subtidal mollusc in the North of the Magellanic Province (43° 49' -41° 32' S). They found six areas of similar malacological composition, mainly represented (Figure 10) by *Gastropoda* (58%), *Bivalvia* (58%), *Polyplacophora* (4%) and *Scaphopoda* (1%).

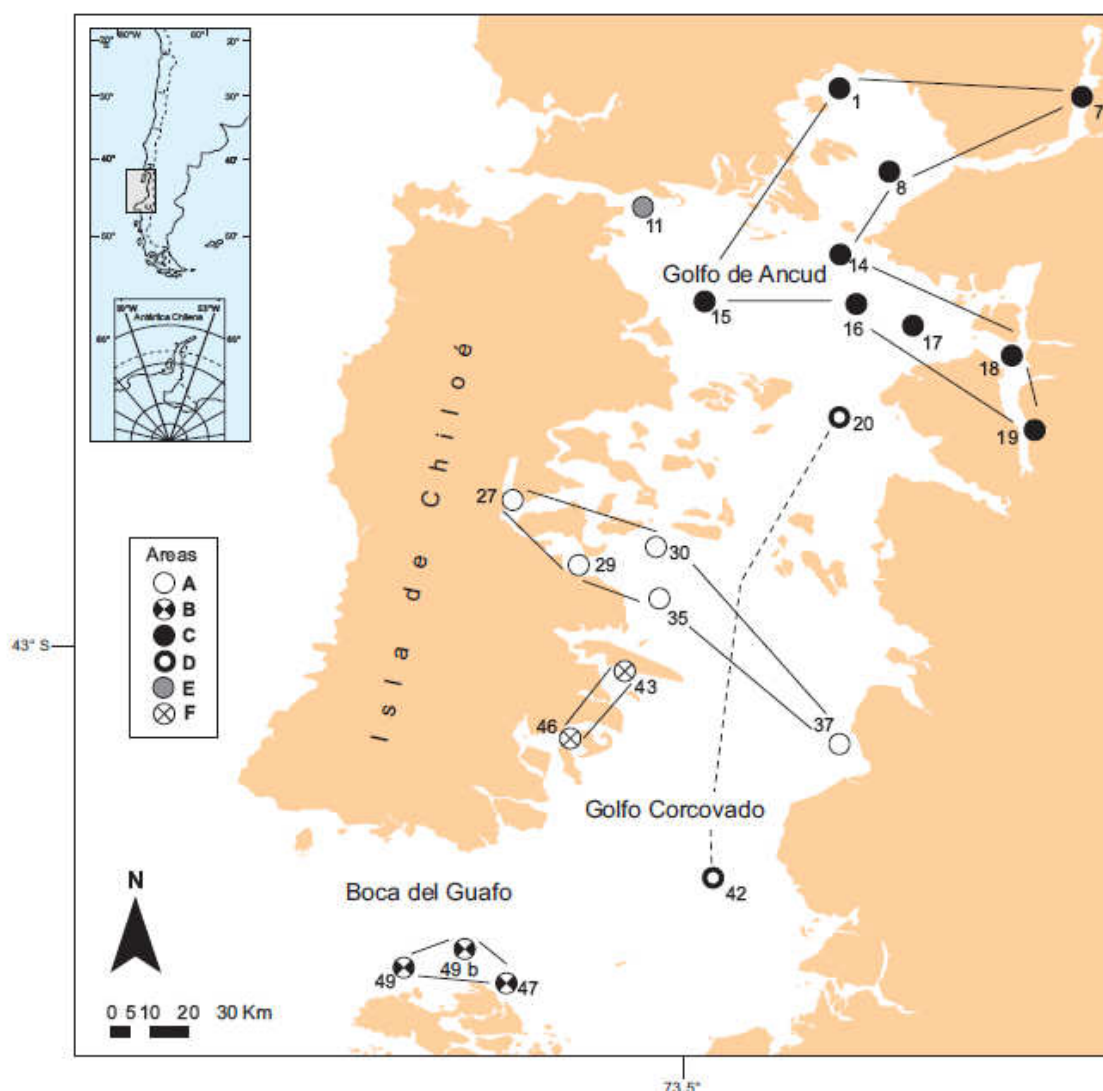


Figure 10. Composition and spatial pattern of diversity of subtidal mollusc in the North of the Magellanic Province

This study shows the distribution of *Mytilus chilensis* in natural condition along the area (Table6).

Table 6. Distribution of *Mytilus chilensis* in natural condition along the area

E	Location	Depth (m)	Kind of sediment (Wentworth)
1	Seno de Reloncavi	285	Loamy sand (limo)
14	Golfo de Ancud	214	Sand
46	Canal Coldita	55	Sand

According to Siever and Silva (op. cit), the chemical and physical condition of the water column varied from estuarine to Ecuadorian Sub Superficial Water. *Mytilus chilensis* can accept a wide range of salinity, oxygen concentration and even pressure.

The estimation of the retention time of the particle estimated as ASC formula is 3,74 days which is in accordance with the retention time communicated by José Luis Blanco as Oceanographer Stakeholder (Skype meeting).

Where:

$$1) \text{ CT(days)} = V_t / (N \times C)$$

CT = Clearance Time.

V_t = Total Volume of the water body at high tide (litres).

N = Number of Bivalves in the water body.

C = Average clearance rate (litres/individuals species/day) at harvest size

$$N = 9.500.000.000(\text{gr}) / 25(\text{gr}) = 380.000.000$$

$$C = 36,61 \text{ L/day (Universidad Austral de Chile)}$$

$$V_t = [40\text{m}(\text{depth}) * 100.000\text{m}(\text{long}) * 200\text{m}(\text{wide})] * 1000\text{L} = 800\text{exp}9 \text{ L}$$

$$\text{CT} = 800\text{exp}9 \text{ L} / (380\text{exp}6 * 36,61)$$

$$\text{CT} = 57,5 \text{ days}$$

$$2) \text{ RT} = -1 \times P / \ln(V_l / V_t)$$

P = Tidal periodicity

V_l is the total volume of the water body at low tide (L).

V_t is the total volume of the water body at high tide (L).

RT is the retention time of a particle.

$$V_l = 700\text{exp}9 \text{ L}$$

$$V_t = 800\text{exp}9 \text{ L}$$

$$P = 0,5 \text{ days}$$

$$\text{RT} = 1 * 0,5 / \ln(700\text{exp}9 / 800\text{exp}9) = 3,74 \text{ days}$$

$$3) \text{ CT/RT} = 57,5 / 3,74 = 15,36 \text{ days.}$$

In the General Law for Fisheries and Aquaculture (LGPA) there are emphasizes on well development of the aquaculture considering the equilibrium of ecosystem but the measures taken are dealing with the impact produced by every single farmer, applying the rule RE 3612/2009 from Subpesca which establishes the methodology for monitoring physical and biological parameters in the habitat where the fishery is developing and also establishes the limits of these parameters. Also the Ministry of Environment imposes the compliments with CITES through DIA (Study of the Environmental Impact), national and international agreement dealing with marine contamination and sailing rules.

In addition the farmer must obtain a licence for developing the aquaculture activity and for the acceptance of biomass of the technical project. Even when the mussel farming has had

an expansive development since 2000 until 2011, there is no evidence of detrimental impact on the phytoplankton biomass. A study conducted by Clement *et al.* (2010) between Ilque (near to Puerto Montt) and Quellón Viejo (southeast of Quellón), shows that there is a combination of different variables such as water temperature, salinity and oxygen profiles that influences the phytoplankton biomass.

Habitat

There is a Supreme Decree 320/2001 (SUBPESCA) which determines the environmental requirements for aquacultures in Chile. Under this, the RE 3612/09 SUBPESCA, gives the methodology and establishes the period of sampling in the areas where the aquaculture is developed. Initially, the mussel farming must sample every year. So, on the basis of the results presented since 2004, in 2009 (Re 3612/09) Subpesca modified this period every two years.

Environmental Informs or INFAs results show aerobic results of Toralla which are agreed with the standard requirements of RE 3612/2009 (Subpesca). Results of pH and Eh (NHE) show that the average Toralla has in its location along the years since 2004 are over 6,8 in pH and Eh over 250 mV.

According to Hardgrave, 2008 and Hardgrave *et al.*, 2008, the Eh (NHE) found in Sea facilities of Toralla are equivalent to 100-200 µM of sulphide concentration.

There is a management in place the DS 320, and RE 3612/2009 both from Subpesca. Since 2004 the fishery activity has shown that its effects on the habitat has been low and showed in reports emitted by Subpesca every two years. (Informes ambientales de la acuicultura, años 2006 y 2008).

However, the data comprised during the period between 2009 up to date is confident because the methodologies and sampling method applied for sampling were normalized to ISO 17025.

Recently, the modification of the Law 20.434 (LGPA) focused on aquaculture, liberated until 2015 the mussel farming as a fishery, of the obligation of Environmental Impact Studies being bid by Sernapesca as occurred with salmon farming up to date. Mussel farming must develop their studies every two years, but every farmer should contract an environmental lab registered in Sernapesca according to the law. This is a result of well development of this fishery in terms of environmental management and the confidence that authorities have in mussel farming activities.

Translocation considered as transport of pest, diseases and plagues

There is **evidence** that the translocation activity is **highly unlikely** to introduce diseases, pests, pathogens, or non-native species into the surrounding ecosystem. The main reason is that *Mytilus chilensis* is a native species well distributed along Chile and in natural beds well distributed along the Inner sea of Chiloé's Interior Sea and Seno de Reloncaví. Even thought, Sernapesca has emitted a regulation that avoids the transport of diseases from aquaculture species DS 319/01 and DS 345/05. In the case of mussels, in the Official Magazine (Diario Oficial de la Republica de Chile, September 2006) was published in 2006, that *Mytilus chilensis* has not developed diseases considered as plague by OIE. On the other hand, in 2012 the results of the project "Reforzamiento de las capacidades de

investigación en el área de patologías de moluscos” were presented which demonstrate that there are pathogens existent but not identified which cause diseases or plagues in *Mytilus chilensis* and other mussels of commercial interest.

3.4.2 The retained, bycatch and endangered, threatened or protected (ETP) species including their status and relevant management history

There is a National Strategy announced by the Ministry of Environment involving the National biodiversity. On the other hand, focusing on marine areas the Subsecretary of Fisheries has determined different rules under the General Fisheries and Aquaculture Law 18.892, which protects the ETP species listed in international agreements which Chile subscribed. In this sense, Chile is part of the CITES Agreement since 1975.

The fishery accepts and declares their compromises in protection to ETP's in the Declaration of Environmental Impact of their activities. This DEI (DIA in Spanish) is submitted to the Ministry of Environment always when a company likes to start aquaculture activities or to change the technical project for an increase in production or another production area. This ministry sends this document for review to the different Marine authorities such as Subpesca, DGTM y MM (Army), Ministry of Agriculture, Tourism, etc. The authority involved in the protection of ETPs is Subpesca. DE (MINECON, Ministry of Economy) N°765/2004 includes the protection of the Common Sea lion and DE (MINECON) 135/2005 prohibits the capture of fish and marine mammals, birds and aquatic reptiles.

There is a strategy in place with which Subpesca has regulated the protection of marine ETPs species, and the listed species are recognised by national and international agreements (CITES).

Sernapesca, the authority that applies the rules, provides a list on its website with the marine ETPs and their status. Subpesca has different rules in place for protecting the ETPs. There are no claims or evidences declared to Sernapesca or to DIRECTEMAR that mortalities have increased.

Even though, WWF presented some scientific reports in which suggested that this fishery could impact the dolphins` behaviour indirectly (Ribeiro *et al.*, 2005, Watson-Capp and Mann, 2004; Ribeiro *et al.*, 2007). These reports also indicated that activities like mussel farming could modify the chemical water column structure, as well as the benthic parameters impacting on dolphins` development.

So, these studies

- a. Are not concluding about the impact of the fishery on the behaviour of dolphins, because they are mainly in shallow areas (5-10m depth) near to the shore (<250 m). The fishery needs more than 25 m for a well-developed farm, and most of Toralla`s farms are in more than 50 m depth.
- b. The studies of Ribeiro *et al.* (2004, 2007) were done in Yaldad, a shallow bay (30 m as a maximum depth) south of Chiloé Island. One of them (2004) concluded that boats affected behaviour, while the other study was carried out in 2002, but published in 2007 shows that the animals selected their environment mainly near to river mouths and streams, shallow waters, but during foraging the animals prefer areas near to mussel farming lines. The authors suggest that Chilean dolphin might be finding food opportunistically. The main negative impact pointed out by another study done on per

oyster farming in New Zealand is the loss of space. Then, indirectly presumes that this might be the case with the behaviour of Chilean dolphin in Yaldad bay.

- c. The studies published in 2007 by Ribeiro *et al.*, do not actualize the information related to the changes that fishery has experimented as environmental rules and strict regulation that the fishery follows for exporting mussel to the EC, as PSMB which demand high standards of microbiology, heavy metals, and lacks of species causing red tide.
- d. There is no information about contamination related to this fishery. Since 2004 to 2009 Subpesca was applying the RAMA or environmental procedures for the determination of Aquaculture impacts, or Environmental Informs (INFAs) which were presented annually to the Subsecretary. During this period, the mussel farming as aquaculture activity had aerobic conditions (>95% of the total activity), which was taking into account by the authorities for changing the environmental regulation to this activity, which by RE 3612/2009 (Subpesca) request INFAs every second year.

Toralla has presented INFAs reports annually until 2009, and every two year up to date including aerobic results.

This information suggests that the fishery neither affects the water structure column nor the benthic area which might affect the dolphin behaviour.

3.4.3 Details of any critical environments or sources of concern and actions required to address them

Main impacts of the fishery on these key ecosystem elements can be inferred from existing information and **some has been investigated in detail.**

There are researches done by different universities sponsored by FIP (Fisheries Research Funds) which depends on Subpesca. The main problem is that the results are not well defunded and published for the application in the improvement of the fishery. One example is the project “Definición de criterios biológicos, ambientales, sanitarios y operativos para la instalación de colectores de moluscos bivalvos en la X región” which was sponsored by this fund but the knowledge is not well understood and applied in the development of the fishery.

The main functions of the components (i.e., target, bycatch, retained and ETP species and habitats) in the ecosystem are **known**. There is knowledge about the different components of the ecosystem which is not well integrated. Such is the case of the information or research done in the Cruise of scientific marine research (CIMAR 1 since 1995 up date) from Puerto Montt (Region X) to region XII.

The main areas studied are meteorology, geology and bathymetry:

- Mass waters, physical, chemical and circulation characteristics, currents and tides, phytoplankton a primary production, red tides, zooplanktonic fish and crustaceans larvae,
- Benthic organism, physic-chemical and geochronology of sediments, and Contamination

This information has been published in international and national scientific magazines, presented in national and international workshops and symposia, and thesis of pre or post degree in Chilean or international universities.

However, the results of this series of research cruises have been managed in the academic area, completely unknown for the farmers and very low useful for the authorities (Palma and Silva, 2006).

There is other technical research developed as well into the university as studies carried out in bay Vilupulli in 2002 (channel located in Central Chiloé) by Troncoso *et al.*, (2010) on carrying capacity for mussels that was presented just recently to the farmers in January 2010.

The main criticism on this issue is that the policy of Subpesca is mainly focused on Salmon farming applying the same rules for mussel farming and the environmental policy is not well developed as well as has not a holistic vision.

3.5 Principle Three: Management System Background

The fishery is located in Region X de los Lagos under Chile's national jurisdiction with policy and planning the responsibility of Subsecretaria de Pesca (Subpesca) and regulated by Servicio Nacional de Pesca (Sernapesca) with additional elements regulated by Direccion General del Territorio Maritimo y Marina Mercante (Directemar).

Fisheries and aquaculture, including the fishery under assessment, are regulated under the Ley General de Pesca y Acuicultura (18.892, 1991) (hereafter termed the 'General Law'). Modifications to the General Law continue to be made to address issues and update fisheries management. The latest version with amendments reviewed as part of this assessment was 20/560 dated 01/03/12.

Chile developed a National Aquaculture Policy (NAP) in 2003, with its implementation subsequently adopted within the General Law (decree 280). The general objective is the promotion of aquaculture for maximum economic growth, environmental sustainability and equitable access to the activity. Environmental sustainability is to be achieved with the following objectives:

Public and private efficiency, effectiveness, co-responsibility and transparency of environmental work associated to design, control and fulfillment of regulations along the whole productive chain in the aquaculture industry.

Conservation of genetic patrimony of endemic culture resources.

Strengthening public and private competence and responsibility for the introduction and culture of exotic species as well as modified organisms.

This catch and grow fishery can be considered as operating under two management systems. The first relates to the management of the wild stock (this includes an artisanal wild catch fishery for adult mussels and the collection of seed). The second relates to the on-growing stage, which is managed under aquaculture regulations, also found in the General Law.

3.5.1 Management of the wild stock

Article 48 of the General Law states that the area within five miles of shore is reserved for marine artisanal fisheries. Those fisheries may establish, following approval of Subpesca and the respective Regional Fisheries Council:

- a) Fisheries for a given species;
- b) Determination of marine reserves;
- c) Measures for the installation of seeds collectors; and

- d) the Areas De Manejo y Explotacion De Recursos Bentonicos (AMERB) management system where legally constituted fishermen's organizations manage the benthic resources in a given area.

The fishing of mussel (locally termed 'chorito') from wild beds is regulated by the Reglamento Sobre Areas De Manejo y Explotacion De Recursos Bentonicos (RAMERB) no. 335/95. This establishes the AMERB management system for benthic artisanal fisheries including mussels. In Region X there are over 250 AMERB areas (Figure 8).

The Management Areas were created as a fisheries management measure, designed to enable organizations of fishermen, with the technical advice from a qualified institution in the field, to manage resources with the following objectives:

- Conservation of benthic resources (invertebrates)
- Sustainability of economic activity by assigning traditional "banks" natural
- Maintain or increase the biological productivity of important benthic resources
- commercial
- Increase knowledge of the benthic ecosystem
- Encourage and promote participatory management

Participants are:

- Fishermen's organizations legally constituted (including Associations formed by indigenous fishermen)
- State Institutions involved in the management of the coast
- Operators that are registered in the register of Management Areas

The AMERB system requires the fishermen's organisations in charge of an area to produce a Base Situation Study (ESBA) and then to establish a plan of management and exploitation of the area (PMEA). The PMEa, produced with technical advice from a marine science institution or company, is then approved by Subpesca and the Regional Fisheries Council. The management, operation and marketing of the resource are then the responsibility of the fishermen's organization via a user agreement with Subpesca which is reviewed every four years.

Article 9 of the General Law states that:

The management plan for each fishery unit shall contain at least the following aspects:

- a) His description, for its geographical location and species within it.*
- b) Background-fishery biological constituent species and their strategy exploitation.*
- c) Conservation and access regimes that apply.*
- d) History of capture, production and market processed products.*
- e) Requirements for conservation research and management.*

And that...

In addition to the conservation and management measures referred to in this Act, management plans may also include the following measures by resolution of the Secretary:

- a) rotation of fishing areas.*
- b) Criteria and limiting extraction.*
- c) translocation and recruitment of benthic resources.*

d) extracting or harvesting techniques.

e) Best practices, sustainability and ecosystem restoration.

In relation to mussels the management plans are further guided by national regulations to prevent overexploitation such as harvesting by divers only, a 50 mm minimum landing size (decree 635 of 1948) and lines cannot extend over more than 40% of a management area (Article 55). Over-exploitation of the resource is further avoided indirectly by phyto-sanitary regulations. The testing requirements to provide assurances of a safe and hygienic product are prohibitively expensive for the artisanal fisheries. These products are therefore restricted to a limited seasonal local market for chorito, leaving the larger companies to export farmed production.

The AMERB management system manages the wild mussel fishery and also seed collection if collection occurs in management areas. However some seed collection occurs in areas not under the AMERB system. Additional regulation has therefore been established to cover all seed collection under modification 297/2005 of the General Law. This establishes a number of management measures to avoid over-exploitation such as all seed collectors must be licensed and on the register, a maximum 6 months in the water, no seed collection in November & December which is known to be the months with the highest spawning levels. There is also a voluntary agreement by seed collectors to return 10% of seed to the same area.

The enforcement authorities (Sernapesca and Directemar) undertake regular boat-based inspection and monitoring of fishery and seed collection activities. They report a good level of compliance with the regulations. Some fines are administered but licenses are rarely removed. If gear is identified in a non-permitted area or during the closed season, the local (Chiloal) judge is informed and the gear is removed with the judge's permission.

3.5.2 Management of the on-growing phase (the mussel farm)

The management of the on-growing phase is also established under the General Law (part VI) and covers the concessions and licenses required by operators.

- The procedure associated with obtaining permissions involves numerous public agencies: The process begins with an approach to the local harbour master (part of Directemar)
- A technical project proposal is then presented to Sernapesca who refers the case to Subpesca
- Subpesca checks compliance with existing management (the location is not already allocated to another producer, is within an AAA, not a protected area, etc.)
- The project must be submitted to the National Environment Commission (CONAMA), if equal to or greater than 6 hectares and / or maximum projected annual production is equal to or greater than 300 tons of bivalve molluscs
- With outline approval, the applicant must produce a System Environmental Impact Assessment (SEIA)
- If the Environmental Qualification Resolution (CAR) is favorable, Subpesca then issues a licence
- the case is submitted to the Undersecretary of the Nay (Submarine), checked against existing concessions and announced in the official journal.

- Submarine then issue a concession before the local Directemar Captain issues full approval.

The technical report defines the location and extent of farming structures to be installed. For molluscs bivalve cultured in long-line requires a minimum ratio of 1:50, i.e. 1 culture line of 100 m in length for each 5,000 m². Buffer areas between concessions are required; they must be at least 400 m away from existing salmon applications and 200 m away from other bivalve molluscs concessions.

The operators are also obliged to:

- Operate at least 50 percent of the engaged within the first year (counting from the physical delivery of the grant by the Authority Maritime).
- Report monthly to the National Fisheries Service Activities (Supply, harvesting and existence).
- Pay the annual Unified Patent Aquaculture, corresponding to 2 Units Monthly tax per hectare.
- Submit annually Environmental Information Once a year, during the period the crop has a high biomass, (the) holder must record and report on the environmental conditions of its center of culture, which includes a benthic survey.
- Not stop operations for more than 24 consecutive months.
- Each fish farm must have a Contingency Plan for escapees of organisms from culture systems.
- The facility must operate for the same purpose for which permission was granted.
- For crops intended bivalve molluscs production to external markets, the holder must comply with Health Programme Bivalve Molluscs (PSMB).

The operators must comply with many other Regulations such as the Regulation of pests, which *“regulates the transfer and introduction to the aquatic environment aquatic organisms regardless of their stage of development, use, origin or destination, the transport of elements or structures used for farming or maintenance of aquatic species, the cultivation and research on species hydrobiological, and the transformation and processing of aquatic species.”*

The main organization involved delivering aquaculture management is Sernapesca. Sernapesca's Aquaculture Unit, is aimed at fulfilling the following objectives¹:

- Apply the rules governing aquaculture activities, both land or sea waters.
- Monitor, analyze and report those matters technically related to the development of aquaculture and
- Propose actions to promote the harmonious development of the activity.

Aquaculture Sernapesca divided into three work areas:

1. Licensing

The Unit is responsible to inform technically and process the Undersecretary of Fisheries, applications to develop aquaculture activities. Entered for processing each application is assigned a number, which identifies it throughout the process of granting the respective

¹ From www.sernapesca.cl

concession or authorization of aquaculture. Persons wishing to carry out aquaculture activities must apply in writing to the Undersecretary of Fisheries, under the procedure established by the General Law of Fishing and Aquaculture and the Regulation of Concessions.

This unit performs the monitoring, analyzes and reports regarding compliance with technical projects approved by the Undersecretary of Fisheries and constitutes part of the resolution granting the respective concession or authorization of aquaculture. The Unit also keeps track of Aquaculture, analyzes and reports concerning the applicability and effect of existing rules on aquaculture activities.

2. Animal Health

The Animal Health Unit is responsible to manage the programs Prevention, Surveillance and Control of High Risk Diseases affecting aquatic species in the country, whose products are marketed domestically and internationally. The unit applies the rules of Protection, Control and Eradication of High Risk Diseases for Hydrobiological Species (RESA) and supports the country's obligations in respect of animal health of aquatic species to the World Organization for Animal Health (OIE)

3. Environmental

Apply the Environmental Regulation for Aquaculture (RAMA).

The main non-statutory organisation with an involvement in mussel production is Amichile (www.amichile.com), the Association of Mussel Growers Chile. Amichile formed in 1991 and brings together key producers and processors of mussels in Chile. Amichile currently has more than 54 partners, all companies and producers involved and informed which represent over 80% of national production, and production of its partners, estimated at 223,000 tons of fresh mussels for the 2010 season. Amichile is consulted during the drafting of laws and regulations, as well as wider consultation with individual companies including Toralla.

4. Evaluation Procedure

4.1 Assessment Methodologies

The MSC Certification Requirements (MSC CR) version 1.2 was used as the basis of the full assessment. The MSC Full Assessment Reporting Template version 1.2 was used to produce this report. The default assessment tree with modifications for enhanced bivalve fisheries was used for the assessment of the Chilean mussel fishery and suspended culture Toralla S.A. and Cultivos Toralla S.A. as it is an enhanced CAG bivalve fishery based solely on spat collection with translocation.

The assessment tree pre-defined by MSC includes the following modifications to the default assessment tree according to Annex CK of the MSC Certification Requirements. MSC Principle 1 was scored by using the RBF on all seed sources and the retained and by-catch Performance Indicators of principle 2 were not scored at all. The PI Genetic Outcome (1.1.4) was added to evaluate the fishery's impact on the genetic structure of the population by the enhancement activity. All translocation PIs were added to the assessment tree. These include the following PIs. The PI Translocation Outcome (2.6.1) to evaluate the impact of the translocation activity on the surrounding ecosystem, the PI Translocation Management (2.6.2) to evaluate the translocation contingency measures and the PI translocation Information (2.6.3) to evaluate the information quality.

4.2 Evaluation Processes and Techniques

4.2.1 Site Visits

Table 7 shows activities carried out during the site visit

Table 7. On-site visit schedule

Date	Day	Activity
05.03.2012	Monday	Opening meeting Toralla office audit Toralla fishery audit Traceability Team discussions
06.03.2012	Tuesday	Data review in team Planning stakeholder meeting Individual sorting of data/ info Team discussions
07.03.2012	Wednesday	Introduction & presentation to stakeholder group Presentation on RBF RBF exercises Stakeholder meetings Team discussions
08.03.2012	Thursday	Scoring/ setting conditions/ notes for report Team discussions
09.03.2012	Friday	Scoring/ setting conditions/ notes for report Team discussions Closing meeting

4.2.2 Consultations

Stakeholder issues

Verbal representations were provided to the assessment team expressing a range of views, opinions and concerns. The team is of the view that matters raised have been adequately debated and addressed as a part of the scoring process for this fishery, and that none of the issues raised, therefore, require separate attention beyond that represented in this report.

Interview Program

Following the collation of general information on the fishery, a number of meetings with key stakeholders were scheduled by the team to fill in information gaps and to explore and discuss areas of concern.

Meetings were held as follows:

Table 8. Personal meetings that have taken place during the on-site visit.

Date	Duration	Organization	Person/s
06.03.2012	3h	WWF	Cristina Torres and Mauricio Galvez
07.03.2012	5h	Sernapesca Directemar Amichile	Pedro Miranda Pedro Herrera, Gonzalo Castro, Javier Hausdorf & Felipe Zapata Johanna Gonzalez
08.03.2012	2h	Subpesca	Sergio Mesa, Max Montoya, Claudia Javalquinto

Summary of Information Obtained

A number of important points were recorded by the assessment team during the site visit interviews. The assessment team found that all points raised by stakeholders were well documented in documents provided by the client.

4.2.3 Evaluation Techniques

Public Consultation

A total of around 20 stakeholder individuals and organisations having relevant interest in the assessment were identified and consulted during this assessment. The interest of others not appearing on this list was solicited through the postings on the MSC website, and by advertising in:

<http://www.aqua.cl/noticias/index.php?doc=48971>

and in:

<http://www.visionacuicola.cl/articulo.html?ia=1881&t=toralla-s.a.-en-proceso-de-certificacion-msc>.

Initial approaches were made by email and followed up by phone. Issues raised during correspondence were investigated during research and information gathering activities, and during interviews.

Most stakeholders contacted during this exercise either indicated that they had no direct interest in this fishery assessment, or that they had no particular cause for concern with regard to its assessment to the MSC standard.

Process

The MSC is dedicated to promoting “well-managed” and “sustainable” fisheries, and the MSC initiative focuses on identifying such fisheries through means of independent third-party assessments and certification. Once certified, fisheries are awarded the opportunity to utilise an MSC promoted eco-label to gain economic advantages in the marketplace. Through certification and eco-labelling the MSC works to promote and encourage better management of world fisheries, many of which have been suggested to suffer from poor management.

The MSC Principles and Criteria for Sustainable Fisheries form the standard against which the fishery is assessed and are organised in terms of three principles:

- » **MSC Principle 1** - Resource Sustainability
- » **MSC Principle 2** - Ecosystem Sustainability
- » **MSC Principle 3** - Management Systems

The MSC Principles and Criteria provide the overall requirements necessary for certification of a sustainably managed fishery. To facilitate assessment of any given fishery against this standard, these Criteria are further split into Sub-criteria. Sub-criteria represent separate areas of important information (e.g. Sub-criterion 1.1.1. requires a sufficient level of information on the target species and stock, 1.1.2 requires information on the effects of the fishery on the stock and so on). These Sub-criteria, therefore, provide a detailed checklist of factors necessary to meet the MSC Criteria in the same way as the Criteria provide the factors necessary to meet each Principle.

Below each Sub-criterion, individual ‘Performance Indicators’ (PIs) are identified. It is at this level that the performance of the fishery is measured. Altogether, assessment of this fishery against the MSC standard is achieved through measurement of 31 Performance Indicators. The Principles and their supporting Criteria, Sub-criteria and Performance Indicators that have been used by the assessment team to assess this fishery are incorporated into the scoring sheets (**Appendix 1.1**).

Scoring of the attributes of this fishery against the MSC Principles and Criteria involves the following process:

- » Decision to use the MSC Default Assessment Tree contained within the MSC Certification Requirements.
- » Description of the justification as to why a particular score has been given to each sub-criterion
- » Allocation of a score (out of 100) to each Performance Indicator

In order to make the assessment process as clear and transparent as possible, the Scoring Guideposts are presented in the scoring table and describe the level of performance necessary to achieve **100** (represents the level of performance for a Performance Indicator that would be expected in a theoretically ‘perfect’ fishery), **80** (defines the unconditional pass mark for a Performance Indicator for that type of fishery), and **60** (defines the minimum, conditional pass mark for each Performance Indicator for that type of fishery). The

Assessment Tree and Scoring Guideposts for the Toralla S.A. and Cultivos Toralla S.A fishery are shown as **Appendix 1.1** to this report.

Scoring outcomes

There are two, coupled, scoring requirements that constitute the Marine Stewardship Council's minimum threshold for a sustainable fishery:

- » The fishery must obtain a score of 80 or more for each of the MSC's three Principles, based on the weighted average score for all Criteria and Sub-criteria under each Principle.
- » The fishery must obtain a score of 60 or more for each Performance Indicator.

A score below 80 at the Principle level or 60 for any individual Performance Indicator would represent a level of performance that causes the fishery to automatically fail the assessment. A score of 80 or above for all three Principles results in pass.

RBF Use

The RBF was used for MSC principle 1 due to the MSC requirements for the assessment of enhanced bivalve fisheries based solely on spat collection with translocation according to MSC CR v1.2 Annex CK. Stakeholder were informed about the intent to use the RBF on the 17th of January 2012 by the stakeholder notification on the MSC website and additionally by direct emailing to the identified stakeholders on the same day.

RBF Consultation Process Summary

During each of the meeting outline in Table 5 above the assessment team presented the RBF methodology and provided the opportunity to all stakeholders to express themselves in relation to the risk that the fishery pose on each of the outcome PIs. Stakeholders interview were defined by the assessment team as very relevant to this fishery as they were all directly involved in the assessment and/or management of this fishery. Therefore the assessment team used each of the meetings also as an information gathering exercise. The RBF methodology is presented in Appendix 1.2 in detail.

Summary of Information Obtained

Information obtained and discussed was related to the scale (spatial and temporal) and intensity of fisheries exploiting the *Mytilus chilensis* in Chile's Region X. Risk causing activities and the consequence risk level on the productivity of the stock was assessed by using documented information and comments submitted by stakeholders.

Documented information included management measures in placed under the harvest strategy of mussels (see section 3). Stakeholder's comments served to verify correctness of the documented information provided by the client and were used by the team in the assessment of risk.

The process of choosing the most vulnerable subcomponent included 1. Review of all information/documentation submitted to the assessment team, 2. Stakeholder consultation (the SICA method was presented and applied) and 3. the assessment team determination on the most relevant subcomponent and consequence score (based on available information and stakeholders comments).

Summary of Activities and Components Discussed / Evaluated

The SICA method was presented to stakeholders and was used to provide the opportunity to all stakeholders to comment on risk scores. None of the stakeholders determine the risk that the fishery poses on the conservation of the stock as high.

5. Traceability

5.1 Eligibility Date

The actual eligibility date (AED) is the date from which product from the fishery is permitted to bear the MSC Ecolabel which is the date of certification of the fishery.

The chosen AED is 2nd January 2013 which is exactly 6 months prior to publication of the Public Comment Draft Report. This date has been chosen because the fishery is seasonal and there is a temporal restriction. „There is a closed season from the 1st of November to the 31st of December designed to protect spawners“. The AED was chosen starting after this temporal restriction (plus one day to make sure the six months were met).

The fishery already has a traceability system in place which was assessed by the IMO team as adequate. No segregation is required as all the production is included in the unit of certification.

5.2 Traceability within the Fishery

All seed is caught within the UOC in Reloncavi. All seed used by Toralla S.A. and Cultivos Toralla S.A. is approved by Sernapesca. For seed approved by Sernapesca, each catch and all movements are reported to, registered by and controlled by Sernapesca. This registered data on catch and movement is described in the quality manual and can easily be traced and verified via traceability documentation approved by Sernapesca. The majority of the seed is collected by Toralla S.A. and Cultivos Toralla S.A. using their own vessels. In exceptional years, when seed availability is low, a small part may sometimes be bought from other suppliers from within the UOC, again under the same control mechanism of Sernapesca with the same traceability documentation. There is no history or tradition of collecting seed outside of the UOC. Due to the possibility to buy from other suppliers when seed availability is low and the lack of history and tradition to fish outside of the UOC, it is highly unlikely that fishing outside of the UOC would occur. However, it is in theory possible for collectors to fish outside the unit of certification, however, this would not seem very beneficial to the fishery (e.g. longer distance travel) and traceability documentation would show such an event.

Each line has a distinct traceability code which is documented from seed receipt to the grow-out and to final harvest. The seed transport information is registered on a document template provided and controlled by Sernapesca including information such as origin and final destination.

The traceability code identifies the site and location within each site (a list of supplier sites can be found in Table 4 on page 18). The location of the different lines is indicated on maps and can be traced through all transport, grow-out and harvest documentation. Line specifications and hence estimated quantities of harvest are also known per line. Mass balance background data/quantity of mussel in production is informed to Sernapesca (mandatory).

At the grow-out level for this type of production, there is no at sea processing and no use of trans-shipping. Lines are harvested and brought ashore. For the grown mussels from all sites within this UOC only one point of landing at “Muelle” (small pier outside processing) is used. Only in the instance of a storm or ship damage, could the product exceptionally be brought by truck from a different landing site. Therefore, it is highly unlikely that any substitution would occur before or at the point of landing. The tracking and tracing system within the fishery is adequate and an additional separation system is not applicable within the fishery.

5.3 Eligibility to Enter Further Chains of Custody

All product within the UOC is eligible to enter further Chain of Custody and is eligible to carry the MSC ecolabel. All product landed by Toralla S.A. and Cultivos Toralla S.A is eligible to enter Chain of Custody. All landing takes place at Muelle. Chain of Custody starts at the point of entry to the processing plant, which is at the same place as the point of landing. All 13 supplier sites (list of supplier sites can be found in table 4) included in the UOC are owned by Toralla S.A or its subsidiary Cultivos Toralla S.A., therefore, there is no change in ownership until after the Chain of Custody starts at the point of entry to the processing plant. Other mussels from outside the UOC are also received by truck (not by boat at the Muelle landing site), which are kept separate and fall under the COC of the processing plant. The processing plant of Toralla S.A. certified according to the MSC COC Standard Version 3 since 20.11.2012 (IMO-COC-120240). There are effective internal procedures and documents (“Procedimiento de Trazabilidad”, “Procedimientos de procesos”, “Instructivos de procesos”) for separation between MSC and non-MSC-products available.

5.4 Eligibility of Inseparable or Practically Inseparable (IPI) stock(s) to Enter Further Chains of Custody

There is no IPI stock involved in the assessment. Amongst the targeted species chorito (*Mytilus chilensis*), also a small percentage of Giant mussel (*Choromytilus chorus* - Choro zapato) and Ribbed mussel (*Aulacomya ater* - Cholga) can be harvested from the ropes. Prior to buying, the seed ropes are checked for absence or low percentage of foreign species. Due to their different size at that time of the year, they can be selected out visually. Some individuals will remain during grow-out, which are selected out during grading in the processing unit and sold on the local market. The average weight percentage over the past two years was below 1%.

6. Evaluation Results

6.1 Principle Level Scores

Table 9 presents scores at principle level for each of the Units of Certification under assessment.

Table 9. Final Principle Scores

Final Principle Scores	
Principle	Score
Principle 1 – Target Species	80.3
Principle 2 – Ecosystem	85.0
Principle 3 – Management System	80.1

6.2 Summary of Scores

Table 10 shows score given at performance indicator level for each Unit of Certification under assessment.

Table 10. Score at Performance Indicator level

Principle	Component	PI No.	Performance Indicator (PI)	Score
1	Outcome	1.1.1	Stock status	81.6
		1.1.2	Reference points	80.0
		1.1.3	Stock rebuilding	NA
		1.1.4	Genetic outcome	80.0
	Management	1.2.1	Harvest strategy	80.0
		1.2.2	Harvest control rules & tools	80.0
		1.2.3	Information & monitoring	80.0
		1.2.4	Assessment of stock status	80.0
2	Retained species	2.1.1	Outcome	NA
		2.1.2	Management	NA
		2.1.3	Information	NA
	Bycatch species	2.2.1	Outcome	NA
		2.2.2	Management	NA
		2.2.3	Information	NA
	ETP species	2.3.1	Outcome	95.0
		2.3.2	Management	80.0
		2.3.3	Information	80.0
	Habitats	2.4.1	Outcome	90.0
		2.4.2	Management	100.0
		2.4.3	Information	80.0
	Ecosystem	2.5.1	Outcome	80.0

	Translocation	2.5.2	Management	65.0
		2.5.3	Information	75.0
		2.6.1	Outcome	100.0
		2.6.2	Management	95.0
		2.6.3	Information	80.0
3	Governance and policy	3.1.1	Legal & customary framework	90.0
		3.1.2	Consultation, roles & responsibilities	85.0
		3.1.3	Long term objectives	90.0
		3.1.4	Incentives for sustainable fishing	80.0
	Fishery specific management system	3.2.1	Fishery specific objectives	70.0
		3.2.2	Decision making processes	75.0
		3.2.3	Compliance & enforcement	95.0
		3.2.4	Research plan	60.0
		3.2.5	Management performance evaluation	70.0

6.3 Summary of Conditions

Table 11 shows summary of conditions raised under principle 2 and principle 3.

Table 11. Summary of conditions of certification

Condition number	Condition	Performance Indicator
1	Develop a partial strategy that take into account available information about the element of the ecosystem, based on carrying capacity for example, that expects to restrain the impact on the ecosystem, work based on plausible arguments and demonstrate with same evidence that the measures will be implemented successfully.	2.5.2
2	It should develop a research plan that define the variables that must be collected to detect any increase in risk level (e.g., due to changes in the outcome indicator scores or the operation of the fishery or the effectiveness of the measures).	2.5.3
3	Clear, specific objectives designed to achieve the outcomes expressed by MSC's Principles 1 and 2 need to be developed.	3.2.1
4	A mussel management plan is required that establishes research and management responses in a strategic and comprehensive manner. This would provide stakeholders with explanations of actions or non-action resulting from research or review activities.	3.2.2
5	A research plan that addresses the information needs of management needs to be developed	3.2.4
6	An effective and timely review of the fishery-specific management system needs to be developed.	3.2.5

6.3.1 Recommendations

There are no recommendations for this fishery.

6.4 Determination, Formal Conclusion and Agreement

The fishery attained a score of 80 or more against each of the MSC principles and did not score less than 60 against any MSC criteria.

It is therefore determined that the Toralla S.A. and Cultivos Toralla S.A. catch and grow mussel **fishery should be certified according to the Marine Stewardship Council Principles and Criteria for Sustainable Fisheries.**

Following this decision by the assessment team, and review by stakeholders and peer-reviewers, the determination will be presented to IMO's decision making entity that this fishery has passed its assessment and should be certified.

The fishery assessed has achieved a score above 80 against each of the three MSC principles and therefore, IMO makes the decision that the Chilean mussel fishery and suspended culture Toralla S.A. and Cultivos Toralla S.A. is certified according to the Marine Stewardship Council Principles and Criteria for Sustainable Fisheries.

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Appendices

Appendix 1 Scoring and Rationales

Appendix 1.1 Performance Indicator Scores and Rationale

Evaluation Table PI 1.1.1

PI 1.1.1		The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing		
SG	Issue	Met? (Y/N)	Justification/Rationale	
60	a	NA	It is likely that the stock is above the point where recruitment would be impaired.	
			RBF used (see SICA and PSA evaluation in Appendix 1.2)	
80	a	NA	It is highly likely that the stock is above the point where recruitment would be impaired.	
			RBF used (see SICA and PSA evaluation in Appendix 1.2)	
	b	NA	The stock is at or fluctuating around its target reference point.	
			RBF used (see SICA and PSA evaluation in Appendix 1.2)	
100	a	NA	There is a high degree of certainty that the stock is above the point where recruitment would be impaired.	
			RBF used (see SICA and PSA evaluation in Appendix 1.2)	
	b	NA	There is a high degree of certainty that the stock has been fluctuating around its target reference point, or has been above its target reference point, over recent years .	
			RBF used (see SICA and PSA evaluation in Appendix 1.2)	
References				
Stock Status relative to Reference Points				
		Type of reference point	Value of reference point	Current stock status relative to reference point
Target reference point		NA (RBF fishery)	NA (RBF fishery)	NA (RBF fishery)
Limit reference point		NA (RBF fishery)	NA (RBF fishery)	NA (RBF fishery)
OVERALL PERFORMANCE INDICATOR SCORE:				81.6
CONDITION NUMBER (if relevant):				NA

Evaluation Table: PI 1.1.2

PI 1.1.2		Limit and target reference points are appropriate for the stock	
SG	Issue	Met? (Y/N)	Justification/Rationale
60	a	NA	Generic limit and target reference points are based on justifiable and reasonable practice appropriate for the species category.
			RBF used. Therefore and 80 score is awarded by default
80	a	NA	Reference points are appropriate for the stock and can be estimated.
			RBF used. Therefore and 80 score is awarded by default
	b	NA	The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity.
			RBF used. Therefore and 80 score is awarded by default
	c	NA	The target reference point is such that the stock is maintained at a level consistent with B_{MSY} or some measure or surrogate with similar intent or outcome.
			RBF used. Therefore and 80 score is awarded by default
	d	NA	Key low trophic level species, the target reference point takes into account the ecological role of the stock.
			RBF used. Therefore and 80 score is awarded by default
100	b	NA	The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity following consideration of precautionary issues .
			RBF used. Therefore and 80 score is awarded by default
	c	NA	The target reference point is such that the stock is maintained at a level consistent with B_{MSY} or some measure or surrogate with similar intent or outcome, or a higher level , and takes into account relevant precautionary issues such as the ecological role of the stock with a high degree of certainty .
References		NA	
OVERALL PERFORMANCE INDICATOR SCORE:			80
CONDITION NUMBER (if relevant):			NA

Evaluation Table: PI 1.1.3

PI 1.1.3		Where the stock is depleted, there is evidence of stock rebuilding	
SG	Issue	Met? (Y/N)	Justification/Rationale
60	a	NA	Where stocks are depleted rebuilding strategies which have a reasonable expectation of success are in place.
			RBF used. Therefore this PI is not scored
	b	NA	A rebuilding timeframe is specified for the depleted stock that is the shorter of 30 years or 3 times its generation time. For cases where 3 generations is less than 5 years, the rebuilding timeframe is up to 5 years.
			RBF used. Therefore this PI is not scored
	c	NA	Monitoring is in place to determine whether they are effective in rebuilding the stock within a specified timeframe.
			RBF used. Therefore this PI is not scored
80	a	NA	Where stocks are depleted rebuilding strategies are in place.
			RBF used. Therefore this PI is not scored
	b	NA	A rebuilding timeframe is specified for the depleted stock that is the shorter of 20 years or 2 times its generation time . For cases where 2 generations is less than 5 years, the rebuilding timeframe is up to 5 years.
			RBF used. Therefore this PI is not scored
	c	NA	There is evidence that they are rebuilding stocks, or it is highly likely based on simulation modelling or previous performance that they will be able to rebuild the stock within a specified timeframe.
			RBF used. Therefore this PI is not scored
100	a	NA	Where stocks are depleted, strategies are demonstrated to be rebuilding stocks continuously and there is strong evidence that rebuilding will be complete within the specified timeframe .
			RBF used. Therefore this PI is not scored
	b	NA	The shortest practicable rebuilding timeframe is specified which does not exceed one generation time for the depleted stock.
			RBF used. Therefore this PI is not scored
References		NA	
OVERALL PERFORMANCE INDICATOR SCORE:			NA
CONDITION NUMBER (if relevant):			NA

Evaluation Table: PI 1.1.4

PI 1.1.4		The fishery has negligible discernible impact on the genetic structure of the population.	
SG	Issue	Met? (Y/N)	Justification/Rationale
60	a	Y	The fishery is unlikely to impact genetic structure of wild populations to a point where there would be serious or irreversible harm.
			<i>Mytilus chilensis</i> is characterised for a dispersing planktonic larvae phase and is environmentally adapted to a wide range temperature and salinity. Mussel larvae can travel within the X Region for a period of 3-4 weeks and can settle in polyhaline to mesohaline environments. Therefore fishery activities related to movement od seed between the X region is unlikely to impact the genetic structure of the wild population
80	a	Y	The fishery is highly unlikely to impact genetic structure of wild populations to a point where there would be serious or irreversible harm.
			<i>Mytilus chilensis</i> is characterised for a dispersing planktonic larvae phase and is environmentally adapted to a wide range temperature and salinity. Mussel larvae can travel within the X Region for a period of 3-4 weeks and can settle in polyhaline to mesohaline environments. Therefore fishery activities related to movement od seed between the X region is highly unlikely to impact the genetic structure of the wild population
100	a	N	An independent peer-reviewed scientific assessment confirms with a high degree of certainty that there are no risks to the genetic structure of the wild population associated with the enhancement activity.
			There is no peer review scientific assessment that confirms that there is no risk to the genetic structure of the wild population associated with the enhancement activity. Therefore this issue is not met
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OVERALL PERFORMANCE INDICATOR SCORE:			80
CONDITION NUMBER (if relevant):			NA

Evaluation Table: PI 1.2.1

PI 1.2.1		There is a robust and precautionary harvest strategy in place	
SG	Issue	Met? (Y/N)	Justification/Rationale
60	a	Y	The harvest strategy is expected to achieve stock management objectives reflected in the target and limit reference points.
			<p>The <i>Mytilus chilensis</i> fishery is not managed using biological based reference points. Seed collectors and adult harvest by diving are the two ways of exploiting the mussel stock of the X Region. The fishery is managed with the expectation that the fishery does not pose any risk to the productivity of the wild stock. Management measures include:</p> <p>-Minimum landing size of 50 mm.</p> <p>-Close season: Seed collection and harvest by diving is close from the 1st of November to the 31st of Dec with the aim of protecting spawners. In AMERBs seed collection can occur for a maximum of 8 months. Outside AMERBs and designated aquaculture centers (i.e. areas of low importance) seed collection can occur for a maximum of 6 months.</p> <p>-Spatial management measures: Seed collectors can occupy a maximum of 40% of the overall areas in AMERBs. In aquaculture centers seed collectors cannot overlap with natural beds.</p> <p>The above management measures are expected to ensure that the fishery does not pose a risk to the productivity of the stock in RBF terms as it limits availability and encounterability.</p>
	b	Y	The harvest strategy is likely to work based on prior experience or plausible argument.
			Prior experience indicates that the fishery is not posing a risk to the productivity of the stock. Mussel production levels show an increasing trend over the years.
	c	Y	Monitoring is in place that is expected to determine whether the harvest strategy is working.
			Monitoring is carried out in the AMERBs and aquaculture centers. The number of locations fished and annual monitoring result demonstrate that the harvest strategy is working in terms of protecting the productivity of the stock.
80	a	Y	The harvest strategy is responsive to the state of the stock and the elements of the harvest strategy work together towards achieving management objectives reflected in the target and limit reference points.
			<p>The <i>Mytilus chilensis</i> fishery is not managed using biological based reference points. Seed collectors and adult harvest by diving are the two ways of exploiting the mussel stock of the X Region. A number of management measures are in place working together toward achieving the objective of not posing a risk of impact on the productivity of the wild stock. Management measures include:</p> <p>-Minimum landing size of 50 mm. Although the MLS is similar to the size at maturity it is expected that in some areas (where growth rate is high) spawning will occur before harvesting.</p> <p>-Close season: Seed collection and harvest by diving is close from the 1st of November to the 31st of Dec with the aim of protecting spawners. In AMERBs seed collection can occur for a maximum of 8 months. Outside</p>

PI 1.2.1		There is a robust and precautionary harvest strategy in place	
SG	Issue	Met? (Y/N)	Justification/Rationale
			<p>AMERBs and designated aquaculture centers (i.e. areas of low importance) seed collection can occur for a maximum of 6 months</p> <p>-Spatial management measures: Seed collectors can occupy a maximum of 40% of the overall areas in AMERBs. In aquaculture centers seed collectors cannot overlap with natural beds.</p> <p>-Animal health requirements determine that adult wild beds are exploited at very low levels (78 tones has been recorded as the highest catch by divers) as these regulations do not allow adult beds to be commercialized for the export market (main market for <i>Mytilus chilesis</i>). Therefore the productivity of adult wild beds is unaffected by fishing.</p> <p>The above management measures work together to ensure that the fishery does not pose a risk to the productivity of the stock.</p>
	b	Y	<p>The harvest strategy may not have been fully tested but monitoring is in place and evidence exists that it is achieving its objectives.</p> <p>The harvest strategy has not been fully tested but monitoring indicates the objectives of maintaining the adult stock biomass protected are achieved. This is demonstrated by the license system that is used and evidences that IUU does not occur in this fishery.</p>
100	a	N	<p>The harvest strategy is responsive to the state of the stock and is designed to achieve stock management objectives reflected in the target and limit reference points.</p> <p>The set of management measures described above have not being designed explicitly to protect the productivity of wild beds. Main management measures in place for mussel farming are designed to minimise the impact on habitats (organic enrichment). Therefore this issue is not met.</p>
	b	N	<p>The performance of the harvest strategy has been fully evaluated and evidence exists to show that it is achieving its objectives including being clearly able to maintain stocks at target levels.</p> <p>The performance of the harvest strategy has not been fully evaluated. Therefore this issue is not met</p>
	d	N	<p>The harvest strategy is periodically reviewed and improved as necessary.</p> <p>Management measures in place under which the exploitation of mussel seed must operate have not been reviewed since implemented. Therefore this issue is not met</p>
References			<p>General Law: "La Ley N° 18.892, y Sus Modificaciones, Ley General De Pesca Y Acuicultura."</p> <p>Norambuena, R. 2008. Normativa aplicada al cultivo de bivalvos en Chile. En A. Lovatelli, A. Farias e I. Uriarte (eds). Estado actual del cultivo y manejo de moluscos bivalvos y su proyeccion futura: factores que afectan su sustentabilidad en America Latina. Taller Tecnico Regional de la FAO. 20–24 de agosto de 2007, Puerto Montt, Chile. <i>FAO Actas de Pesca y Acuicultura</i>. No. 12. Roma, FAO. pp. 199–204.</p> <p>Politica Nacional Acuicultura, 2003</p> <p>Paola Bravo Barnes, Mares Chile Ltda. Presentation: "Area De Manejo Y Explotacion De Recursos Bentonicos" (AMERB)</p> <p>Centro de Investigación, Desarrollo y Capacitación en Ciencias del Mar</p>

PI 1.2.1		There is a robust and precautionary harvest strategy in place	
SG	Issue	Met? (Y/N)	Justification/Rationale
			Encargada Unidad Recursos Bentónicos REGLAMENTO SOBRE AREAS DE MANEJO Y EXPLOTACION DE RECURSOS BENTONICOS. Num 355/1995
OVERALL PERFORMANCE INDICATOR SCORE:			80
CONDITION NUMBER (if relevant):			NA

Evaluation Table: PI 1.2.2

PI 1.2.2		There are well defined and effective harvest control rules in place	
SG	Issue	Met? (Y/N)	Justification/Rationale
60	a	Y	<p>Generally understood harvest rules are in place that are consistent with the harvest strategy and which act to reduce the exploitation rate as limit reference points are approached.</p> <p>Well defined harvest control rules are in place, which are precautionary and act to avoid the risk of encounterability and availability to levels that would risk over-exploitation.</p> <p>In AMERBs fishers must present a management plan for the exploitation of mussel seed which must include spatial and temporal conservation measures:</p> <p><u>Spatial restrictions</u>: A maximum of 40% of the area can be used by seed collectors (D.S. N°355/95 of RAMERB).</p> <p><u>Temporal restrictions</u>: Seed collectors can be deployed for a maximum of eight months per year (D.S. N° 355/95 of RAMERB). There is a closed season from the 1st of November to the 31st of December designed to protect spawners.</p> <p>A proportion of the seed collected should be returned to the seabed in order to protect the mussel population (D.S. N°355/95 of RAMERB). Although the proportion to be returned is not defined under regulation a voluntary 10% of seed to be returned is being agreed under current management.</p> <p>Additional regulation has been established in areas not under the AMERB system to cover all seed collection under modification 297/2005 of the General Law. This establishes similar management measures to avoid over-exploitation including licensing seed collectors and the same <u>temporal restrictions</u>. As in TURFs areas there is also a voluntary agreement by seed collectors to return 10% of seed to the seabed.</p>
	c	Y	<p>There is some evidence that tools used to implement harvest control rules are appropriate and effective in controlling exploitation.</p> <p>License requirement and closed seasons are the main management tool are appropriate and effective in achieving exploitation levels in aquaculture centers that do not risk over-exploitation.</p> <p>In AMERBs, management tools include harvest control rules (spatial and temporal restrictions,) that are appropriate and effective in achieving exploitation levels that do not risk over-exploitation of wild seed.</p>
80	a	Y	<p>Well defined harvest control rules are in place that are consistent with the harvest strategy and ensure that the exploitation rate is reduced as limit reference points are approached.</p> <p>Well defined harvest control rules are in place.</p> <p>In AMERBs fishers must present a management plan for the exploitation of mussel seed which must include spatial and temporal conservation measures as described above. Additional regulations are in place requiring licenses for collectors outside AMERBs.</p> <p>The above management measures are expected to ensure that the fishery does not pose a risk to the productivity of the stock in RBF terms as it limits</p>

PI 1.2.2		There are well defined and effective harvest control rules in place	
SG	Issue	Met? (Y/N)	Justification/Rationale
			availability and encounterability.
	b	Y	The selection of the harvest control rules takes into account the main uncertainties. Uncertainties related to the impact that seed collection may have on the wild mussel population are accounted for before issuing a license for the exploitation of mussel seed. Mussel sites cannot overlap with natural beds in aquaculture centres and must occupy a maximum of 40% of the AMERB.
	c	Y	Available evidence indicates that the tools in use are appropriate and effective in achieving the exploitation levels required under the harvest control rules. Licenses are the main management tools – this is appropriate and proven to be effective in achieving desired exploitation levels in aquaculture centers. In AMERBs, the AMERBS as a management tool include a harvest control rules (spatial and temporal restrictions, see PI 1.2.1) that are appropriate and effective in achieving desired exploitation levels.
	100	b	N The design of the harvest control rules takes into account a wide range of uncertainties. The design of harvest control rules does not take a wide range of uncertainty. Management measures in place are working together to avoid a risk of impact on the productivity of the wild population. However, to account for a wide range of uncertainty production limits by license should be included as a condition of licence. Therefore this issue was not awarded.
	c	Y	Evidence clearly shows that the tools in use are effective in achieving the exploitation levels required under the harvest control rules. The license is the tool used to control exploitation rates. This tool is appropriate and effective as there is a good monitoring and control system in place and IUU is not an issue of concern.
References		<p>General Law: “La Ley N° 18.892, y Sus Modificaciones, Ley General De Pesca Y Acuicultura.”</p> <p>Norambuena, R. 2008. Normativa aplicada al cultivo de bivalvos en Chile. En A. Lovatelli, A. Farias e I. Uriarte (eds). Estado actual del cultivo y manejo de moluscos bivalvos y su proyeccion futura: factores que afectan su sustentabilidad en America Latina. Taller Tecnico Regional de la FAO. 20–24 de agosto de 2007, Puerto Montt, Chile. <i>FAO Actas de Pesca y Acuicultura</i>. No. 12. Roma, FAO. pp. 199–204.</p> <p>Politica Nacional Acuicultura, 2003</p> <p>Paola Bravo Barnes, Mares Chile Ltda. Presentation: “Area De Manejo Y Explotacion De Recursos Bentonicos” (AMERB) Centro de Investigación, Desarrollo y Capacitación en Ciencias del Mar Encargada Unidad Recursos Bentónicos</p> <p>REGLAMENTO SOBRE AREAS DE MANEJO Y EXPLOTACION DE RECURSOS BENTONICOS. Num 355/1995</p>	
OVERALL PERFORMANCE INDICATOR SCORE:			90
CONDITION NUMBER (if relevant):			NA

Evaluation Table: PI 1.2.3

PI 1.2.3		Relevant information is collected to support the harvest strategy	
SG	Issue	Met? (Y/N)	Justification/Rationale
60	a	Y	Some relevant information related to stock structure, stock productivity and fleet composition is available to support the harvest strategy.
			Information on the biology of mussels is sufficient to support the harvest strategy. Seed collection (site location, number of licenses) is well understood by management authorities and is well monitored.
	b	Y	Stock abundance and fishery removals are monitored and at least one indicator is available and monitored with sufficient frequency to support the harvest control rule.
			Stock removals are well monitored. All management rules in place in aquaculture centres and AMERBs are monitored by SERNAPESCA (Inspection body)
80	a	Y	Sufficient relevant information related to stock structure, stock productivity, fleet composition and other data is available to support the harvest strategy.
			Information on the biology of mussels is sufficient to support the harvest strategy. Seed collection (site location, number of licenses) is well understood by management authorities and is well monitored.
	b	Y	Stock abundance and fishery removals are regularly monitored at a level of accuracy and coverage consistent with the harvest control rule , and one or more indicators are available and monitored with sufficient frequency to support the harvest control rule.
			Stock removals are well monitored. All management rules in place in aquaculture centers and AMERBs are monitored by SERNAPESCA (Inspection body)
	c	Y	There is good information on all other fishery removals from the stock.
			There is good information on seed collected within AMERBs as they are sold to aquaculture centres for on-growing and all mussel production at aquaculture canterers are well recorded.
100	a	N	A comprehensive range of information (on stock structure, stock productivity, fleet composition, stock abundance, fishery removals and other information such as environmental information), including some that may not be directly related to the current harvest strategy, is available.
			This issue is not met. Data on biological parameters used for management (e.g. Minimum landing size) are dated and not considered comprehensive. Spatial variability in biological parameters (e.g. growth, size at maturity) are not used by management.
	b	N	All information required by the harvest control rule is monitored with high frequency and a high degree of certainty, and there is a good understanding of inherent uncertainties in the information [data] and the robustness of assessment and management to this uncertainty.
			This issue is not met as the landings by divers, although small, are not monitored with high frequency and high degree of certainty.
References		General Law: "La Ley Nº 18.892, y Sus Modificaciones, Ley General De	

13 A MSC F Full assessment Toralla S.A. 20.3.10 PCR page 62 of 160	Version 1 05.2012
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PI 1.2.3		Relevant information is collected to support the harvest strategy	
SG	Issue	Met? (Y/N)	Justification/Rationale
			<p>Pesca Y Acuicultura.”</p> <p>Norambuena, R. 2008. Normativa aplicada al cultivo de bivalvos en Chile. En A. Lovatelli, A. Farias e I. Uriarte (eds). Estado actual del cultivo y manejo de moluscos bivalvos y su proyeccion futura: factores que afectan su sustentabilidad en America Latina. Taller Tecnico Regional de la FAO. 20–24 de agosto de 2007, Puerto Montt, Chile. <i>FAO Actas de Pesca y Acuicultura</i>. No. 12. Roma, FAO. pp. 199–204.</p> <p>Politica Nacional Acuicultura, 2003</p> <p>Paola Bravo Barnes, Mares Chile Ltda. Presentation: “Area De Manejo Y Explotacion De Recursos Bentonicos” (AMERB) Centro de Investigación, Desarrollo y Capacitación en Ciencias del Mar Encargada Unidad Recursos Bentónicos</p> <p>REGLAMENTO SOBRE AREAS DE MANEJO Y EXPLOTACION DE RECURSOS BENTONICOS. Num 355/1995</p>
OVERALL PERFORMANCE INDICATOR SCORE:			80
CONDITION NUMBER (if relevant):			NA

Evaluation Table: PI 1.2.4

PI 1.2.4		There is an adequate assessment of the stock status	
SG	Issue	Met? (Y/N)	Justification/Rationale
60	b	NA	The assessment estimates stock status relative to reference points.
			RBF used. Therefore and 80 score is awarded by default
	c	NA	The assessment identifies major sources of uncertainty.
			RBF used. Therefore and 80 score is awarded by default
80	a	NA	The assessment is appropriate for the stock and for the harvest control rule.
			RBF used. Therefore and 80 score is awarded by default
	c	NA	The assessment takes uncertainty into account .
			RBF used. Therefore and 80 score is awarded by default
	e	NA	The assessment of stock status is subject to peer review.
			RBF used. Therefore and 80 score is awarded by default
100	a	NA	The assessment is appropriate for the stock and for the harvest control rule and takes into account the major features relevant to the biology of the species and the nature of the fishery.
			RBF used. Therefore and 80 score is awarded by default
	c	NA	The assessment takes into account uncertainty and is evaluating stock status relative to reference points in a probabilistic way.
			RBF used. Therefore and 80 score is awarded by default
	d	NA	The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored.
			RBF used. Therefore and 80 score is awarded by default
	e	NA	The assessment has been internally and externally peer reviewed.
			RBF used. Therefore and 80 score is awarded by default
References			
OVERALL PERFORMANCE INDICATOR SCORE:			80
CONDITION NUMBER (if relevant):			NA

Evaluation Table: PI 2.3.1

PI 2.3.1		The fishery meets national and international requirements for the protection of ETP species The fishery does not pose a risk of serious or irreversible harm to ETP species and does not hinder recovery of ETP species	
SG	Issue	Met? (Y/N)	Justification/Rationale
60	a	Y	Known effects of the fishery are likely to be within limits of national and international requirements for protection of ETP species.
			The known effects are delimited by the Ministry of Environment and the rules of Subpesca whom protect the ETP species that are involve with the fishery.
	b	Y	Known direct effects are unlikely to create unacceptable impacts to ETP species.
			There are not known direct effect of the fishery on the ETP species listed by Sernapesca and regulated by Subpesca.
80	a	Y	The effects of the fishery are known and are highly likely to be within limits of national and international requirements for protection of ETP species.
			Chile is part of CITES Agreement since 1975. But the ETP species are also protected by the General Low of Fisheries and Aquaculture.
	b	Y	Direct effects are highly unlikely to create unacceptable impacts to ETP species.
			Because there are not known direct effect of the fishery on the ETP species listed by Sernapesca and regulated by Subpesca.
	c	Y	Indirect effects have been considered and are thought to be unlikely to create unacceptable impacts.
			There are known indirect effects reported by Ribeiro et al (2006, 2007) on the behaviour of dolphins which will be discuss in PL2.3.2
100	a	Y	There is a high degree of certainty that the effects of the fishery are within limits of national and international requirements for protection of ETP species.
			There is a National Strategy announced by the Ministry of Environment involving the National biodiversity. On the other hand, the Subsecretary of Fisheries focuses on marine areas and , has determined different rules under the General Fiheries and Aquaculture Low 18.892, which protects the ETP species listed in international agreements which Chile has subscribed. In this sense, Chile is part of the CITES Agreement since 1975.
	b	Y	There is a high degree of confidence that there are no significant detrimental direct effects of the fishery on ETP species.
			With the Declaration of Environmental Impact the fishery accepts and declares the compromises in protecting ETP species within their activities. This DEI (DIA in Spanish) has to be submitted to the Ministry of Environment when a company is starting an aquaculture activity or changing the technical project to increase production or the production area. The Ministry forwards this document for review to the different Marine authorities such as Subpesca, DGTM y MM (Army), Ministry of Agriculture, Tourism, etc. The authority involved in the protection of ETPs is Subpesca. The DE (MINECON, Ministry of Economy) N° 765/2004 protects the Common Sea Lion and DE (MINECON) 135/2005 prohibits catching protected fish, marine mammals, birds and aquatic reptiles.
	c	N	There is a high degree of confidence that there are no significant detrimental indirect effects of the fishery on ETP species.

			There is no recorded information about the status of the ETP species available showing the results of the application of the regulation which was announced before.
	References		<ul style="list-style-type: none"> a) Ley general de Pesca y Acuicultura (LGPA). Protección de especies marinas. b) Estrategia Nacional de Biodiversidad. CONAMA 2003. c) Evaluación del desempeño ambiental. Conservación de la naturaleza y biodiversidad biológica. CEPAL/OCDE d) Marco Legal Relativo a la conservación y uso sustentable de aves, mamíferos y reptiles marinos de Chile. Estud. Oceanolog. 18: 5-12, 1999.
OVERALL PERFORMANCE INDICATOR SCORE:			95
CONDITION NUMBER (if relevant):			NA

Evaluation Table: PI 2.3.2

PI 2.3.2		<p>The fishery has in place precautionary management strategies designed to:</p> <ul style="list-style-type: none"> • Meet national and international requirements; • Ensure the fishery does not pose a risk of serious harm to ETP species; • Ensure the fishery does not hinder recovery of ETP species; and • Minimise mortality of ETP species. 	
SG	Issue	Met? (Y/N)	Justification/Rationale
60	a	Y	There are measures in place that minimise mortality, and are expected to be highly likely to achieve national and international requirements for the protection of ETP species.
			There are measures in place. Subpesca, dictated the DE(MINECON, Ministry of Economy) N° 765/2004 to protect Common Sea lion, and DE (MINECON) 135/2005 that forbidden fish and caught marine mammals, birds and aquatic reptiles.
	b	Y	The measures are considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/species).
			The measure is considered working on information given by Sernapesca and the Maritime authority. These authorities have not records of increase mortality of sea lion, dolphins or birds products of the fishery.
80	a	Y	There is a strategy in place for managing the fishery's impact on ETP species, including measures to minimise mortality that is designed to be highly likely to achieve national and international requirements for the protection of ETP species.
			In this sense, SubPesca has regulated the protection of marine ETPs species, where the listed species are recognised by national international agreements (CITES).
			Sernapesca, which is the authority that applies the rules, in its web maintained a list with the marine ETPs and its status.
	b	Y	There is an objective basis for confidence that the strategy will work, based on information directly about the fishery and/or the species involved.
			The farmer present the DIA or DEI to the Ministry of Environment where they take the compromise of protecting the ETP species, and any event related some accident should be declare to Sernapesca and Maritime authority.
	c	Y	There is evidence that the strategy is being implemented successfully.
			<p>Subpesca has in place different rules protecting the ETPs. There are not claims or evidence that mortalities have increased declared to Sernapesca or to DIRECTEMAR.</p> <p>Even thought, WWF presented some scientific reports where suggested that this fishery indirectly could impact the dolphins behaviour (Ribeiro et al, 2005, Watson-Capp and Mann, 2004; Ribeiro et al, 2007). These reports also indicated that activities like mussel farming could modify the chemical water column structure, as well as the benthic parameters impacting on dolphins developments.</p> <p>So, these studies</p> <p>a. Are not concluding about the impact of the fishery on the behaviour of dolphins, because they are mainly in shallows areas (5-10m depth) near to the shore (<250m). The fishery need more than 25m for a well development of the farming, and Toralla has its farm most of them over</p>

PI 2.3.2		The fishery has in place precautionary management strategies designed to: <ul style="list-style-type: none"> • Meet national and international requirements; • Ensure the fishery does not pose a risk of serious harm to ETP species; • Ensure the fishery does not hinder recovery of ETP species; and • Minimise mortality of ETP species. 	
SG	Issue	Met? (Y/N)	Justification/Rationale
			<p>50m depth.</p> <p>b. The studies of Ribeiro et al (2004, 2007) done in Yaldad, a shallow bay (30m as a maximum depth), south of Chiloé Island. One of them (2004) concluded that boats affected its behaviour, while the other study was carried out on 2002, but was published on 2007, shows that the animals selected their environment mainly near to river mouth and stream, shallow waters, but during foraging the animals prefer areas near to mussel farming lines. The authors suggest Chilean dolphin might be finding food opportunistically. The main negative impact pointed out by another study done in pearl oyster farming in New Zealand is loss of space. Then, indirectly presume that this might be the case with the behaviour of Chilean dolphin in Yaldad bay.</p> <p>c. The studies published on 2007, by Ribeiro et al, do not actualize the information related to the changes that fishery has experimented as environmental rules and strict regulation that the fishery follows for exporting mussel to the EC, as PSMB which demand high standards of microbiology, heavy metals, and lacks of species causing red tide.</p> <p>d. There is no information about contamination related to this fishery. Since 2004 until 2009 Subpesca was applying the RAMA or environmental procedures for determine Aquaculture impacts, or Environmental Informs (INFAs) which were presented annually to Subsecretary. During this period, the mussel farming as aquaculture activity had aerobic condition (>95% of the total activity), which was taking into account by the authorities for changing the environmental regulation to this activity, which by RE 3612/2009 (Subpesca) request INFAs every 2 years. Toraya has presented INFAs Reports, annually until 2009, and every 2 years up date, with aerobic results. This information permit suggests that the fishery is not affecting neither the water structure column nor the benthic area that might affect the dolphin behaviour.</p>
100	a	N	There is a comprehensive strategy in place for managing the fishery's impact on ETP species, including measures to minimise mortality that is designed to achieve above national and international requirements for the protection of ETP species.
			The strategy in place is not fully comprehensive. There are measures to achieve the national and international requirements for the protection of ETPs, but is not complete in terms of procedures.
	b	N	The strategy is mainly based on information directly about the fishery and/or species involved, and a quantitative analysis supports high confidence that the strategy will work.
			There is no quantitative analysis the data collected by the authorities involves.
	c	N	There is clear evidence that the strategy is being implemented successfully.
			The rules that protect ETP species are respected by the fishery, but there are not a clear evidence that the strategy is being implemented successfully such as technical reports, or scientific documents.
	d	N	There is evidence that the strategy is achieving its objective.
			According to the information given by Sernapesca and Maritime authority, the objective is achieving, but there is not strong information to support this issue.

PI 2.3.2			The fishery has in place precautionary management strategies designed to: <ul style="list-style-type: none"> • Meet national and international requirements; • Ensure the fishery does not pose a risk of serious harm to ETP species; • Ensure the fishery does not hinder recovery of ETP species; and • Minimise mortality of ETP species.
SG	Issue	Met? (Y/N)	Justification/Rationale
References			<ul style="list-style-type: none"> - Ribeiro, S.; Viddi, F.A.; Freitas, T.R.O. 2005. Behaviour responses of Chilean dolphin (<i>Cephalorhynchus eutropia</i>) to boats, Yaldad Bay, Southern Chile. <i>Aquatic Mammals</i> 2005, 31 (2): 234-242. - Ribeiro, S.; Viddi, F.A.; Cordeiro, J.L.; Freitas, T.R.O. 2007. Fine Scale Habitat selection of Chilean dolphin (<i>Cephalorhynchus eutropia</i>): Interaction with aquaculture activities in southern Chiloé Island, Chile. <i>J. Mar. Biol. Ass. U.K.</i> (2007), 87:119-128. - Subsecretaría de Pesca, 2009. Resolución Exenta 3612.
OVERALL PERFORMANCE INDICATOR SCORE:			80
CONDITION NUMBER (if relevant):			NA

Evaluation Table: PI 2.3.3

PI 2.3.3		<p>Relevant information is collected to support the management of fishery impacts on ETP species including:</p> <ul style="list-style-type: none"> • Information for the development of the management strategy; • Information to assess the effectiveness of the management strategy; and • Information to determine the outcome status of ETP species. 	
SG	Issue	Met? (Y/N)	Justification/Rationale
60	a	Y	Information is sufficient to qualitatively estimate the fishery related mortality of ETP species.
			ETP species involved in the fishery are Sea lion, birds and mammals like dolphins. The fishery has not direct effect on this ETP then is not causing mortality.
	b	Y	Information is adequate to broadly understand the impact of the fishery on ETP species.
			There is research done dealing with dolphins Ribeiro et al (op.cit) that suggest the fishery might have indirect effect on the behaviour of these ETPs but are not concluding.
	c	Y	Information is adequate to support measures to manage the impacts on ETP species.
			There are scientific data such as the Ribeiro et al (op.cit), and chemical and physical data of the water body as well as the information about the structure of the sediment (CIMAR Fiordos, 1-10, INFAs) which demonstrate that there are contamination caused by fishery that is affecting the ETP species related.
80	a	Y	Sufficient data are available to allow fishery related mortality and the impact of fishing to be quantitatively estimated for ETP species.
			The information shows the fishery do not affect directly the ETP species. There is no negative interaction.
	b	Y	Information is sufficient to determine whether the fishery may be a threat to protection and recovery of the ETP species.
			The information shows the fishery do not affect directly the ETP species. There is no negative interaction. Nevertheless, in January 2012 Toralla began to record the presence, and statement of bird in their sea facilities.
	c	Y	Information is sufficient to measure trends and support a full strategy to manage impacts on ETP species.
			Chile is part of CITES Agreement since 1975, has rules that protect the ETP species, Sernapesca has a list of the aquatic ETP species on its web page, the authorities in charge of controlling along the cost the fulfilment the rules are Sernapesca and maritime authority.
100	a	N	Information is sufficient to quantitatively estimate outcome status of ETP species with a high degree of certainty.
			There are not sufficient information that estimate the of ETP species with a high degree of certainty. That is the case of the information published by Ribeiro et al (2007) where the information presented was collected 5 years before, do not actualize the information related to the changes that fishery has experimented as environmental rules. There is a strict regulation that the fishery follows for exporting mussel to the EC, as PSMB which demand high standards of microbiology, heavy metals, and lacks of species causing

PI 2.3.3		Relevant information is collected to support the management of fishery impacts on ETP species including: <ul style="list-style-type: none"> • Information for the development of the management strategy; • Information to assess the effectiveness of the management strategy; and • Information to determine the outcome status of ETP species. 	
SG	Issue	Met? (Y/N)	Justification/Rationale
			red tide.
	b	N	<p>Accurate and verifiable information is available on the magnitude of all impacts, mortalities and injuries and the consequences for the status of ETP species.</p> <p>There are not accurate and verifiable information dealing with this issue. Even though, the fishery has no negative impact on the ETP species (Sernapesca and Maritime authority Stakeholders).</p>
	c	N	<p>Information is adequate to support a comprehensive strategy to manage impacts, minimise mortality and injury of ETP species, and evaluate with a high degree of certainty whether a strategy is achieving its objectives.</p> <p>The information collected by authorities is not further processed. Therefore, there is no evaluation and a high degree of certainty that the strategy is achieving its objectives.</p>
References		<ul style="list-style-type: none"> - DE (MINECON, Ministry of Economy) N°765/2004 protects Common Sea lion. - DE (MINECON) 135/2005 prohibits caught fish and marine mammals, birds and aquatic reptiles 	
OVERALL PERFORMANCE INDICATOR SCORE:			80
CONDITION NUMBER (if relevant):			NA

Evaluation Table: PI 2.4.1

PI 2.4.1		The fishery does not cause serious or irreversible harm to habitat structure, considered on a regional or bioregional basis and function	
SG	Issue	Met? (Y/P/N)	Justification/Rationale
60	a	Y	The fishery is unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm.
			There are good and strict regulations such as RE 36 12/2009 (Subpesca) which standardize the limit of variables for declare a sea facility in aerobic or anaerobic condition. The sea facility with aerobic condition will obtain from Sernapesca permission to put seeds for ongrowing during a production cycle.
80	a	Y	The fishery is highly unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm.
			Environmental Informs or INFAs results of the fishery show that this activity is developing in more than 95% of aerobic condition. Particularly, show that Toralla has aerobic results which are agreed with the standard requirements of RE 3612/2009 (Subpesca). Results of pH and Eh shows that the average that Toralla has in its location along the years since 2004, over 6,8 in pH and Eh over 250mv. The standard requirement s are pH ≥6,8 and EH≥50 According to Hardgrave, 2008, Hardgrave et al, 2008, the Eh (NHE) found in Sea facilities of Toralla are equivalent to 100-200 µM de S.
100	a	Y	There is evidence that the fishery is highly unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm.
			There is a Supreme Decree 320/2001(SUBPESCA) which determines the environmental requirement for aquaculture in Chile. Under this, the RE3612/09 SUBPESCA, give the methodology and establish the period of sampling in the areas where the aquaculture is developed. Initially, the mussel farming must sample every year. The results from 2004-2009 showed no evidence of serious or irreversible harm to habitat function and therefore Subpesca changed the sampling frequency to every two years instead of annually (RE 3612/09). Habitat structure is not explicitly referenced and therefore SG 100 is partially met
References		DS 320/01 Subpesca RE 3612/09 Subpesca Hardgrave B.T. Methods Eh and S measurements in sediments for application in marine aquaculture environmental monitoring programs.	
OVERALL PERFORMANCE INDICATOR SCORE:			90
CONDITION NUMBER (if relevant):			NA

Evaluation Table: PI 2.4.2

PI 2.4.2		There is a strategy in place that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to habitat types	
SG	Issue	Met? (Y/N)	Justification/Rationale
60	a	Y	There are measures in place, if necessary, that are expected to achieve the Habitat Outcome 80 level of performance.
			The article 74 and 87 of GLPA indicate that aquaculture must develop according to the carrying capacity of the water body maintaining the Ecosystem equilibrium. Under these articles, the MINECON, published the DS 320/2001 (Subpesca) which established the rule for achieving this objectives settling that the environmental regulation should be modified every two years. In 2004 the RA 404 (Subpesca) (Annex Rule) established the parameters to measure environmental impact around the sea facility and the analysis methodology. In 2006 changed to RE 3411 (Subpesca) and in 2009 to RE 3612. Every change had implied enforcement in number of sampling in the impacted area, and improvement in methodologies.
	b	Y	The measures are considered likely to work, based on plausible argument (e.g. general experience, theory or comparison with similar fisheries/habitats).
			The measures are considered likely to work and results of the INFA (Environmental Assessment report) shows the status of a particular concession in terms of aerobic or anaerobic condition.
80	a	Y	There is a partial strategy in place, if necessary, that is expected to achieve the Habitat Outcome 80 level of performance or above.
			As described in 60a above there is a strategy in place well developed and focused on habitat impact through the DS 320 and its rules (RA 404/2004, RE3612/2006 and RE 3612/2009).
	b	Y	There is some objective basis for confidence that the partial strategy will work, based on information directly about the fishery and/or habitats involved.
			Since, 2004 the fishery activity has shown that its effects on the habitat has been low. (Informes ambientales de la acuicultura, años 2006 y 2008).
	c	Y	There is some evidence that the partial strategy is being implemented successfully.
100	a	Y	There is a strategy in place for managing the impact of the fishery on habitat types.
			As described in 60a above there is a strategy in place well developed and focused on habitat impact through the DS 320 and its rules (RA 404/2004, RE3612/2006 and RE 3612/2009).
	b	Y	Testing supports high confidence that the strategy will work, based on information directly about the fishery and/or habitats involved.
			Since, 2004 the fishery activity has shown that its effects on the habitat has been low. (Informes ambientales de la acuicultura, años 2006 y 2008). Since 2009, the methodologies and sampling method applied for sampling have traceability because are normalized to ISO 17025.

PI 2.4.2		There is a strategy in place that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to habitat types	
SG	Issue	Met? (Y/N)	Justification/Rationale
	c	Y	<p>There is clear evidence that that strategy is being implemented successfully.</p> <p>In 2009, Subpesca, dictated the rule RE 3612 where mussel farming need to present INFAs every 2 years, instead 1 year.</p>
	d	Y	<p>There is some evidence that the strategy is achieving its objective.</p> <p>Recently, the modification of the Low 20.434 (LGDA) focused on Aquaculture, liberated until 2015 the mussel farming as a fishery, of the obligation of Environmental Impact Studies being bid by Sernapesca as occurred with salmon farming up date. This is a resul of well development of this fishery and the confidence that authorities hives in mussel farming activity.</p>
References		<ul style="list-style-type: none"> - Subpesca, 2006. Informe ambiental de la Acuicultura, febrero 2006. - Subpesca, 2008. Informe Ambiental de la Acuicultura 2005-2006. - DS 320/2001 (Subpesca) Reglamento ambiental para la acuicultura, RAMA. - Parrafo Modificación Ley 20434 (Subpesca, 2010) 	
OVERALL PERFORMANCE INDICATOR SCORE:			100
CONDITION NUMBER (if relevant):			NA

Evaluation Table: PI 2.4.3

PI 2.4.3		Information is adequate to determine the risk posed to habitat types by the fishery and the effectiveness of the strategy to manage impacts on habitat types	
SG	Issue	Met? (Y/N)	Justification/Rationale
60	a	Y	There is basic understanding of the types and distribution of main habitats in the area of the fishery.
			There are data published mainly by CIMAR fiordos cruises that allow understanding the types and distribution of main habitats in the area of the fishery. The PSMB is recording monthly quantities and qualitative phytoplankton data, for more than ten years.
	b	Y	Information is adequate to broadly understand the nature of the main impacts of gear use on the main habitats, including spatial overlap of habitat with fishing gear.
			The DS 320/2001 (Subpesca) gives the procedures focused on habitat.
80	a	Y	The nature, distribution and vulnerability of all main habitat types in the fishery are known at a level of detail relevant to the scale and intensity of the fishery.
			In order to protect the environment, Subpesca with the RE 3612 describes the methodology of sampling the sea site. The compilation of the results of environmental studies presented by the fisheries, it is a role of Subpesca, which published every 2 years the status of the environment affected by Aquaculture. (documents presented in 2.4.2)
	b	Y	Sufficient data are available to allow the nature of the impacts of the fishery on habitat types to be identified and there is reliable information on the spatial extent of interaction, and the timing and location of use of the fishing gear.
			Based on DS 320/2001 and RE 36 12, previous to the aquaculture activity, the titular must present a study to the fisheries authorities, that the sea site which is applying for aquaculture authorization that is not located on a natural banc.
			In the next step, the farmer needs to present another study or research mapping all the sea site, one point/ha on the sea bed, the environmental variables according to the production (Ton) and the depth (m) which will be the basement environmental condition of the sea site called CPS, or Previous condition of Sea site (Condición Preliminar del Sitio) which is well describes in the RE 3612/2009 (Subpesca).
			When the sea site is in operation the farmers must present INFAs where the difference with the CPS methodology is this sampling area, which is located only in the area were the maximum biomass is developed.
	c	Y	Sufficient data continue to be collected to detect any increase in risk to habitat (e.g. due to changes in the outcome indicator scores or the operation of the fishery or the effectiveness of the measures).
			With INFAs every 2 years. The PSMB is monthly monitoring and the time series of this data is centralised in Sernapesca.
100	a	N	The distribution of habitat types is known over their range, with particular attention to the occurrence of vulnerable habitat types.

			Maybe the information has been taken (example in CIMAR Cruises) but there are not integration or crossed with the INFAs results or other valuable scientific information, in order to define the distribution of habitat types, with particular attention to the occurrence of vulnerable habitat types.
	b	N	<p>The physical impacts of the gear on the habitat types have been quantified fully.</p> <p>There are some research done in specific bays or channel, but is not representative. One the main issues concern was the polystyrene blocks as floating system because the impact offshore. Forcing by law this situation has been changing and there are a low proportion of farming (mainly artisanal fisherman) that maintain this system.</p>
	c	N	<p>Changes in habitat distributions over time are measured.</p> <p>As explained before, there are different kind of information collected CIMAR Fiordos Cruises, PSMB, INFAs and CPSs, but are not integrated to evaluate the changes over a determined period where the fishery has been develop as a commercial activity.</p>
References			<ul style="list-style-type: none"> - DS 320/2001 (Subpesca) Reglamento ambiental para la Acuicultura. - RE 3612/2009 (Subpesca) Aprueba Resolución que fija las Metodologías para elaborar la caracterización Preliminar del Sitio (CPS) y la Información Ambiental (INFA)
OVERALL PERFORMANCE INDICATOR SCORE:			80
CONDITION NUMBER (if relevant):			NA

Evaluation Table: PI 2.5.1

PI 2.5.1		The fishery does not cause serious or irreversible harm to the key elements of ecosystem structure and function	
SG	Issue	Met? (Y/P/N)	Justification/Rationale
60	a	Y	The fishery is unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm.
			There is information about the Chiloé's Interior sea before the expansive mussel farming as the CIMAR cruises since 1995 which show that there are not serious or irreversible harm to the key elements of the ecosystem structure and function.
80	a	Y	The fishery is highly unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm.
			<p>The estimation of the retention time of the particle estimated as ASC formula is 3,74 days which is in accordance with the retention time communicated by José Luis Blanco as Oceanographer Stakeholder, (Skype meeting).</p> <p>Where:</p> <p>2) $CT(days) = Vt/(NxC)$</p> <p>CT = Clearance Time. Vt = Total Volume of the water body at high tide (litres). N = Number of Bivalves in the water body. C = Average clearance rate (litres/individuals species/day) at harvest size</p> <p>$N = 9.500.000.000(gr)/25(gr) = 380.000.000$ $C = 36,61 \text{ L/day (Universidad Austral de Chile)}$ $Vt = [40m(depth)*100.000m (long)*200m (wide)]*1000L = 800exp9 \text{ L}$ $CT = 800exp9 \text{ L}/(380exp6*36,61)$</p> <p>CT = 57,5 days</p> <p>2) $RT = -1xP/\ln(VI/Vt)$ P = Tidal periodicity VI is the total volume of the water body at low tide (L). Vt is the total volume of the water body at high tide (L).</p> <p>RT is the retention time of a particle. $VI = 700exp9L$ $Vt = 800exp9L$ P = 0,5 days</p> <p>$RT = 1*0,5/\ln(700exp9/800exp9) = 3,74 \text{ days}$</p> <p>4) $CT/RT = 57,5/3,74 = 15,36 \text{ days.}$</p>

PI 2.5.1		The fishery does not cause serious or irreversible harm to the key elements of ecosystem structure and function	
SG	Issue	Met? (Y/P/N)	Justification/Rationale
100	a	P	<p>There is evidence that the fishery is highly unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm.</p> <ul style="list-style-type: none"> - There are the INFAs presented every two years to the authority which publish the results in documents previously cited as Informe ambiental de la Acuicultura, 2006 and Informe Ambiental de la Acuicultura 2005-2006 <i>op.cit.</i> These documents show the impacts of the fishery are very low compared to other aquaculture activities such as salmon. - Nevertheless the traceability of data began in 2009, because the variables methodologies and sampling methods were normalized to ISO 17.025. <p>The studies of Clement A. (comm. pers) during a time series of tenth years and Clement et al, 2010, remark that the structure of the phytoplankton has not been change by the fishery.</p> <ul style="list-style-type: none"> - There is valuable information in the CIMAR fiordos Cruises that might be considered as evidence, that the fishery is highly unlikely to disrupt the key elements. - The weakness point is that all this information is not compiled and integrated by Subpesca in upgrade management of the ecosystem.
References		<p>[List any references here]</p> <p>CT Calculated by Universidad Austral de Chile.</p> <p>Plancton Andino Ltda: Clement A, Mardones J., Ñancupil I, Fernandez Cesar (2010). "Algoritmo para estimar el riesgo de ocurrencia de una FAN producida por <i>Alexandrium catenella</i>". Periodo 2008-diciembre 2009. Proyecto Fondef MR071-1010</p>	
OVERALL PERFORMANCE INDICATOR SCORE:			80
CONDITION NUMBER (if relevant):			NA

Evaluation Table: PI 2.5.2

PI 2.5.2		There are measures in place to ensure the fishery does not pose a risk of serious or irreversible harm to ecosystem structure and function	
SG	Issue	Met? (Y/N)	Justification/Rationale
60	a	Y	There are measures in place, if necessary.
			<p>There are emphasizes on well development of the aquaculture considering the equilibrium of ecosystem in the General Law for Fisheries and Aquaculture (LGPA), the DS 320/2001 or RAMA establish the procedures to develop aquaculture with a minimum environmental impact, but the measures taken are dealing with the impact produce by every single farmer, applying the rule RE 3612/2009 from Subpesca. Also the Ministry of Environment though DIA impose the respect to CITES, National and international agreement dealing with marine contamination and sailing rules.</p> <p>Other measure taken, are the compliments of different application that the farmer must observe to obtain the licence for developing the aquaculture activity and for the acceptance of biomass of the technical project. Even when the mussel farming has had an expansive development since 2000 until 2011, there are no evidence of detrimental impact on the phytoplankton biomass. A study done by Clement et al. (2010) between Ilque (near to Puerto Montt) to Quellón Viejo (southeast of Quellón), shows that there are a combination of different variables that influence the phytoplankton biomass such water temperature and oxygen profiles.</p>
	b	Y	The measures take into account potential impacts of the fishery on key elements of the ecosystem.
			The RE 3612 consider the measures of dissolved Oxygen, temperature, salinity and DO%. As well as benthic area around the sea facilities, such as Organic matter, pH/orp/T°C of the sediment, macro f aunal composition.
	c	Y	The measures are considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/ecosystems).
			Mainly focused on habitat component.
80	a	Y	There is a partial strategy in place, if necessary.
			The GLFA (LGPA) gives the guidelines for the development of Aquaculture thought its articles 74 and 87. The DS 323/2001 supplements the partial strategy which is focused on habitats and consists on a plan, (CPS) Acuicultura commercial activity NFAs CPSs.
	b	N	The partial strategy takes into account available information and is expected to restrain impacts of the fishery on the ecosystem so as to achieve the Ecosystem Outcome 80 level of performance.
			There is no development in this area.
	c	N	The partial strategy is considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/ecosystems).
			As there is not a full partial strategy in place, this issue is not achieved.
	d	N	There is some evidence that the measures comprising the partial strategy are being implemented successfully .

PI 2.5.2		There are measures in place to ensure the fishery does not pose a risk of serious or irreversible harm to ecosystem structure and function	
SG	Issue	Met? (Y/N)	Justification/Rationale
			As there is not a full partial strategy in place, this issue is not achieved.
100	a	N	There is a strategy that consists of a plan , in place. This issue is not achieved.
	b	N	The strategy , which consists of a plan , contains measures to address all main impacts of the fishery on the ecosystem, and at least some of these measures are in place. The plan and measures are based on well-understood functional relationships between the fishery and the Components and elements of the ecosystem. There are no consistent measures in place. There are measures focuses on habitat component. This plan provides for development of a full strategy that restrains impacts on the ecosystem to ensure the fishery does not cause serious or irreversible harm.
	c	N	The measures are considered likely to work based on prior experience , plausible argument or information directly from the fishery/ecosystems involved. There are not achieved this issue.
	d	N	There is evidence that the measures are being implemented successfully . There is no measure implemented.
	References		Plancton Andino Ltda: Clement A, Mardones J., Nancupil I, Fernandez Cesar (2010). "Algoritmo para estimar el riesgo de ocurrencia de una FAN producida por Alexandrium catenella". Periodo 2008-diciembre 2009. Proyecto Fondef MR071-1010
	OVERALL PERFORMANCE INDICATOR SCORE:		65
	CONDITION NUMBER (if relevant):		1

Condition: Developed a partial strategy that take into account available information about the element of the ecosystem, based on carrying capacity for example, that expects to restrain the impact on the ecosystem, work based on plausible arguments and demonstrate with same evidence that the measures will be implemented successfully.

Evaluation Table: PI 2.5.3

PI 2.5.3		There is adequate knowledge of the impacts of the fishery on the ecosystem	
SG	Issue	Met? (Y/N)	Justification/Rationale
60	a	Y	Information is adequate to identify the key elements of the ecosystem (e.g., trophic structure and function, community composition, productivity pattern and biodiversity).
			There are good information about the different key element of the ecosystem where the fishery is develop, but are disperse like research done in the scientific cruise CIMAR10 fiordos, Clement et al (2010), Valdovinos et al (2008)
	b	Y	Main impacts of the fishery on these key ecosystem elements can be inferred from existing information, and have not been investigated in detail .
			There is baseline information which allows to inferred the main impact on the key elements. Such is the case of Scientific Cruses of CIMAR.
80	a	Y	Information is adequate to broadly understand the key elements of the ecosystem.
			There is sufficient information to understand the key element of the ecosystem but focused on Habitat. There is the same information available regarding with ETP species. On the other hand, <i>Mytilus chilensis</i> is native species then there is no risk of translocation to introduce diseases, pests, pathogens, or non-native species (species not already established in the ecosystem) into the surrounding ecosystem as shown in 2.6.1.
	b	Y	Main impacts of the fishery on these key ecosystem elements can be inferred from existing information and some have been investigated in detail .
			There are researches done by different universities sponsored by FIP (Fisheries Research Funds) which depends on Subpesca. The main problem is that results are not well defunded and published for the application in the improvement of the fishery. One example is the project "Definición de criterios biológicos, ambientales, sanitarios y operativos para la instalación de colectores de moluscos bivalvos en la X región" which was sponsored by this fund but the knowledge is not well understood and applied in the development of the fishery.
	c	Y	The main functions of the Components (i.e., target, By-catch, Retained and ETP species and Habitats) in the ecosystem are known .
			The main functions of the components (i.e., target, by-catch, retained and ETP species and habitats) in the ecosystem are known. There is knowledge about the different components of the ecosystem which is not well integrated. Such is the case of the information or research done in the Cruise of scientific marine research (CIMAR 1 since 1995 up date) from Puerto Montt (Region X) to region XII. The main areas studied were meteorology, geology and bathymetry: - Mass waters, physical, chemical and circulation characteristics, Currents and tides, phytoplankton an primary production, red tides, zooplanktonic fish and crustaceans larvae, - Benthic organism, physic-chemical and geochronology of sediments, and

PI 2.5.3		There is adequate knowledge of the impacts of the fishery on the ecosystem	
SG	Issue	Met? (Y/N)	Justification/Rationale
			<p>Contamination</p> <p>This information has been published in international and domestic scientific magazines, presented in domestic and international workshops and symposia, and thesis of pre or post degree in Chilean or international universities.</p> <p>However, the results of this series of research cruises are been manage in the academic area, completely unknown for the farmers and very low useful for the authorities (Palma and Silva, 2006).</p> <p>There are other technical research developed as well into the university as studies carried out in bay Vilupulli in 2002 (channel located in Central Chiloé) by Troncoso et al., (2010) on carrying capacity for mussels that was presented just recently to the farmer in January 2010.</p> <p>The main criticism on this issue is that the policy of Subpesca is mainly focused on Salmon farming applying the same rules for mussel farming</p>
	d	Y	<p>Sufficient information is available on the impacts of the fishery on these Components to allow some of the main consequences for the ecosystem to be inferred.</p> <p>There are information collected from INFAs and DIAs which are referred to habitat. There are no much information about ETP species, but are incorporated in the studies of DIA.</p>
	e	N	<p>Sufficient data continue to be collected to detect any increase in risk level (e.g., due to changes in the outcome indicator scores or the operation of the fishery or the effectiveness of the measures).</p> <p>No related to the fishery in study. There much more information which is collected but for salmon aquaculture instead to mussel farming.</p>
	b	N	<p>Main interactions between the fishery and these ecosystem elements can be inferred from existing information, and have been investigated.</p> <p>There are available base line information where the main interaction between the and this ecosystem area can be inferred, but have not been investigated.</p>
			<p>The impacts of the fishery on target, by-catch and ETP species are identified and the main functions of these Components in the ecosystem are understood.</p> <p>The information available does not allow achieving this issue.</p>
	d	N	<p>Sufficient information is available on the impacts of the fishery on the Components and elements to allow the main consequences for the ecosystem to be inferred.</p> <p>There are some areas understood, e.g. habitat but the information available does not allow achieving this issue.</p>
100	e	N	<p>Information is sufficient to support the development of strategies to manage ecosystem impacts.</p> <p>The information available does not allow achieving this issue.</p>

PI 2.5.3		There is adequate knowledge of the impacts of the fishery on the ecosystem	
SG	Issue	Met? (Y/N)	Justification/Rationale
References			<ul style="list-style-type: none"> • V. Alfredo Troncoso, Marco Salamanca, Patricio Campos. 2010. Capacidad de Carga Productiva de un Área de Cultivos de Choritos. Taller de Capacidad de Carga: Sustentabilidad y Manejo a Largo Plazo de la Actividad Acuicola. Subsecretaría de Pesca. • Litoral Austral (2007). Definición de criterios biológicos, ambientales, sanitarios y operativos para la instalación de colectores de moluscos bivalvos en la X región. PROYECTO FIP N° 2005-18. • Claudio Valdovinos^{1,2*}, Javiera Cárdenas^{3,1}, Cristian Aldea¹, Carolina Moya¹ & Gabriela Mancilla¹ PATRONES ESPACIALES DE DIVERSIDAD DE MOLUSCOS MARINOS EN EL LÍMITE NORTE DE LA PROVINCIA MAGALLÁNICA. (CONA-C10F 04-20)
OVERALL PERFORMANCE INDICATOR SCORE:			75
CONDITION NUMBER (if relevant):			2

Condition: It should develop a research plan that define the variables that must collect to detect any increase in risk level (e.g., due to changes in the outcome indicator scores or the operation of the fishery or the effectiveness of the measures).

Evaluation Table: PI 2.6.1

PI 2.6.1		The translocation activity has negligible discernible impact on the surrounding ecosystem.	
SG	Issue	Met? (Y/N)	Justification/Rationale
60	a	Y	The translocation activity is unlikely to introduce diseases, pests, pathogens, or non-native species (species not already established in the ecosystem) into the surrounding ecosystem.
			<i>Mytilus chilensis</i> is a native species which in 2006 was included by Sernapesca in the list this species not cause risk of introduce diseases, pests, pathogens. Official Magazine (Diario Oficial de la Republica de Chile, September 2006.
80	a	Y	The translocation activity is highly unlikely to introduce diseases, pests, pathogens, or non-native species into the surrounding ecosystem.
			<i>Mytilus chilensis</i> is a native species which in 2006 was included by Sernapesca in the list that not cause risk of introduce diseases, pests, pathogens. Official Magazine (Diario Oficial de la Republica de Chile, September 2006.
100	a	Y	There is evidence that the translocation activity is highly unlikely to introduce diseases, pests, pathogens, or non-native species into the surrounding ecosystem.
			The main reason is that <i>Mitylus chilensis</i> is a native species well distributed along Chile. Even thought, Sernapesca has emitted regulation that avoid transport of diseases from aquaculture species DS 319/01 and DS 345/05. In the case of mussels, in 2006 was published in the Official Magazine (Diario Oficial de la Republica de Chile, September 2006), that <i>Mitylus chilensis</i> has not develop diseases considered as plague by OIE. On the other hand, during 2012 was presented the results of the project: "Reforzamiento de las capacidades de investigación en el área de patologías de moluscos" which demonstrate that there are not identified pathogens that causes diseases or plagues in <i>Mitylus chilensis</i> and other mussels of commercial interest.
References			<ul style="list-style-type: none">- DS 319/01 Aprueba reglamento de medidas de protección, control y erradicación de enfermedades de alto riesgo para las especies hidrobiologicas. Deroga DS N° 162 de 1985, del Ministerio de Economía, Fomento y Reconstrucción.- DS 345/05 Aprueba Reglamento Sobre Plagas Hidrobiológicas. MINECOM.- Base científicas para el diseño de protocolos de traslado de recursos hidrobiológicos para evitar la dispersión de organismos constituyentes de plagas. 2007. P. Universidad Católica de Valparaís. Facultad de Recursos Naturales. Escuela de Ciencias del Mar- Diario Oficial de la República de Chile, 06/09/2006 pagina 3. Clasificación de enfermedades de alto riesgo.- Reforzamiento de las capacidades de investigación en el área de patologías de moluscos. Conicyt, Florencia Cremonte (CENPAT Argentina), Viviana Videla (Fundación Chinquihue), Claudia Puebla (Universidad Arturo Prat), Jorge Tilleria (Fundación Chinquihue) y Ramiro Contreras (Universidad Arturo Prat) 2012.
OVERALL PERFORMANCE INDICATOR SCORE:			100

PI 2.6.1		The translocation activity has negligible discernible impact on the surrounding ecosystem.	
SG	Issue	Met? (Y/N)	Justification/Rationale
CONDITION NUMBER (if relevant):			NA

Evaluation Table: PI 2.6.2

PI 2.6.2		There is a strategy in place for managing translocations such that the fishery does not pose a risk of serious or irreversible harm to the surrounding ecosystem.	
SG	Issue	Met? (Y/N)	Justification/Rationale
60	a	Y	There are measures in place which are expected to protect the surrounding ecosystem from the translocation activity at levels compatible with the SG80 Translocation outcome level of performance (PI 2.6.1).
			There are measures in place which are working for the aquaculture focuses on transport of pest and diseases as it was explained in point 2.6.1
	b	Y	The measures are considered likely to work based on plausible argument (e.g. general experience, theory, or comparison with similar fisheries/species).
			The compliment of the 319/01 and DS345/05 are very strict controlled by Sernapesca, where the Animal Health Department is in charge.
80	a	Y	There is a partial strategy in place, if necessary, that is expected to protect the surrounding ecosystem from the translocation activity at levels compatible the SG80 Translocation outcome level of performance (PI 2.6.1).
			There are rules which are applying for all the species aquaculture: DS 319/01 y DS 345/05.
	b	Y	A valid documented risk assessment or equivalent environmental impact assessment demonstrates that the translocation activity is highly unlikely to introduce diseases, pests, pathogens, or non-native species into the surrounding ecosystem.
			- Diario Oficial de la República de Chile, 06/09/2006 pagina 3. Clasificación de enfermedades de alto riesgo. Where remarks that <i>Mytilus chilensis</i> do not introduce diseases, pests, pathogens, or non-native species into the surrounding ecosystem.
100	a	Y	Contingency measures have been agreed in the case of an accidental introduction of diseases, pests, pathogens, or non-native species due to the translocation.
			The information is 2.6.1
	b	Y	There is a strategy in place for managing the impacts of translocation on the surrounding ecosystem.
			There is a strategy in place with the DS 319/01 and DS345/05 from Sernapesca with controls by the animal health department. <i>Mytilus chilensis</i> is not on the list of species that may cause diseases of high risk.
	b	Y	An independent peer-reviewed scientific assessment confirms with a high degree of certainty that there are no risks to the surrounding ecosystem associated with the translocation activity.

PI 2.6.2		There is a strategy in place for managing translocations such that the fishery does not pose a risk of serious or irreversible harm to the surrounding ecosystem.	
SG	Issue	Met? (Y/N)	Justification/Rationale
			Cremonte <i>et al.</i> (<i>op.cit</i>) demonstrate that there are no identified pathogens that cause diseases or plagues in <i>Mytilus chilensis</i> and other mussels of commercial interest.
	c	N	A formalized contingency plan in the case of an accidental introduction of diseases, pests, pathogens, or non-native species due to the translocation is documented and available. Sernapesca has not developed contingency plan for <i>Mytilus chilensis</i> .
References			<ul style="list-style-type: none"> - DS 319/01 Aprueba reglamento de medidas de protección, control y erradicación de enfermedades de alto riesgo para las especies hidrobiológicas. Deroga DS N° 162 de 1985, del Ministerio de Economía, Fomento y Reconstrucción. - DS 345/05 Aprueba Reglamento Sobre Plagas Hidrobiológicas. MINECOM. - Baese científicas para el diseño de protocolos de traslado de recursos hidrobiológicos para evitar la dispersión de organismos constituyentes de plagas. 2007. P. Universidad Católica de Valparaíso. Facultad de Recursos Naturales. Escuela de Ciencias del Mar - Diario Oficial de la República de Chile, 06/09/2006 pagina 3. Clasificación de enfermedades de alto riesgo. - Reforzamiento de las capacidades de investigación en el área de patologías de moluscos. Conicyt, Florencia Cremonte (CENPAT Argentina), Viviana Videla (Fundación Chinchihue), Claudia Puebla (Universidad Arturo Prat), Jorge Tilleria (Fundación Chinchihue) y Ramiro Contreras (Universidad Arturo Prat) 2012.
OVERALL PERFORMANCE INDICATOR SCORE:			95
CONDITION NUMBER (if relevant):			NA

Evaluation Table: PI 2.6.3

PI 2.6.3		Information on the impact of the translocation activity on the environment is adequate to determine the risk posed by the fishery.	
SG	Issue	Met? (Y/N)	Justification/Rationale
60	a	Y	<p>Information is available on the presence or absence of diseases, pests, pathogens, and non-native species at the source and destination of the translocated stock to guide the management strategy and reduce the risks associated with the translocation.</p> <p>The information available shows that <i>Mytilus chilensis</i> do not introduce diseases, pests, pathogens, or non-native species into the surrounding ecosystem. Diario Oficial de la República de Chile, 06/09/2006 pagina 3. Clasificación de enfermedades de alto riesgo, Information presented in 2.6.1</p>

PI 2.6.3		Information on the impact of the translocation activity on the environment is adequate to determine the risk posed by the fishery.	
SG	Issue	Met? (Y/N)	Justification/Rationale
80	a	Y	Information is sufficient to adequately inform the risk and impact assessments required in the SG80 Translocation management level of performance (PI 2.6.2).
			There is sufficient information presented in Oficial Magazine, op cit, the rules DS 319/01 and DS 345/05, Cremonte et al op.cit. There are also protocols develop for PUCV 2007, for transport hydro biologic species.
100	a	N	Information from frequent and comprehensive monitoring demonstrates no impact from introduced diseases, pests, and non-native species with a high degree of certainty .
			The information available correspond to research project sponsored by Conycit (National Committee for Science and Technology).
References			<ul style="list-style-type: none">- DS 319/01 Aprueba reglamento de medidas de protección, control y erradicación de enfermedades de alto riesgo para las especies hidrobiológicas. Deroga DS N° 162 de 1985, del Ministerio de Economía, Fomento y Reconstrucción.- DS 345/05 Aprueba Reglamento Sobre Plagas Hidrobiológicas. MINECOM.- Baese científicas para el diseño de protocolos de traslado de recursos hidrobiológicos para evitar la dispersión de organismos constituyentes de plagas. 2007. P. Universidad Católica de Valparaís. Facultad de Recursos Naturales. Escuela de Ciencias del Mar- Diario Oficial de la República de Chile, 06/09/2006 pagina 3. Clasificación de enfermedades de alto riesgo.- Reforzamiento de las capacidades de investigación en el área de patologías de moluscos. Conicyt, Florencia Cremonte (CENPAT Argentina), Viviana Videla (Fundación Chiquihue), Claudia Puebla (Universidad Arturo Prat), Jorge Tilleria (Fundación Chiquihue) y Ramiro Contreras (Universidad Arturo Prat) 2012.
OVERALL PERFORMANCE INDICATOR SCORE:			80
CONDITION NUMBER (if relevant):			NA

Evaluation Table: PI 3.1.1

PI 3.1.1		<p>The management system exists within an appropriate legal and/or customary framework which ensures that it:</p> <ul style="list-style-type: none"> • Is capable of delivering sustainable fisheries in accordance with MSC Principles 1 and 2; • Observes the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood; and • Incorporates an appropriate dispute resolution framework. 	
SG	Issue	Met? (Y/N)	Justification/Rationale
60	a	Y	The management system is generally consistent with local, national or international laws or standards that are aimed at achieving sustainable fisheries in accordance with MSC Principles 1 and 2.
			The General Law of fisheries and aquaculture (18.892, 1991) is in accordance with national laws, including environmental regulations as well as international laws and treaties related to the maritime area. Article 3 of the law establishes the conservation responsibilities which incorporates fisheries management measures and environmental conservation such as the establishment of marine parks.
	b	Y	The management system incorporates or is subject by law to a mechanism for the resolution of legal disputes arising within the system.
			Fisheries management planning is subject to approval by the Regional Fisheries Councils and Subpesca, each enabling appeal against decisions. Legal disputes associated with fisheries and aquaculture, if not resolved by Subpesca, go to national courts.
	c	Y	Although the management authority or fishery may be subject to continuing court challenges, it is not indicating a disrespect or defiance of the law by repeatedly violating the same law or regulation necessary for the sustainability of the fishery.
			The management authority is not subject to continuing court challenges and is in fact responsible for the sustainability of the fishery.
	d	Y	The management system has a mechanism to generally respect the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.
			Part IV of the general law relates to Artisanal Fisheries, which are permitted exclusive rights within 5 nautical miles of the baseline. The establishment of AMERB system (Article 48) states that the scheme will consist of the traditional distribution of the fraction of the overall share of capture in a given region, either by area, vessel size, inlet, fishermen's organizations handmade or individually. Collection Parks are also established where the demands of Native Peoples are a priority
80	b	Y	The management system incorporates or is subject by law to a transparent mechanism for the resolution of legal disputes which is considered to be effective in dealing with most issues and that is appropriate to the context of the fishery.
			Management plans for fisheries include provision for resolution of internal disputes. The processes for establishing AMERBs by fishermen's organisations and concessions for private companies in aquaculture areas are transparent with each requiring the approval and publication of proposals. This enable challenges to be made and legal disputes avoided.
	c	Y	The management system or fishery is attempting to comply in a timely fashion within binding judicial decisions arising from any legal challenges.

PI 3.1.1		<p>The management system exists within an appropriate legal and/or customary framework which ensures that it:</p> <ul style="list-style-type: none"> • Is capable of delivering sustainable fisheries in accordance with MSC Principles 1 and 2; • Observes the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood; and • Incorporates an appropriate dispute resolution framework. 	
SG	Issue	Met? (Y/N)	Justification/Rationale
			Consultation did not provide evidence of any legal challenges, however the frequent modification of the General Law indicates that the management system is able to comply with judicial decisions in a timely manner.
	d	Y	<p>The management system has a mechanism to observe the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.</p> <p>Article 2 of the General Law states that any concessions granted will not affect the rights recognized by the Law No. 20,249, which creates the coastal marine area of native peoples.</p>
100	b	Y	<p>The management system incorporates or subject by law to a transparent mechanism for the resolution of legal disputes that is appropriate to the context of the fishery and has been tested and proven to be effective.</p> <p>Management plans for fisheries include provision for resolution of internal disputes. The processes for establishing AMERBs by fishermen's organisations and concessions for private companies in aquaculture areas are transparent with each requiring the approval and publication of proposals. This enable challenges to be made and legal disputes avoided. An example of legal disputes being proven to be effective is the process whereby Sernapesca applies to Chiloal judge to permit the removal of illegal gear.</p>
	c	Y	<p>The management system or fishery acts proactively to avoid legal disputes or rapidly implements binding judicial decisions arising from legal challenges.</p> <p>The management system is stakeholder-led (in the case of AMERB) or at minimum involves stakeholders in the process, which avoids legal disputes.</p>
	d	N	<p>The management system has a mechanism to formally commit to the legal rights created explicitly or established by custom of people dependent on fishing for food and livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.</p> <p>There is commitment (e.g. in relation to declaration of natural disaster and obligations for native peoples), but this over-rides management controls and so may not be fully consistent with sustainable exploitation. Therefore this SG is not met.</p>
References		<p>Reglamento Para La Instalacion De Colectores. D.S. N°29710 Nov 2005 General Law: "La Ley N° 18.892, y Sus Modificaciones, Ley General De Pesca Y Acuicultura."</p>	
OVERALL PERFORMANCE INDICATOR SCORE:			90
CONDITION NUMBER (if relevant):			NA

Evaluation Table: PI 3.1.2

PI 3.1.2		<p>The management system has effective consultation processes that are open to interested and affected parties.</p> <p>The roles and responsibilities of organisations and individuals who are involved in the management process are clear and understood by all relevant parties</p>	
SG	Issue	Met? (Y/N)	Justification/Rationale
60	a	Y	Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are generally understood .
			There are a number of state agencies involved with the management process. The key organisations are Subpesca, responsible for setting fisheries policy, Sernapesca, applying that fisheries policy and Directemar, with wider maritime responsibilities. Their roles and responsibilities are well understood by stakeholders.
	b	Y	The management system includes consultation processes that obtain relevant information from the main affected parties, including local knowledge, to inform the management system.
			The management system includes a fishermen-led management system AMERB, with oversight by the Regional Fisheries Council and National Fisheries Council. Scientific expertise is also sought through the requirement for technical baseline reports to support management plans and aquaculture applications.
80	a	Y	Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are explicitly defined and well understood for key areas of responsibility and interaction.
			The General Law explicitly defines the roles and responsibilities of each organisation involved. These are further defined on the websites of those respective organisations.
	b	Y	The management system includes consultation processes that regularly seek and accept relevant information, including local knowledge. The management system demonstrates consideration of the information obtained.
			Fishermen's organisations and the Regional Fisheries Councils meet regularly to share information, including local knowledge. Stakeholder consultation is undertaken in relation to modifications of the General Law.
	c	Y	The consultation process provides opportunity for all interested and affected parties to be involved.
			All modifications to the General Law are consulted on with relevant stakeholders. For example Amichile stated that "the opinion of AmiChile was considered in the drafting of laws and regulations promoted by the Authority within the field of fisheries and aquaculture, allowing growers to analyze the profound changes lay ahead, understanding the creation of new regulations and expressing their apprehensions about them."
100	a	Y	Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are explicitly defined and well understood for key areas of responsibility and interaction.
			The General Law explicitly defines the roles and responsibilities of each organisation involved. These are further defined on the websites of those respective organisations.

PI 3.1.2		The management system has effective consultation processes that are open to interested and affected parties. The roles and responsibilities of organisations and individuals who are involved in the management process are clear and understood by all relevant parties	
SG	Issue	Met? (Y/N)	Justification/Rationale
	b	N	The management system includes consultation processes that regularly seek and accept relevant information, including local knowledge. The management system demonstrates consideration of the information and explains how it is used or not used .
			Fishermen’s organisations and the Regional Fisheries Councils meet regularly to share information, including local knowledge. However there is no evidence of how the system uses that information and this is not always reported back to the stakeholders providing that information.
	c	N	The consultation process provides opportunity and encouragement for all interested and affected parties to be involved, and facilitates their effective engagement.
			Modifications to the General Law are consulted on with relevant stakeholders. However there is no evidence of the consultation process facilitating engagement. The frequency and extent of modifications risks stakeholders disengaging from the consultation process.
References		General Law: “La Ley Nº 18.892, y Sus Modificaciones, Ley General De Pesca Y Acuicultura.” www.subpesca.cl www.amichile.com Stakeholder consultation Dr. Julio Peña-Torres Right-based Fishery Management Programs in Chile: How It Was Done & How It Has Worked	
OVERALL PERFORMANCE INDICATOR SCORE:			85
CONDITION NUMBER (if relevant):			NA

Evaluation Table: PI 3.1.3

PI 3.1.3		The management policy has clear long-term objectives to guide decision-making that are consistent with MSC Principles and Criteria, and incorporates the precautionary approach	
SG	Issue	Met? (Y/P/N)	Justification/Rationale
60	a	Y	Long-term objectives to guide decision-making, consistent with the MSC Principles and Criteria and the precautionary approach, are implicit within management policy
			See 80a.
80	a	Y	Clear long-term objectives that guide decision-making, consistent with MSC Principles and Criteria and the precautionary approach are explicit within management policy.
			Article 3 of the General Law provides for the conservation aquatic species, including through establishment of specific areas to be known and bounded Marine Parks, for preserve ecological units of interest to science and precautionary areas to ensure maintenance and diversity of aquatic species, as well as those associated with their habitat. This is consistent with MSC principle 2. The General Law has also incorporated the National Aquaculture Policy with explicit long term objectives that seek economic development, but within sustainable limits (see main report 3.5.2).
100	a	N	Clear long-term objectives that guide decision-making, consistent with MSC Principles and Criteria and the precautionary approach, are explicit within and required by management policy.
			Depsite the evidence of clear long-term objectives within the General Law, such as those associated with aquaculture development, there is no evidence of these being a requirement of management policy.
References		General Law: “La Ley N° 18.892, y Sus Modificaciones, Ley General De Pesca Y Acuicultura.” Policia Nacional Acuicultura, 2003 Stakeholder consultation	
OVERALL PERFORMANCE INDICATOR SCORE:			90
CONDITION NUMBER (if relevant):			NA

Evaluation Table: PI 3.1.4

PI 3.1.4		The management system provides economic and social incentives for sustainable fishing and does not operate with subsidies that contribute to unsustainable fishing	
SG	Issue	Met? (Y/P/N)	Justification/Rationale
60	a	Y	The management system provides for incentives that are consistent with achieving the outcomes expressed by MSC Principles 1 and 2.
			Economic and social incentives are evident with assuring continued rights to fish or produce to those able to demonstrate environmentally-responsible activities via technical reports, management plans and environmental reports such as the INFA. There are no reported subsidies beyond small levels of subsidies for artisanal seaweed cultivation.
80	a	Y	The management system provides for incentives that are consistent with achieving the outcomes expressed by MSC Principles 1 and 2, and seeks to ensure that perverse incentives do not arise.
			As above, incentives are limited to permitted rights for parties involved with the management of the fishery. The development of management by the fishermen's organisations themselves under the AMERB system should ensure that perverse incentives do not arise.
100	a	N	The management system provides for incentives that are consistent with achieving the outcomes expressed by MSC Principles 1 and 2, and explicitly considers incentives in a regular review of management policy or procedures to ensure they not contribute to unsustainable fishing practices.
			Regular reviews are focused on necessary modifications and there is no evidence suggesting these reviews include a consideration of incentives.
References		General Law: "La Ley N° 18.892, y Sus Modificaciones, Ley General De Pesca Y Acuicultura." Stakeholder consultation	
OVERALL PERFORMANCE INDICATOR SCORE:			80
CONDITION NUMBER (if relevant):			NA

Evaluation Table: PI 3.2.1

PI 3.2.1		The fishery has clear, specific objectives designed to achieve the outcomes expressed by MSC's Principles 1 and 2	
SG	Issue	Met? (Y/P N)	Justification/Rationale
60	a	Y	Objectives , which are broadly consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are implicit within the fishery's management system.
			[Insert as much text as required into every relevant SG issue] In relation to the specific management of the mussel fishery, the management of seed collection, the wild 'chorito' fishery and on-growing stages are considered. Objectives are implicit through the requirements associated with each aspect; wild capture (under AMERB management plans), seed collection (various regulations) and on-growing (licences and concessions requirements).
80	a	N	Short and long-term objectives , which are consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are explicit within the fishery's management system.
			Some objectives associated with the mussel fishery are explicit, such as to not deplete natural beds, and these are consistent with MSC principles 1 & 2. However these are not well-defined and some aspects, specifically the consideration of the carrying capacity (ecosystem criteria). Therefore this SG is partially met, a score of 70 given and a condition raised.
100	a	N	Well defined and measurable short and long-term objectives , which are demonstrably consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are explicit within the fishery's management system.
			As per SG 80 above
References		General Law: "La Ley N° 18.892, y Sus Modificaciones, Ley General De Pesca Y Acuicultura." National Aquaculture Policy	
OVERALL PERFORMANCE INDICATOR SCORE:			70
CONDITION NUMBER (if relevant):			3

Condition: A management & research plan is required that contains clear, specific objectives designed to achieve the outcomes expressed by MSC's Principles 1 and 2.

Evaluation Table: PI 3.2.2

PI 3.2.2		The fishery-specific management system includes effective decision-making processes that result in measures and strategies to achieve the objectives	
SG	Issue	Met? (Y/N)	Justification/Rationale
60	a	Y	There are some decision-making processes in place that result in measures and strategies to achieve the fishery-specific objectives.
			Decision-making processes in all 3 aspects (chorito fishery, seed collection and on-growing) are in place and aim to achieve the objectives of sustainable exploitation and production respectively. These processes include the need for environmental information and limits to exploitation and production.
	b	Y	Decision-making processes respond to serious issues identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take some account of the wider implications of decisions.
			The AMERB system's management by the fishermen's organisations themselves enables prompt response to serious issues identified. Regular consultation via the Fisheries Councils enables issues to be identified outside the fishery and the wider implications of decisions to be considered. The management plan can then be revised if necessary. Seed collection has been researched in an ad hoc manner in part as a reaction to issues arising and this has enabled the introduction of measures such as the closure in November and December during identified peak spawning periods. On-growing operations require regular benthic monitoring (INFA), which will identify benthic habitat impacts. If impacting an area, production is required to cease for a period of time. Ad hoc research is commissioned to improve the knowledge-base on ecosystem and genetic consequences of seed transfer for on-growing.
80	a	Y	There are established decision-making processes that result in measures and strategies to achieve the fishery-specific objectives.
			The decision making processes are well-established in relation to all aspects of the mussel fishery and these have been integrated into the General Law though regular modifications continue to be made.
	b	Y	Decision-making processes respond to serious and other important issues identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take account of the wider implications of decisions.
			Yes, see SG 60 equivalent above. Modifications to the General Law are made to introduce new or revised measures and strategies if necessary. Before their introduction into statute it is the responsibility of Subpesca to ensure they take into account the wider implications of decisions. This is facilitated by stakeholder engagement and the consultation process.
	c	Y	Decision-making processes use the precautionary approach and are based on best available information.
			Evidence of use of the precautionary approach includes the consideration of technical reports (produced by scientific third parties) and the requirement for an SEIA. There is also a limit on the proportion of an area that can be exploited, buffer zones and activity is only permitted within recognised zones.

PI 3.2.2		The fishery-specific management system includes effective decision-making processes that result in measures and strategies to achieve the objectives	
SG	Issue	Met? (Y/N)	Justification/Rationale
	d	N	<p>Explanations are provided for any actions or lack of action associated with findings and relevant recommendations emerging from research, monitoring, evaluation and review activity.</p> <p>The AMERB system is stakeholder driven, but requiring approval indicating dialogue and explanation.</p> <p>The ad hoc arrangements for most of the research associated with mussels, there is no clear process for identifying actions or non-action resulting from the findings.</p> <p>There is a lack of transparency in the decision-making process relating to the granting of aquaculture concessions. Applications are made and the decision provided by the relevant authority, but not with explanation. This process is also reported to take more than two years and sometimes several years.</p>
100	b	N	<p>Decision-making processes respond to all issues identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take account of the wider implications of decisions.</p> <p>A risk-based and reactive approach to decision-making is adopted whereby the resources of the authorities are allocated to the highest priority issues. In recent years this has led to a focus on salmon and responding to the ISA outbreak. The mussel fishery is treated as a low-risk activity compared to salmon production with the result that decisions affecting all aquaculture operations are made without due consideration of the wider implications for mussel fishery. This is gradually being addressed, for example with the permission to reduce the frequency of INFA reports if no significant impacts detected.</p>
	d	N	<p>Formal reporting to all interested stakeholders describes how the management system responded to findings and relevant recommendations emerging from research, monitoring, evaluation and review activity.</p> <p>Formal reporting that explains management response to all interested stakeholders is not undertaken.</p>
	References		General Law: “La Ley Nº 18.892, y Sus Modificaciones, Ley General De Pesca Y Acuicultura.” stakeholder consultation
OVERALL PERFORMANCE INDICATOR SCORE:			75
CONDITION NUMBER (if relevant):			4

Condition: A mussel management plan is required that establishes research and management responses in a strategic and comprehensive manner. This would provide stakeholders with explanations of actions or non-action resulting from research or review activities.

Evaluation Table: PI 3.2.3

PI 3.2.3		Monitoring, control and surveillance mechanisms ensure the fishery's management measures are enforced and complied with	
SG	Issue	Met? (Y/N)	Justification/Rationale
60	a	Y	Monitoring, control and surveillance <u>mechanisms</u> exist are implemented in the fishery under assessment and there is a reasonable expectation that they are effective.
			MCS responsibilities and procedures are well established. Inspections are conducted in a manner and at an appropriate level of intensity to have a reasonable expectation that they are effective.
	b	Y	Sanctions to deal with non-compliance exist and there is some evidence that they are applied.
			Fines are occasionally imposed, but most non-compliance (reported to be at a low level) is generally dealt with by warning operators and clarifying a breach of regulations.
	c	Y	Fishers are generally thought to comply with the management system for the fishery under assessment, including, when required, providing information of importance to the effective management of the fishery.
			Stakeholders (in all stages: AMERB, seed collection and on-growing) are central to the provision of information. This in itself provides evidence of compliance.
80	a	Y	A monitoring, control and surveillance system has been implemented in the fishery under assessment and has demonstrated an ability to enforce relevant management measures, strategies and/or rules.
			As SG60 above; MCs mechanisms are operated within a co-ordinated MCS system involving Sernapesca and Directemar inspection operations in addition to the checking of stakeholder plans and reporting by Subpesca.
	b	Y	Sanctions to deal with non-compliance exist, are consistently applied and thought to provide effective deterrence.
			Sanctions (fines, removal of gear and revoking of license) are in place and are used in an apparently consistent manner. There is anecdotal evidence of good compliance.
	c	Y	Some evidence exists to demonstrate fishers comply with the management system under assessment, including, when required, providing information of importance to the effective management of the fishery.
			There is some evidence (anecdotal from inspection authorities) of a high level of compliance. Information on seed collection and diver-caught mussel harvest is provided to Sernapesca as a condition of approved management plans under the AMERB management system.
	d	Y	There is no evidence of systematic non-compliance.
			Consultation with stakeholders, in particular Sernapesca and Directemar has revealed no evidence of systematic non-compliance.
100	a	Y	A comprehensive monitoring, control and surveillance system has been implemented in the fishery under assessment and has demonstrated a consistent ability to enforce relevant management measures, strategies and/or rules.
			Monitoring, control and surveillance (MCS) is applied by Sernapesca at an appropriate level in relation to the risk posed by fisheries extraction in the

PI 3.2.3		Monitoring, control and surveillance mechanisms ensure the fishery's management measures are enforced and complied with	
SG	Issue	Met? (Y/N)	Justification/Rationale
			<p>chorito fishery. Measures are in place to implement management of each aspect of the fishery; the diver-caught fishery, seed collection and grow-out.</p> <p>The harvest of mussel by divers is for local 'chorito' market, not for export market as cost of compliance PSMB regulations creates an effective barrier. This diver-based system is under the AMERB co-management system and feeds a local seasonal market, which provide further operational safeguards against over-exploitation. This reduces the risk posed by this fisheries activity and Sernapesca applies the level of MCS accordingly.</p> <p>Seed collection is under temporary 6-month licence that is monitored by Sernapesca and the Maritime Authority. Grow-out facilities are also regularly monitored by these agencies to ensure compliance with management measures.</p> <p>There are examples of effective MCS in other fisheries illustrating that a Sernapesca and the Maritime Authority have the capacity to implement additional MCS if necessary.</p>
	b	N	<p>Sanctions to deal with non-compliance exist, are consistently applied and demonstrably provide effective deterrence.</p> <p>Sanctions (fines, removal of gear and revoking of license) are in place and are used in an apparently consistent manner. However, there is no evidence provided to indicate demonstrably effective deterrence beyond anecdotal reporting of good compliance. Therefore SG100 is not fully met.</p>
	c	Y	<p>There is a high degree of confidence that fishers comply with the management system under assessment, including, providing information of importance to the effective management of the fishery.</p> <p>There is no evidence of non-compliance. Environmental NGOs and authorities report high levels of compliance. There are requirements for information provision by operators all stages in the mussel fishery management.</p>
References		<p>General Law: "La Ley N° 18.892, y Sus Modificaciones, Ley General De Pesca y Acuicultura."</p> <p>Cumplimiento Indicadores de Desempeno, 2010. Review of Sernapesca by Ministry of Economy, Development and Tourism.</p> <p>Consultation with Sernapesca and Directemar.</p>	
OVERALL PERFORMANCE INDICATOR SCORE:			95
CONDITION NUMBER (if relevant):			NA

Evaluation Table: PI 3.2.4

PI 3.2.4		The fishery has a research plan that addresses the information needs of management	
SG	Issue	Met? (Y/N)	Justification/Rationale
60	a	Y	Research is undertaken, as required, to achieve the objectives consistent with MSC's Principles 1 and 2.
			The Fisheries Research Council (IPC) has been given the task of undertaking a strategic plan to define and prioritize what to do, for whom, with whom, when and how. In operational terms the strategic planning has been defined here as a process and as an instrument. A process because it is a set of actions and tasks that involve members of an organization, in this case the FIP, and an instrument, because it is a conceptual framework that guides decision making aimed at implementing the necessary changes to improve efficiency and effectiveness of their work.
	b	Y	Research results are available to interested parties.
			The results of research are made available on websites (FIP, Sernapesca, Amichile, etc.) and also reported back to stakeholders via the Fisheries Councils.
80	a	N	A research plan provides the management system with a strategic approach to research and reliable and timely information sufficient to achieve the objectives consistent with MSC's Principles 1 and 2.
			There is no evidence of a research plan associated with the mussel fishery. Research is undertaken in an ad hoc manner driven by academic curiosity rather than need as identified by stakeholders. In recent years research capacities have been focused on salmon rather than mussel.
	b	N	Research results are disseminated to all interested parties in a timely fashion.
			While research results are disseminated (as per SG60 above), there were complaints by stakeholders that this is not done in a consistent and timely manner. The most recent examples cited was the FAO Expert workshop on bivalve mollusc management in Latin America (held in 2007) and a 2010 workshop on mussel management & genetics.
100	a	N	A comprehensive research plan provides the management system with a coherent and strategic approach to research across P1, P2 and P3, and reliable and timely information sufficient to achieve the objectives consistent with MSC's Principles 1 and 2.
			A comprehensive research plan for the mussel fishery is not evident.
	b	N	Research plan and results are disseminated to all interested parties in a timely fashion and are widely and publicly available .
			There is currently no research plan.
References		Fisheries Research Council Strategic Plan, 2009 (www.fip.cl) "Estado actual del cultivo y manejo de moluscos bivalvos y su proyección future Factores que afectan su sustentabilidad en América Latina". FAO Technical workshop, Puerto Montt, 2007.	
OVERALL PERFORMANCE INDICATOR SCORE:			60

CONDITION NUMBER (if relevant):	5
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Condition: Develop a comprehensive research plan providing the management system with a strategic approach to research that is timely and appropriately disseminated.

Evaluation Table: PI 3.2.5

PI 3.2.5		There is a system of monitoring and evaluating the performance of the fishery-specific management system against its objectives There is effective and timely review of the fishery-specific management system	
SG	Issue	Met? (Y/N)	Justification/Rationale
60	a	Y	The fishery has in place mechanisms to evaluate some parts of the management system.
			Some parts of the management system, namely the AMERB management plans are evaluated by Subpesca. There is regular opportunity to evaluate management of the ongrowing stage via discussions at National Fishery Council level and with Amichile.
	b	Y	The fishery-specific management system is subject to occasional internal review.
			Operators review their own internal management of the seed collection and on-growing stages regularly. The same is true of the fishermen's organisations under the AMERB system.
80	a	Y	The fishery has in place mechanisms to evaluate key parts of the management system
			Regular modifications are made to the General Law as issues arise. These include all aspects of the fishery management. The National Fisheries Council and Regional Fisheries Councils provide a regular evaluation process involving stakeholders.
	b	N	The fishery-specific management system is subject to regular internal and occasional external review.
			AMERB management plans are subject to review by Subpesca every 4 years. However there is no evidence of a similar review process for seed collection or on-growing management systems.
100	a	N	The fishery has in place mechanisms to evaluate all parts of the management system.
			As identified in SG80 above, evaluation of seed collection and on-growing appears to be lacking.
	b	N	The fishery-specific management system is subject to regular internal and external review.
			Regular review of the fishery-specific management systems is lacking, other than for AMERB. This illustrates a lack of a cohesive management system for the mussel fishery.
References		General Law: "La Ley N° 18.892, y Sus Modificaciones, Ley General De Pesca Y Acuicultura." Paola Bravo Barnes, Mares Chile Ltda. Presentation: "Area De Manejo Y Explotacion De Recursos Bentonicos" (AMERB) Centro de Investigación, Desarrollo y Capacitación en Ciencias del Mar Encargada Unidad Recursos Bentónicos.	
OVERALL PERFORMANCE INDICATOR SCORE:			70
CONDITION NUMBER (if relevant):			6

Condition: An effective and timely review of the fishery-specific management system needs to be developed. The Management plan to be developed requires regular internal and occasional external review.

Appendix 1.2 Risk Based Framework (RBF) Outputs

The Risk-Based framework is designed for use in association with the Marine Stewardship Council Default Assessment Tree in data deficient situations. The risk assessment framework is designed to assess components of the ecological system, including the target species (principle 1) and on species identified as retained catch, by-catch, on habitats, and on ecosystems (in Principle 2).

Two main assessment methods are distinguished, the scale, intensity, and consequence analysis (SICA) and the productivity susceptibility analysis (PSA). SICA is a qualitative method of assessing impact and is based in expert judgment. PSA can be defined as a semi-quantitative analysis to assess potential risk of impact. In the MSC risk assessment methodology these methods form part of a hierarchy, progressing from SICA to PSA. The MSC scoring procedure is a qualitative process. Scores are given in the scale to 60 to 100 and a score of 80 is required to ensure that the fishery meet the principles and criteria of the standard. If the SICA score is 80 or above, then this score is the score given for the relevant PI. If the score is below 80 (or for 1.1.1 in any case), a second type of assessment is carried out: a Productivity-Susceptibility Analysis (PSA).

Appendix 1.2.1 Scale Intensity Consequence Analysis (SICA)

In deriving the SICA score for each outcome Performance Indicator, the Scale (temporal and spatial) and Intensity of the relevant risk-causing activity, as well as the Consequence are required. Scale, Intensity, and Consequence analysis (SICA) in the MSC RBF- consists of the following six steps for each relevant component:

- » **Step 1:** Determine “worst plausible case” combination of fishing activity and scoring element, and prepare a SICA scoring template for this species, habitat, or ecosystem.
- » **Step 2:** Score Spatial scale of the activity for the Performance Indicator
- » **Step 3:** Score Temporal scale of the activity for the Performance Indicator
- » **Step 4:** Score the Intensity of the activity for all relevant components (e.g. target species, habitat, etc.). It depends on the temporal and spatial scale of the activity
- » **Step 5:** Score the Consequence resulting from the intensity of the activity for all relevant sub-components (e.g. population size of target species) for the Performance Indicator.
- » **Step 6:** Convert the consequence score into an MSC score, and feed back into the assessment tree, or go to PSA.

The criteria for scoring the impact of fishing in each of the SICA steps are presented below:

- » **SICA Step 1: Determine “worst plausible case”**
See appendix X where table with risk causing activities is presented.
- » **SICA Step 2: Score spatial scale of activity**

The greatest spatial extent on which the fishing activity occurs in relation to the overall distribution of the relevant component that is being evaluated (e.g. target species, bycatch species, and habitats) (**Table A.2.1**).

Table A.2.1. Table for deriving the SICA spatial scale score of the activity.

<10%	11-25%	26-40%	41-55%	56-70%	>70%
1	2	3	4	5	6

» **SICA Step 3: Score temporal scale of activity**

The highest temporal frequency must be used for determining the temporal scale score for the relevant component that is being evaluated (**Table A.2.2**)

Table A.2.2. Table for deriving the SICA temporal scale score of the activity.

Decadal (1 day every 10 years or so)	Every several years (1 day every several years)	Annual (1-100 days per year)	Quarterly (100-200 days per year)	Weekly (200-300 days per year)	Daily (300-365 days per year)
1	2	3	4	5	6

» **SICA Step 4: Score the intensity of the relevant activity**

The score for intensity of an activity (**Table A.2.3**) considers the direct impacts in line with categories such as capture, direct impact without capture, movement of biological material, and disturbance to physical processes.

Table A.2.3. Table for deriving the SICA intensity score of activity.

Level	Score	Description
Negligible	1	Remote likelihood of detection of activity at any spatial or temporal scale
Minor	2	Activity occurs rarely or in few restricted locations and evidence of activity even at these scales is rare
Moderate	3	Moderate detection of activity occurs reasonably often at broad spatial scale
Major	4	Detectable evidence of activity occurs reasonably often at broad spatial scale
Severe	5	Easily detectable localized evidence of activity or widespread and frequent evidence of activity
Catastrophic	6	Local to regional evidence of activity or continual and widespread evidence

» **SICA Step 5: Score the consequence of intensity for the relevant activity**

The consequence of the activity on the target species (principle 1) is scored using the criteria shown in **Table A.2.4** and **Table A.2.5**. Where the impact of fishing is relevant to more than one sub-component, the most vulnerable will be selected. The consequence score is translated into a MSC score (see step 6).

Table A.2.4. Table for deriving the SICA consequence score of causing risk activity on target species (PI 1.1.1), retained species (PI2.1.1), and bycatch species (PI 2.2.1).

Subcomponent	Consequence Category		
	1	2	3
Population size	Insignificant change to population size/growth rate (r). Unlikely to be detectable against background variability for this population.	Possible detectable change in size/growth rate (r) but minimal impact on population size and none on dynamics.	Full exploitation rate but long-term recruitment dynamics not adversely damaged
Reproductive capacity	No detectable change in reproductive capacity. Unlikely to be detectable against background variability for this population.	Possible detectable change in reproductive capacity but minimal impact on population dynamics.	Detectable change in reproductive capacity, impact on population dynamics at maximum sustainable level, long-term recruitment dynamics not adversely damaged.
Age/size/sex structure	No detectable change in age/size/sex structure. Unlikely to be detectable against background variability for this population.	Possible detectable change in age/size/sex structure but minimal impact on population dynamics.	Detectable change in age/size/sex structure. Impact on population dynamics at maximum sustainable level, long-term recruitment dynamics not adversely damaged.
Geographic range	No detectable change in geographic range. Unlikely to be detectable against background variability for this population.	Possible detectable change in geographic range but minimal impact on population range and none on dynamics.	Clear change in geographic range due to fishing activities

Table A.2.5. Table for deriving the SICA consequence score of causing risk activity (i.e. genetic structure) on target species (PI 1.1.1). This subcomponent was added to the SICA assessment as a result of the enhance characteristics of the rope grown mussel fishery.

Subcomponent	Consequence category		
	1	2	3
Genetic structure	No detectable change in genetic structure.	Possible detectable change in genetic structure but minimal impact of fishing on population genetic structure	Clear change in genetic structure due to fishing activities

Table A.2.6. Table for deriving the SICA consequence score of causing risk activity on habitats (PI 2.4.1)

Subcomponent	Consequence Category		
	1	2	3
Habitat types	No direct impact on habitat types. Impact unlikely to be detectable. Time taken to recover to pre-disturbed state on the scale of hours to days.	Detectable impact on distribution of habitat types. Time to recover from local impact on the scale of days to weeks, at larger spatial scales recovery time up to one year.	Impact reduces distribution of habitat types. Time to recover from local impact on the scale of months to a few years, at larger spatial scales recovery time of several years to less than two decades.
Habitat structure and function	No detectable change to the internal dynamics of habitat or populations of species making up the habitat. Time taken to recover to pre-disturbed state on the scale of hours to days.	Detectable impact on habitat structure and function. Time to recover from impact on the scale up to one year, regardless of spatial scale.	Impact reduces habitat structure and function. For impacts on non-fragile habitat structure, this may be for up to 50% of habitat affected, but for more fragile habitats, to stay in this category the % area affected needs to be smaller-- up to 20%. Time to recover from impact up to two decades.

» **SICA Step 5. Convert the consequence score into an MSC score, and feed back into the assessment tree, or go to PSA.**

Upon conclusion of the SICA analysis for the relevant outcome indicator, and the completion of **Table A.2.6**, the SICA consequence score must be converted into an MSC score equivalent according to **Table A.2.7**, then fed back into the assessment tree for the PI under consideration.

Table A.2.7. Consequence categories and associated guidepost scores for the risk-based section of the MSC assessment. Each of the Performance Indicators undergoing the risk-based evaluation would be scored using this table.

Consequence category	MSC equivalent score for target, retained and bycatch species	MSC equivalent score for Habitats
1	100	100
2	80	80
3		60
>3		<60

Table 1.2.1.a: Principle 1 SICA Scoring Template Target Species [Only one subcomponent representing the worst plausible case is selected and scored](Reference: CR Table CC3, GCC 2.3)

Performance Indicator	Risk-causing activities	Spatial scale of activity	Temporal scale of activity	Intensity of activity	Relevant subcomponents	Consequence score	MSC Score
Target species outcome	Fishing activities from all fisheries including: <ul style="list-style-type: none">• Direct capture• Unobserved mortality (e.g. gear loss)• Capture as bycatch in other fisheries• Other identified risk-causing activities (please specify)	4	6	4	Population size		
					Reproductive capacity		
					Age/size/sex structure	2	80
					Geographic range		
Rationale:	<p>Rationale:</p> <p>As part of the stakeholder consultation the SICA method was used to determine the risk that fisheries pose on the productivity of the mussel stock. Stakeholders commented on risk scores and the team has taken them into account to determine the final risk score.</p> <p><u>Risk causing activities:</u> Direct capture through seed collection is defined as risk causing activity. Seed collection is the main activity that removes mussels from its natural environment. The main mussel market is in Europe where there are strong requirements related to the Prevention, Surveillance and Control of High Risk Diseases affecting aquatic species. Adults mussels removed from natural beds by diving do not comply with health animal requirements and therefore they are only marketable in the national market where the demand is insignificant compared with the export market. As a result of this landings by diving peaked 78 tons in 2008 which are insignificant quantities compared to aquaculture landings.</p> <p><u>Spatial:</u> Seed collection is carried out in <u>AMERBs</u>, <u>aquaculture centres</u> and <u>areas defined as areas of low importance</u>. Within each <u>AMERB</u> up to 40% can be occupied by longlines. <u>Aquaculture centres</u> can only occur in AAA areas and within each AAA area the aquaculture structures for seed collection and on-growing cannot overlap with natural beds: Therefore by definition the spatial overlap with the wild population is 0%. However, there are no spatial restrictions in <u>areas defined as low importance</u> and spatial overlap with the wild population can be up to 100%.</p> <p>A qualitative score of 4 (31-45%) was awarded to spatial scale of the activity based on: 1. Lack of spatial restriction of the</p>						

	<p>denominated areas of low importance, 2. Spatial management of the AMERBS which allow up to 40 % of the area to be occupied by seed collectors and 3. Spatial restriction of the aquaculture centres (0% overlap with natural beds).</p> <p><u>Temporal:</u> A qualitative score of 6 was awarded to temporal scale due to lines being out all year round in seed collection centres</p> <p><u>Intensity of activity:</u> score of 4 due to scale of activity and interaction it may have with other activities such as tourism, shipping and contamination.</p> <p><u>Relevant subcomponent:</u> The team decided that regardless of which subcomponents is considered as most affected the risk consequence score is low as changes in population dynamics are mainly affected by variability in environmental conditions rather than seed collection. The team gave a consequence score of 2 as seed collection was seen as an activity that could have an effect on age/size structure but with minimal impact on population dynamics.</p> <p>References:</p> <ul style="list-style-type: none"> • General Law: "La Ley Nº 18.892, y Sus Modificaciones, Ley General De Pesca Y Acuicultura." • REGLAMENTO SOBRE AREAS DE MANEJO Y EXPLOTACION DE • RECURSOS BENTONICOS. Num 355/1995 • Stakeholder consultation
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Appendix 1.2.2 Productivity-Susceptibility Analysis (PSA)

The PSA approach is based on the assumption that the risk to a species depend on two characteristics: (1) the extent of the impact due to the fishing activity, which will be determined by the susceptibility to the fishing activities (Susceptibility) and (2) the productivity of the species, habitat or community (Productivity), which will determine the rate at which recovery can occur after potential depletion or damage by fishing. It is important to note that the PSA analysis essentially measures potential risk. A measure of absolute risk requires some direct measure of abundance or mortality rate for the species in question, and this information is generally lacking in most small-scale and data deficient fisheries. For most fisheries, such information is not generally available for most components except for target species. Thus, the PSA is designed to allow assessment of ecological risk without abundance estimates.

Productivity attributes are life history characteristics that correlate with the intrinsic rate of increase (r) while susceptibility attributes correlate with the elements of the susceptibility term (q) in the following equation based on the logistic growth equation with a removal term (qEB):

$$\frac{dB}{dt} = rB \left(1 - \frac{B}{K}\right) - qEB \quad (1)$$

where, for the species in question, r is the intrinsic rate of increase, B is the biomass, K the carrying capacity, q the susceptibility, E the effort, and t time. Susceptibility is made up of the following multiplicative elements:

$$q = A \times E \times S \times PCM \quad (2)$$

Where A is availability, E is encounterability, S is selectivity, and PCM is post-capture mortality of the particular species to the fishing activity under examination.

The PSA approach examines attributes of each unit that contribute to or reflect its productivity or susceptibility to provide a relative measure of the risk to the units. For species productivity is the average of seven attributes, while susceptibility is the product of four aspects (derived from five attributes) (Table A.2.8).

Table A.2.8. Attributes for estimating productivity and susceptibility of each species to the fishing method.

	Attribute
Productivity	Average age at maturity
	Average size at maturity
	Average maximum age
	Average maximum size
	Fecundity
	Reproductive strategy
	Trophic level
Susceptibility	Availability
	Encounterability
	Selectivity
	Post capture Mortality

The calculation of risk score

The overall risk score is calculated as the Euclidian distance from the origin of a 2D plot (0, 0). For two 2D points, P= (Px, Py) and Q=(Qx, Qy), the distance is computed as:

$$\sqrt{(Px - Qx)^2 + (Py - Qy)^2}$$

Where *Px and Py* is the productivity and the susceptibility score respectively and *Qx and Qy* is the origin of the 2D plot (0, 0). Thus the equation can be expressed as:

$$\sqrt{Px + Py}$$

The divisions between risk categories and hence scoring guideposts are based on dividing the area of the PSA plots into equal thirds. If all productivity and susceptibility scores (scale 1-3) are assumed to be equally likely, then 1/3rd of the Euclidean overall risk values will be greater than 3.18 (high risk), 1/3rd will be between 3.18 and 2.64 (medium risk), and 1/3rd will be lower than 2.64 (low risk).

After the PSA is completed a final PSA score is derived for each species. These scores are divided into low risk, medium risk and high risk, on the basis of equal thirds (**Table A.2.9**).

Table A.2.9. PSA risk category for PSA scores. The cut-off values and the scoring guidepost are indicated.

PSA risk category	PSA score	MSC scoring guidepost	MSC action
High	>3.18	<60	Fail
Medium	3.18-2.64	60-80	Corrective action
Low	<2.64	>80	Pass

Productivity considers and scores seven attributes of the life history of the species (*Mytilus chilensis*) and uses these scores to generate an aggregate score (the arithmetic mean of the seven scores). The scoring table for productivity is provided by MSC (see CR version 1.2) and is given in Table X below.

To score susceptibility each fishery (i.e. ropes + diving) affecting the given stock is accounted for in the analysis.

Table 1.2.2a. Scoring table for productivity in the PSA (see FAM)

	Low productivity / high risk – score 3	Medium productivity / medium risk – score 2	High productivity / low risk – score 1
Average age at maturity	> 15 years	5-15 years	<5 years
Average maximum age	> 25 years	10-25 years	< 10 years
Fecundity	< 100 eggs / year	100-20,000 eggs/year	>20,000 eggs/years
Average maximum size	> 300 cm	100-300 cm	< 100 cm
Average size at maturity	> 200 cm	40-200 cm	< 40 cm

Reproductive strategy	live bearer	Demersal egg layer	Broadcast spawner
Trophic level	> 3.25	2.75-3.25	< 2.75

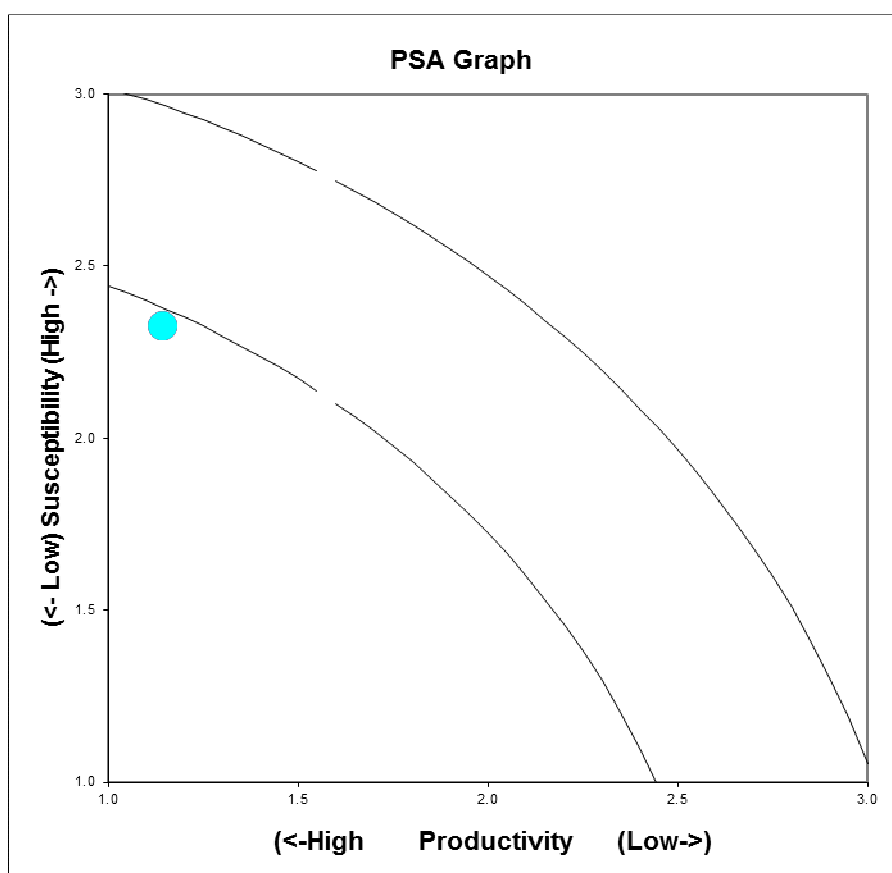
Table 1.2.2b PSA Principle 1 Rationale

PI number	1.1.1	
Productivity	Rationale	Score
Average age at maturity.	On average <i>Mytilus chilensis</i> mature at the first year of age	1
Average maximum age	On average mussels reach above 10 years of age in natural beds	2
Fecundity	>20,000 eggs/years (Litoral Austral, 2007)	1
Average maximum size	Approximately 85 mm (at the age of 5-6) (Litoral Austral, 2007)	1
Average size at maturity	50mm ((Litoral Austral, 2007	1
Reproductive strategy	Broadcast spawner	1
Trophic level	<2.75	1
Fishery	Seed collectors + diving	

Susceptibility	Rationale	Score
Areal Overlap	Score is assigned by combining the geographical overlap between long lines and diving fishing effort. > 30% based on spatial scale of mussel farming in Chiloe´s interior sea (same rationale as for SICA)	3
Vertical Overlap	Score is assigned by combining the vertical overlap between long lines and divers. Score of 2 based on medium vertical overlap exists between a benthic species and gear diving. Depth range of mussels determines that a proportion of the mussel habitat is not accessible to fishing. <i>Mytilus chilensis</i> is found in the sub littoral zone up to depths of over 150 metres (Ramajo & Osorio, 2010; Valdobinos <i>et al.</i> , 2008) but average maximum depth is estimated at 20-25m (Maldonado, 2007). Diving only reach depth up to 10 metres approximately. However higher densities of mussels are found in shallow waters and therefore a score of 2 was considered appropriate under vertical overlap.	2
Selectivity and Post capture mortality is scored individually for each gear type. To assign to overall selectivity score and post-capture score weights for each fishery are assigned according to the proportion of the catch taken by each gear type².		
Ropes Selectivity	Based on relationship between minimum landing size (50mm) and size at maturity (50mm approximately) ³ . (Litoral Austral, 2007). Size at maturity is estimated at around 50 mm length.	3

² Due to equals selectivity and post capture mortality scores assigned to each gear type weighting was not needed.

Diving Selectivity	Based on relationship between. Minimum landing size (50mm) and size at maturity (50mm approximately) (Litoral Austral, 2007). Size at maturity is estimated at around 50 mm length.	3
Ropes: Post capture mortality	High risk score by default risk score for target species	3
Diving: Post capture mortality	High risk score by default risk score for target species	3



Appendix Figure 1. PSA Graph for rope grown mussel and mussel harvesting by diving in Chiloe interior sea

³ Selectivity scores were defined as: Score level 1: Mussels are allowed to spawn more than once before being caught. Score level 2: mussels are allowed to spawn at least once before being caught and Score level 3: Mussels are caught before first year spawning event.

Appendix 1.3 Conditions

There are six conditions for certification.

Table A1.3: Condition 1

Performance Indicator	2.5.2 There are measures in place to ensure the fishery does not pose a risk of serious or irreversible harm to ecosystem structure and function.
Score	65
Rationale	There is not a partial strategy to restrain impacts of the fishery on the ecosystem
Condition	Develop a partial strategy that take into account available information about the element of the ecosystem, based on carrying capacity for example, that expects to restrain the impact on the ecosystem, work based on plausible arguments and demonstrate with same evidence that the measures will be implemented successfully.
Milestones	Year 1. Proof of discussion to the authority (Subpesca) to complete the partial strategy in terms of the impose condition. Score 70 Year 2-4. Implementing and applying the partial strategy. Score 80 Year 4-5 No further action required.
Client action plan	<p>Year 1. During year 1 working meetings will be carried out with consulting and support services. The idea is to start to design, formulate and test a <u>partial strategy to mitigate the impacts</u>, plus <u>a carrying capacity model</u> of the farming areas on the ecosystem.- Initially, the company will develop an <u>internal protocol</u> with all relevant historical information, collected over the past years, which will be the basis to start with the authority to manage a carrying capacity model applicable to our production reality.-</p> <p>Year 2-3. <u>Start of the partial strategy implementation and the carrying capacity model</u>, validated by the authority, as to visualize the aerobic or anaerobic condition of the farming centers, and the oxygen levels in the water and sediment column. Application of environmental indicators such as the AMBI Biotic Index (AZTI Marine Biotic Index) and also a model of sustainable carrying capacity applicable to the mussel industry.</p> <p><u>Data, analysis and information evaluation collection.</u> Contrasting and analysis of the results obtained versus the <u>acceptability limits</u> for the indicators and parameters under study, namely: $\leq 9\%$ organic matter; ≥ 6.8 pH; ≥ 50 mV Eh (redox); $\geq 2,5$ mg/l dissolved oxygen (1 m from the bottom); underwater filming; diversity indices and abundance of benthic macrofauna, granulometric analysis of sediments, etc.-</p> <p><u>Year 4-5. Monitoring, continuity, maintenance, or modification on strategy and carrying capacity model.</u> according to results and/or previous conclusions if there are any.</p>
Consultation on condition	<p>The client fishery will have to conform with the relevant stakeholder that the action plan can be implemented.</p> <p><u>FISHERY SUBSECRETARIAT (SSP) OBSERVATION:</u> Although today there are not values of carrying capacity for sectors where farming centers operate, it is necessary to indicate that in X and XI Regions in Chile, where mussel farming mainly develops, the Law prohibited authorization for new</p>

	<p>concessions.-</p> <p>During the current year, SSP will establish an areas model (called Barrios) for mussel farming, similar to what exists in salmon farming, and then, on that stage, a farming densities per area will be established.</p>
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Table A1.4: Condition 2

Performance Indicator	2.5.3 There is adequate knowledge of the impacts of the fishery on the ecosystem.
Score	75
Rationale	There are not sufficient information r that is been collected related to the fishery in study. There much more information which is collected but for salmon aquaculture instead to mussel farming.
Condition	It should develop a research plan that define the variables that must collect to detect any increase in risk level (e.g., due to changes in the outcome indicator scores or the operation of the fishery or the effectiveness of the measures).
Milestones	<p>Year 1 Develop a research plan that defines the variables that may detect the increase in risk level. Score: 75</p> <p>Year 2. Implemented the research plan to collect sufficient data to detect any increase in risk level. Score: 80</p> <p>Year 3-5. No further action required</p>
Client action plan	<p>Year 1-2. Design, formulation, and Authority validation, a <u>Research Plan to define the risk variables of the impacts of the farming activity</u> in question and on the ecosystem used.</p> <p>The development of the Research Plan to detect the increase in the risk levels. For example, to perform evaluations such as: use of farming management techniques applied; skills in the tasks and personnel training; periodic inspections through underwater filming of seabed; quantifications of losses and release during planting, fattening and harvesting of the centers; evaluation of the state, quantity, and efficiency of the farming floating structures and of recyclable materials; etc.</p> <p>Year 2-3. <u>Implementation of Research Plan</u> to detect the alterations and increases in the levels of the selected risks variables.</p> <p>Data collection and results with statistically valid results sufficient to conclude and modify the altered variables under study.</p> <p><u>Result ≥ 80</u></p> <p>Year 4-5. Monitoring, evaluation, and conclusions of the Research Plan applied. Continuity, maintenance, or modification according to detected changes.</p>
Consultation on condition	The client of the aquaculture /fishery activity will meet with relevant actors in order to implement the Action Plan.

Table A1.5: Condition 3

Performance Indicator	3.2.1 fishery specific objectives
Score	70
<div>13 A MSC F Full assessment Toralla S.A. 20.3.10 PCR</div> <div>page 114 of 160</div>	
<div>Version 1</div> <div>05.2012</div>	

Rationale	<p>Short and long-term objectives, which are consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are explicit within the fishery's management system.</p> <p>Currently objectives are not well-defined and some aspects, specifically the consideration of the carrying capacity (ecosystem criteria).</p>
Condition	A management & research plan is required that contains clear, specific objectives designed to achieve the outcomes expressed by MSC's Principles 1 and 2.
Milestones	<p>Year 1 – Development of research and management plan</p> <p>Year 2 – Implementation of research and management plan</p>
Client action plan	<p>Year 1. Design, formulation, and validation with the Authority, a <u>Research Plan to define the short and long term objectives</u> for the questioned aquaculture activity, consistent with the principles MSC 1 and 2, that means, with the state of the population stock and the activity impact on the ecosystem.</p> <p>At this point, it is necessary <u>to develop specific technical standard</u> to achieve a sustainable management of the productive activity, for example, setting the used areas carrying capacity through the use of a farming standard in tonnes per hectare and compatible densities with the ecosystem and which are sustainable over time. This research will start in the second year, after data obtained from the conditions 1 and 2, based on principles 1 and 2.</p> <p>Year 2. Implementation of the Research and Management Plan through the standards and productive indicators application of the carrying capacity and densities management in the various farming areas. It corresponds to perform an integrated and comparative analysis with the obtained information.</p> <p>Year 3-5. Monitoring, evaluation, and conclusions of the applied Research and Management Plan. It corresponds with the application of the most adequate and convenient standards for both, productive activity and farming environment.</p>
Consultation on condition	<p>Consultation with Subpesca on development of a management & research plan:</p> <p>SSP OBSERVATION: During 2013 the Subsecretariat is developing and tendering the following research projects:</p> <ul style="list-style-type: none"> - <u>"Assessment of the Limiting Factors in the Development of Mussel Farming, for Analysis of Carrying Capacity, X Región de Los Lagos (1st Stage)"</u>, focused on the analyses tending to develop a carrying capacity model for mussel farming. The project started in July 2012 and ends in March 2013, considering its continuity during 2013-2014, in order to validate the analyses and models applied during the first stage. - <u>"DESIGN OF AN INSTITUTIONAL MANAGEMENT MODEL FOR THE IMPLEMENTATION OF THE AMBI "Azti Marine Biotic Index, IN THE NATIONAL AQUACULTURE INDUSTRY"</u>, This Project FIC-2012, is framed within a Results Transfer Agreement between UACH (Universidad Austral de Chile) and the Subsecretariat, whose objective is to incorporate the AMBI index as one of the tools in the analysis of environmental evaluation. This project starts this year 2013 and a technological tour to Spain with Dr. Angel Borja is expected in April, to continue later working its implementation with UACH. This project ends in December 2013. - Besides, project: <u>"Monitoring and surveillance program of mussel larval availability for the sustainability of the aquaculture activity"</u> is incorporated to the ASIPA 2013 projects performed by IFOP. This project starts this year 2013 and ends by mid-2014. - Finally, it should be indicated that it is expected for the current year, to tender another Project related to <u>natural mussel beds</u>, with funds from the Aquaculture Division.

Table A1.6: Condition 4

Performance Indicator	3.2.2 decision-making processes
Score	75
Rationale	<p>Explanations should be provided for any actions or lack of action associated with findings and relevant recommendations emerging from research, monitoring, evaluation and review activity.</p> <p>The ad hoc arrangements for most of the research associated with mussels, there is no clear process for identifying actions or non-action resulting from the findings.</p> <p>Additionally there is a lack of transparency in the decision-making process relating to the granting of aquaculture concessions.</p>
Condition	<p>A management and research plan is required for the mussel sector. This should contain the necessary consultation and iterative management processes to ensure management takes research results into account.</p> <p>The client should discuss the potential to revise the permitting system to ensure it provides adequate transparency in decision-making.</p>
Milestones	<p>Year 1 – Develop management and research plan</p> <p>Year 1 – Consultation with Subpesca on amendments to permitting process</p> <p>Year 2 – Implementation of management and research plan</p>
Client action plan	<p><u>Year 1. Design, formulation and development of a Research and Management Plan.</u> Here, it corresponds to generate a transparent organizational structure of information channels and flows with the aim to know the capacities of the aquatic environment where the questioned productive activity is performed, and also the magnitude of the produced impacts, for the proactive decision-making on the studied information, well-founded, and which should be transmitted in a transparent and timely way to all parts of the work team.</p> <p>Besides, all the levels and elements which participate in questioned productive organization should be aware of the environmental damage produced to the used marine ecosystem, and that this activity involves changes to the habitat and declining of biodiversity, which finally involves important loss of business for the industry.</p> <p><u>Year 2. Administration of Research and Management Plan.</u>- It corresponds to perform the consultations, discussions, and the iterative processes with the necessary interest groups to ensure as far as possible that the administration of the productive process considers the results of the research at the time of decision-making.</p> <p>To check with the Authority as fully as possible the whole system of laws and permits which regulate the activity, to ensure adequate transparency in the decision making.</p> <p><u>Year 3-5. Application of research and management plan.</u> Implementation, monitoring, evaluation, and applied modifications.</p>
Consultation on condition	<p>Consultation with Subpesca on development of a management & research plan:</p> <p><u>SSP OBSERVATION:</u> The Subsecretariat will promptly make available the evaluation of projects to be tendered, which also considers the creation of scientific committees, together with the creation of the CNA (National Aquaculture Commission), which will be an important source for generating</p>

	research projects.
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The AMERB system is stakeholder driven, but requiring approval indicating dialogue and explanation.
Applications are made and the decision provided by the relevant authority, but not with explanation. This process is also reported to take more than two years and sometimes several years.

Table A1.7: Condition 5

Performance Indicator	3.2.4 research plan
Score	60
Rationale	A research plan is required to provide the management system with a strategic approach to research and reliable and timely information sufficient to achieve the objectives consistent with MSC's Principles 1 and 2. Research results should be disseminated to all interested parties in a timely fashion.
Condition	A research plan that addresses the information needs of management needs to be developed. A dissemination strategy should be included in the research plan to ensure stakeholders have access to results in a timely manner.
Milestones	Year 1 – Development of the research plan. Year 2 – Implementation of the research plan.
Client action plan	<u>Year 1. Design and formulation of a strategic research plan</u> that serves to deliver to the management system, reliable, transparent, timely, and enough information to achieve the proposed objectives, whose research results can be easily accessed and timely transmitted to all parts interested through a dissemination strategy. The total studies and researches to be implemented under the various conditions of the Action Plan, will involve evaluations performed with scientific methodology. All studies and evaluations of the Research Plan, -such as the evaluation of different growth zones to determine which are most adequate for the development of specimens, quantity and size of individuals per long-line and distances between long-lines, efficiency of buoys, etc.- should be associated and aimed to find the best balance of carrying capacity and minimizing environmental impacts. <u>Year 2.</u> Implementation of the research plan. <u>Year 3-5.</u> Monitoring, evaluation, conclusions, and modifications of the Research Plan applied.
Consultation on condition	Consultation with Subpesca on development of a research plan: <u>SSP OBSERVATION:</u> The development of strategic importance projects for Subpesca are assigned to the Fishery Development Institute (IFOP) as ASIPA Projects, as part of an agreement between both institutions, plus other shorter projects that IFOP awarded through the tendering process.

Table A1.8: Condition 6

Performance Indicator	3.2.5 monitoring and evaluation
Score	70
Rationale	See page 98. The fishery-specific management system is not subject to regular internal and occasional external review. AMERB management plans are subject to review by Subpesca every 4 years. However there is no evidence of a similar review process for seed collection or on-growing management systems.
Condition	An effective and timely review of the fishery-specific management system needs to be developed. The Management plan to be developed requires regular internal and occasional external review.
Milestones	Year 1 – Development of the research and management plan with the same revision period as the AMERB (that is, 4 years) Year 2 – Application of the research and management plan
Client action plan	<u>Year 1. Design and development of the research and management plan of the management information of the aquaculture/ fishery activity.</u> At this point it is necessary to perform an effective, complete and timely revision of the questioned productivity activity management system through periodic internal and external revisions. For example, of the training processes and transfer of seeds for planting. The management system to be developed, in this direction will involve <u>periodic internal revision</u> , by the company and government entities such as Fishery Subsecretariat, Sernapesca and others like Amichile. And, <u>external revisions</u> , where our management system will be evaluated by some competent agency abroad, mainly management plans with specific objectives proposed in condition 3, plus the decision-making process established in condition 4. <u>Internal revisions</u> will be performed every 4 years, and external revisions will be made every 5 years. <u>Year 2.</u> Application of the research and management plan. <u>Year 3-5.</u> Monitoring, evaluation, conclusions, and modifications of the applied plan.
Consultation on condition	Consultation with Subpesca on development of a management & research plan: <u>SSP OBSERVATION:</u> Subpesca requires coordination with the industry a management revision/ evaluation of each mussel center, with a determined frequency, for example: to carry out measurements of the <u>primary productivity</u> to be evaluated in defined periods.

Appendix 2. Peer Review Reports

PEER REVIEWER 1

Overall Opinion

<i>Has the assessment team arrived at an appropriate conclusion based on the evidence presented in the assessment report?</i>	Yes/No Yes	Conformity Assessment Body Response
<u>Justification:</u> The team uses the principal legal references and some scientific reports for the rationale; however it's necessary to incorporate other scientific studies about the farming <i>Mytilus chilensis</i> in Chile. The use of stakeholders allows supporting the scoring process with more personal information of the fishery. It was included the key components for these fishery.		

<i>Do you think the condition(s) raised are appropriately written to achieve the SG80 outcome within the specified timeframe?</i>	Yes/No Yes	Conformity Assessment Body Response
<u>Justification:</u> Proposals are appropriate to achieve SG80 and the corresponding time. However, it's necessary to include the corresponding organism that should be responsible to develop the conditions since most of them are legal.		The client will engage with the respective authority how to achieve the required outcome within the given timeframe and will specify the agency in the respective action plan.

If included:

<i>Do you think the client action plan is sufficient to close the conditions raised?</i>	Yes/No Yes	Conformity Assessment Body Response
<u>Justification:</u> The action plan presents activities towards qualification within five years. This involves different government organizations that must undertake in order to achieve proposal milestones. Strategy plan to abate impacts, Management and Investigation Plan and the application for the five conditions are suitable to obtain certification.		

General Comments on the Assessment Report (optional)

This report for the mussel fishery seems as a global report because there are few specific parameters that include specific activities of Toralla S.A. and Cultivos Toralla S.A. in the evaluation of Principles 1, 2 and 3. These are the same for any farming that works on the same zone, time and production size. In the evaluation process only it's mentioned the bird's presence monitoring as a specific activity by Toralla.

Assessment team response: According to the MSC assessment procedures, only principle 2 covers farm specific activities. In principle 2 the assessment team described specific activities where specifically bird monitoring was considered to be relevant. Few other farm specific activities are available, leading to the low score of 65.

Performance Indicator Review

Please complete the table below for each Performance Indicator which are listed in the Conformity Assessment Body's Public Certification Draft Report.

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
1.1.1	Yes	Yes	NA	<i>Certifier apply the RBF methodology to evaluation, please see this section</i>	
1.1.2	Yes	Yes	NA	<i>The score of 80 for this PI is by default in the RBF methodology</i>	
1.1.3	NA	NA	NA	<i>RBF used, therefore this PI is not scored</i>	

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
1.1.4	No	No		<p><i>Although the PI could be correct, non scientific references were used. References are pre graduate thesis. At least should have been review:</i></p> <p><i>Toro et al., 2004. The genetic structure of Mytilus chilensis (Hupé 1854) populations along theChilean coast based on RAPDs analysis. Aquaculture Research, 35(15), 1466-1471.</i></p> <p><i>Toro, J.E. 2008. Programas de selección genética en bivalvos marinos con énfasis en el caso de Chile. En A. Lovatelli, A. Farías e I. Uriarte (eds). Estado actual del cultivo y manejo de moluscos bivalvos y su proyección futura: factores que afectan su sustentabilidad en América Latina. Taller Técnico Regional de la FAO. 20–24 de agosto de 2007, Puerto Montt, Chile. FAO Actas de Pesca y Acuicultura. No. 12. Roma, FAO. pp. 289–296.</i></p> <p><i>TORO, JE; ALCAPAN, AC y STEAD, RA. 2008. Cruzamientos interpoblacionales en Mytilus chilensis, un bivalvo de importancia comercial y sus efectos sobre el crecimiento en longitud de la valva durante la etapa larval. Arch. med. vet..40(3)</i></p>	<p>Suggested references have been taken into account in the scoring of PI 1.1.4. The following references are not included in the scoring rationale provided for the score of 80.</p> <p>Jorger E Toro, Johana A Ojeda and Ana M Vergara (2004). The genetic structure of <i>Mytilus chilensis</i> (Hupé 1854) populations along the Chilean coast based on RAPDs analysis.</p> <p>Jorge E. Toro (2008). Programas de Selecccion genetica en bivalvos con enfasis en el caso Chile.</p> <p><i>TORO, JE; ALCAPAN, AC y STEAD, RA. 2008. was not found relevant for the assessment of PI 1.1.4.</i></p>

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
1.2.1	Yes	Yes	NA	<i>Reviewed references allow to assign the score, and to evaluate this PI.</i>	
1.2.2	Yes	Yes	NA	<i>Reviewed references allow to assign the score, and to evaluate this PI.</i>	
1.2.3	Yes	Yes	NA	<i>Reviewed references allow to assign the score, and to evaluate this PI.</i>	
1.2.4	Yes	Yes	NA	<i>The score of 80 for this PI is by default in the RBF methodology</i>	
2.1.1	NA	NA	NA	<i>The fishery is an enhance catch and grow (CAG) fishery as a wild harvest (seed mussels collection) followed by a grow-out phase without retained species</i>	
2.1.2	NA	NA	NA	<i>The fishery is an enhance catch and grow (CAG) fishery as a wild harvest (seed mussels collection) followed by a grow-out phase without retained species</i>	
2.1.3	NA	NA	NA	<i>The fishery is an enhance catch and grow (CAG) fishery as a wild harvest (seed mussels collection) followed by a grow-out phase without retained species</i>	

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
2.2.1	NA	NA	NA	<i>The fishery is an enhance catch and grow (CAG) fishery as a wild harvest (seed mussels collection) followed by a grow-out phase without bycatch species</i>	
2.2.2	NA	NA	NA	<i>The fishery is an enhance catch and grow (CAG) fishery as a wild harvest (seed mussels collection) followed by a grow-out phase without bycatch species</i>	
2.2.3	NA	NA	NA	<i>The fishery is an enhance catch and grow (CAG) fishery as a wild harvest (seed mussels collection) followed by a grow-out phase without bycatch species</i>	
2.3.1	Yes	Yes	NA	<i>Reviewed references allow to assign the score, and to evaluate this PI.</i>	
2.3.2	Yes	Yes	NA	<i>Reviewed references allow to assign the score, and to evaluate this PI.</i>	
2.3.3	Yes	Yes	NA	<i>Reviewed references allow to assign the score, and to evaluate this PI.</i>	

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
2.4.1	Yes	Yes	NA	<i>Although score is according to references, the qualification of SG 100 would be partially (letter P) because there are not enough scientific evidence to confirm a reduction in habitat structure and function.</i>	Assessment Team response: this issue is well covered by RE 3612 (2009) Subpesca. It's Include as literature INFAs Reports published by Subpesca in its webpage www.subpesca.cl : a) Informe ambiental de la acuicultura (2005-2006) Subpesca, 2008; b) Informe ambiental de la acuicultura. Subsecretaría de Pesca (2007-2008) published en 2010.
2.4.2	Yes	Yes	NA	<i>Reviewed references allow to assign the score, and to evaluate this PI.</i>	
2.4.3	Yes	Yes	NA	<i>Reviewed references allow to assign the score, and to evaluate this PI.</i>	
2.5.1	Yes	Yes	NA	<i>Reviewed references allow to assign the score, and to evaluate this PI.</i>	

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
2.5.2	Yes	Yes	Yes	<i>Reviewed references allow to assign the score, and to evaluate this PI. For the condition it should specify the organism who should implement.</i>	Assesment Team response: As part of the condition, the Certification body can not specify the organization that should be contacted. However, it has been suggested (ie) Subpesca as relevant stakeholder.
2.5.3	Yes	Yes	Yes	<i>Reviewed references allow to assign the score, and to evaluate this PI. The propoesd condition should specify the organism who should implement.</i>	Assesment Team response: As part of the condition, the Certification body can not specify the organization that should be contacted. However, it has been suggested (ie) Subpesca (ei) as relevant stakeholder
2.6.1	Yes	Yes	NA	<i>Reviewed references allow to assign the score, and to evaluate this PI.</i>	
2.6.2	Yes	Yes	NA	<i>Reviewed references allow to assign the score, and to evaluate this PI.</i>	

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
2.6.3	Yes	Yes	NA	<i>Reviewed references allow to assign the score, and to evaluate this PI.</i>	
3.1.1	Yes	Yes	NA	<i>Reviewed references allow to assign the score, and to evaluate this PI.</i>	
3.1.2	Yes	Yes	NA	<i>Reviewed references and stakeholders consultation allow to assign the score, and to evaluate this PI.</i>	
3.1.3	Yes	Yes	NA	<i>Reviewed references and stakeholders consultation allow to assign the score, and to evaluate this PI.</i>	
3.1.4	Yes	Yes	NA	<i>Reviewed references and stakeholders consultation allow to assign the score, and to evaluate this PI.</i>	

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
3.2.1	Yes	Yes	Yes	<i>Reviewed references allow to assign the score, and to evaluate this PI. The proposed condition has to be written as a footnote on Table PI 3.2.1 and specify which agency should define the proposed objective.</i>	In setting the condition, the assessment team has identified what is required to achieve the 80 scoring guide post. The client must define in the Client Action Plan (CAP) how that will be met and where relevant, that the necessary agencies are in agreement with the CAP.
3.2.2	Yes	Yes	Yes	<i>Reviewed references and stakeholders consultation allow to assign the score, and to evaluate this PI.</i>	
3.2.3	Yes	Yes	Yes	<i>Reviewed references and stakeholders consultation allow to assign the score, and to evaluate this PI.</i>	

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
3.2.4	Yes	Yes	Yes	<i>Reviewed references allow to assign the score, and to evaluate this PI. The proposed condition has to specify which agency should define the proposed objective.</i>	In setting the condition, the assessment team has identified what is required to achieve the 80 scoring guide post. The client must define in the Client Action Plan (CAP) how that will be met and where relevant, that the necessary agencies are in agreement with the CAP.
3.2.5	Yes	Yes	Yes	<i>Reviewed references and stakeholders consultation allow to assign the score, and to evaluate this PI. The proposed condition has to be written as a footnote on Table PI 3.2.5 and specify which agency should define the proposed objective.</i>	In setting the condition, the assessment team has identified what is required to achieve the 80 scoring guide post. The client must define in the Client Action Plan (CAP) how that will be met and where relevant, that the necessary agencies are in agreement with the CAP.

Any Other Comments

Comments	Conformity Assessment Body Response
<p>Some text observations are:</p> <p>Part B need the respectively Title "Part B"</p> <p>Pg. 14 Table 1 is Table 3</p> <p>Pg. 17 Table 2 is Table 4</p> <p>Pg. 21 at the second paragraph in the first line have to replace "XX"</p> <p>Pg. 26 It must to maintain a single nomination to X region as X or 10th belong the text.</p> <p>Pg. 26 Table 3 is table 5</p> <p>Pg. 33 in the last paragraph it's cited Ribera 2004 and maybe correspond to 2005</p> <p>Pg. 43 in the RBF process summary it's mentioned Appendix 1b must to replace by appendix 1.2</p> <p>Pg. 64 Table PI2.3.1 on SG80 letter c review the age of the reference Ribera 2006 and on SG100 please review the English spelling</p> <p>Pg. 69 SG80 letter b no reference about the bird presence monitoring by Toralla.</p> <p>Pg. 72 Correct the word low to Law</p> <p>Pg. 77 the cited Clement et al. 2010 it's not on the reference list on pg 49</p> <p>Pg. 93 For the specific condition on Table PI 3.2.1 please maintain the same format for all tables, including the condition as a footnote</p> <p>Pg. 95 The correct condition number is 4 an not 3, please correct the numbering for the next condition tables.</p> <p>For the References is appropriate to follow a scientific format and the same for citations along the text.</p>	<p>Number of the table was corrected within the text.</p> <p>Number of the table was corrected within the text.</p> <p>Correct number was included (with reference).</p> <p>Nomination was harmonized to X region.</p> <p>Number of the table was corrected within the text.</p> <p>The studies of Ribeiro et al, are cited on page 34 and were published on 2005 and 2007 respectively</p> <p>It was corrected in the text (page 66)</p> <p>English spelling was changed.</p> <p>Toralla has been monitoring themself, there is not a scientific project carring on.</p> <p>Word was changed to law.</p> <p>Reference is already included – please refer to Plancton Andino Ltda.</p> <p>Format of the tables was revised.</p> <p>Numbers of condition tables were revised.</p> <p>Consistency was checked. However, this is a certification report, not a scientific report.</p>

For reports using the Risk-Based Framework:

Performance Indicator	Does the report clearly explain how the process used to determine risk using the RBF led to the stated outcome? Yes/No	Are the RBF risk scores well-referenced? Yes/No	Justification: Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response:
1.1.1	Yes	Yes	<i>Final scoring includes SICA and PSA analysis showing low risk evidence by the direct capture through seed collection of the target species. This is according to stakeholders information and a support of literature review.</i>	
2.1.1	NA	NA	<i>No retained species exist for this fishery.</i>	
2.2.1	NA	NA	<i>No by-catch species exist for this fishery.</i>	

For reports assessing enhanced fisheries:

Does the report clearly evaluate any additional impacts that might arise from enhancement activities?	Yes/No No	Conformity Assessment Body Response:
<u>Justification:</u> <i>The report do not consider the problem of scarcity of seeds that currently exists maybe because high farming densities, the seed catch or environment factors. An increasing use of littoral zones would exceed the carrying capacity. The above problem needs more scientific investigations to ensure the sustainability of the fishery. However, this is a topic necessary to include in the report.</i>		<p>Assessment Team response: According to the information dealing with the scarcity of seed, there are only some hypothesis suggesting that there are much more ropes than the areas or bay can accept, survival increase rate of larvae, plus other global phenomenon like el Niño and la Niña, Change in the global weather and the effect of the volcano eruption 3 to 4 years ago.</p> <p>Subpesca, as fishery authority, has understand that mussel farming sustainability, needs to manage the knowledge about the seeds availability, and keys which are involving. The study carrying out by C.</p>

	<p>Molinet et al, 2012 (in charged by Subpesca) : "Evaluación de los factores limitantes en el desarrollo de cultivos de mitílidos, para análisis de capacidad de carga, X Región de Los Lagos", recently finished was focused on the keys that are affecting the availability of seeds, is in the line of the peer reviewer comments in this documents.</p> <p>Update, there is not available information, so in the annual audit will be collect it from projects that now a day are carrying out.</p>
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PEER REVIEWER 2

Overall Opinion

<i>Has the assessment team arrived at an appropriate conclusion based on the evidence presented in the assessment report?</i>	Yes/No	Conformity Assessment Body Response
<u>Justification:</u> Yes , however, it would have been interesting to have a higher volume of baseline information in order to evaluate the principle 1 and 2. (Mainly regarding to data from captures and data from results of Environmental Monitoring Program).		

<i>Do you think the condition(s) raised are appropriately written to achieve the SG80 outcome within the specified timeframe?</i>	Yes/No	Conformity Assessment Body Response
<u>Justification:</u> Yes , but some condition (2.5.2), has an implementation timeframe too long.		

If included:

<i>Do you think the client action plan is sufficient to close the conditions raised?</i>	Yes/No	Conformity Assessment Body Response
<u>Justification:</u> The client action plan is sufficient but in too light and the level of details and deep is very low. Also, the timetable to development this Plan should be reviewed and reformulate in a shorter time. Therefore, a little more detail on the actions to take would be recommendable, as well as the need to deliver annual reports of the results.		Further background information has been added explaining the setting of the milestones for specific action plans. The assessment team feels the action plans are adequately detailed, however, the action plans have been revised to be better understandable. Annual surveillance audit reports will answer the request to deliver annual reports.

General Comments on the Assessment Report (optional)

Mussel aquaculture in Chile has grown of very important form in recent years, in parallel also another very important activity in Chile as in the case of salmon.

This growth is so high currently causing some environmental disturbances such as with the issue of seed collection. In recent years, with no obvious reasons, has decreased significantly the natural catchment, which makes even threaten the viability of some companies. Obviously some environmental disturbance or marine conditions can be doing to change the emission patterns and mussel seed setting.

At the same time it is true that the legal framework is quite robust aquaculture in Chile, but as evidenced by the evaluation, it is also true that the greater attention of the authorities and monitoring activity is focused mainly on salmon farming.

Thus, a priori and locally the impact and sustainability of mussel farming has acceptable levels, however, the evaluation there are two aspects that should be strengthened, as they allow better understanding of the real effects of this activity, and therefore its sustainability.

One aspect is the carrying capacity. The document is not sufficiently justified its calculation and interpretation and not justified acceptable ranges. The reference is: *The estimation of the retention time of the particle estimated as ASC formula is 3,74 days, which is in accordance with the retention time communicated by José Luis Blanco as Oceanographer Stakeholder (Skype meeting)*.

The results ($CT/RT = 57,5/3,74 = 15,36$ days), is not explain and we don't Know the range of acceptability or suitability.

Assessment team response: It included the references that reported CT in *Mytilus chilensis*:

- a) B. L. Aguila, F. E. Machmar, 2007. "Crecimiento y dinámica de intoxicación-detoxificación de juveniles de *Mytilus chilensis* (*Bivalvia: Mytilidae*) frente a la presencia del dinoflagelado tóxico *Alexandrium catenella*", UACH, Thesis to get the degree of Licenciado en Ciencias Biologicas.
- b) L. P. Gonzalez , 2003. "Capacidad de alimentación y análisis endoscópico en bivalvos filtradores de la infauna y epifauna de la bahía de Yaldad, Chiloé, Chile.", UACH, Thesis to get the degree of Licenciado en Biología Marina.

Such thesis informed the CT for *M. chilensis* used in the ASC formula.

On the other hand, Ovalle *et al* 2010, reported an average of 3 days in eliminating the tidal effects of the hydrodynamics variables in the validation of the numerical model applied in studies carrying out in Estuario Reloncaví. This is the only research developed in the area where the salmon and mussel farming are interacting. (E.M. Ovalle, O. Pizarro, J. Concha, 2010: Modelación Fiordo de Reloncaví. Primeros resultados. Taller de capacidad de carga, sustentabilidad y manejo a largo plazo de la actividad acuícola. Sponsored by Subsecretaría de Pesca).

Since 2 years ago, IFOP is carrying out another project which main goal is the study of the hydrographic dynamic of the Mar interior de Chiloé, but the results are not yet available.

Subpesca, as fishery authority, has understand that mussel farming sustainability, needs to manage the knowledge about the seeds availability, and keys which are involving. The study carrying out by C. Molinet *et al*, 2012 (in charge of Subpesca): "Evaluación de los factores limitantes en el desarrollo de cultivos de mitílidos, para análisis de capacidad de carga, X Región de Los Lagos", recently finished was focused on the keys that are affecting the availability of seeds, is in the line of the peer reviewer comments in this documents. The results of this project are not published yet because is in analysis step. In this project, were studied mussel physiology, ecology and management, oceanography, phytoplankton and chemical composition of the water column, and a numerical model to apply.

It will expect that, this research continue with a second and long term part,

Another aspect is the knowledge about the impact or environmental effects of the facility. Throughout the document says that there are no impacts, but there are no clear data on the matter today. In fact we can find ...*However, the data comprised during the period between*

2009 up to date is confident because the methodologies and sampling method applied for sampling were normalized to ISO 17025.

Assessment team response: Before 2009, there were different protocols to develop the methodologies of the analysis required for the RA 404, further RE 3411 both from Subpesca. RE 3612 (which replaced RE 3411) established that sampling methods as well as in lab methodologies describes in the RE must be normalised. This has allowed the comparison between labs more confident as well as the results obtained in the INFAs.

Regardless of the quality standard, a higher level of information on these issues would be desirable to know.

Assesment Team response: It is included in two reports published by Subpesca:

- a) Informe ambiental de la Acuicultura 2005-2006 Depto.Acuicultura, 2008.
- b) Informe Ambiental de la Acuicultura Subpesca, periodo 2007-2008 published 2010.

These reports shown the mussel farming diminish its environmental impact according the law, from 4,3% to 0,23% in terms of anaerobic results found between 1101 INFAs submitted to Subpesca, in 2007 and 2.593 in 2008 respectively.

These two aspects must out or referred to in the Action Plan, with sufficient detail and with shorter lead times and appropriate.

In short, the mussel farming should provide information to justify its compatibility with the environment and it sustainability.

Performance Indicator Review

Please complete the table below for each Performance Indicator which are listed in the Conformity Assessment Body's Public Certification Draft Report.

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
1.1.1	YES	YES	NA	The PI score 81,6 is good. Nevertheless, something more information regarding to evolution of captures of seed in the area, would be interesting, due the recent news on problems with annual recruitment.	The problem of lack of seed will be assessed through annual audits. It is not considered to be a reason to change any of full assessment outcome as the reasons causing lack of seed are currently unknown.
1.1.2	YES	YES	NA	The reference points are appropriate for the stock.	
1.1.3	NA	NA	NA		
1.1.4	YES	YES	NA		
1.2.1	YES	YES	NA	The PI score 80 is adequate.	

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
1.2.2	YES	YES	NA	The certifier gave a score of 90 for this PI, and is fine, because the control system through the license is good. But it depends of the post control by the authority on the fisheries (collection of information, fieldwork, so on).	
1.2.3	YES	YES	NA	The score 80 is OK.	
1.2.4	YES	YES	NA	The score 80 is OK.	
2.1.1	NA	NA	NA		
2.1.2	NA	NA	NA		
2.1.3	NA	NA	NA		
2.2.1	NA	NA	NA		
2.2.2	NA	NA	NA		
2.2.3	NA	NA	NA		
2.3.1	YES	YES	NA	The score of 95 is adequate.	

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
2.3.2	YES	YES	NA	The score of 80 is adequate.	
2.3.3	YES	YES	NA	The score of 80 is adequate according to level of information delivered and the references provided.	

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
2.4.1	YES	YES	NA	The score of 90 is good. Nevertheless, the data respect to aerobic result should be current.	Team Assessment response: It included 2 reports published by Subpesca : a) Informe ambiental de la Acuicultura 2005-2006 Depto.Acuicultura, 2008. b) Informe Ambiental de la Acuicultura Subpesca, periodo 2007-2008 published 2010. According to law, these reports shown the mussel farming diminish its environmental impact on habitat according the law, from 4,3% to 0,23% in terms of anaerobic results found between 1101 INFAs submitted to Subpesca, in 2007 and 2.593 in 2008 respectively. Up date, this percentage is around 2% (comm. Pers. Yohana Gonzalez; Gerente AMICHILE)

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
					In summary the strategy is working, as the results found by Subpesca, there is not impact on the habitat.
2.4.2	YES	NO	NA	<p>The score of 100 is ok but the information used to score this indicator is not sufficient to achieve the score.</p> <p>According to report, since 2009, the methodologies and sampling method applied for sampling have traceability because are normalized to ISO 17025, but nevertheless, the data are not availables to be analysed.</p>	This PI is about strategies in place to minimise the impact on the habitat. Therefore, the comment twich relate te PI are delt in 2.4.1
2.4.3	YES	YES	NA	<p>The score of 80 is ok taking in consideration that the information and data available are not sufficient and are not integrated.</p> <p><i>As explained before, there are different kind of information collected CIMAR Fiordos Cruises, PSMB, INFAs and CPSs, but are not integrated to evaluate the changes over a determined period where the fishery has been develop as a commercial activity.</i></p>	

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
2.5.1	YES	NO	NA	<p>The score of 80 is ok but the information used to score this indicator is not sufficient to achieve the score.</p> <p>The report say that the estimation of the retention time of the particle estimated as ASC formula is 3,74 days which is in accordance with the retention time communicated by José Luis Blanco, but nevertheless, this reference is not reported in the Bibliography, and therefore we can not know the range of values to get this results.</p>	<p>Assessment Team response:</p> <p>It included the references where <i>Mytilus chilensis</i> CT were reported. This CT was used for calculation in this report: a) Blanca L. Aguila , Fabiola E. Machmar, 2007. "Crecimiento y dinámica de intoxicación-detoxificación de juveniles de <i>Mytilus chilensis</i> (<i>Bivalvia: Mytilidae</i>) frente a la presencia del dinoflagelado tóxico <i>Alexandrium catenella</i>", UACH, Thesis to get the degree of Licenciado en Ciencias Biologicas. b) Loreto P. Gonzalez, 2003. "Capacidad de alimentación y análisis endoscópico en bivalvos filtradores.</p>

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
					<p>Ovalle et al 2010, reported an average of 3 days in eliminateing the tidal effects on the hydrodynamics variables in the validation of the of the numerical model applied in studies carring out in Estuario Reloncaví. This is the only one study developed in the erea where salmon and mussel interacting.</p> <p>INFAUNA Y EPIFAUNA DE LA BAHÍA DE YALDAD, CHILOÉ, CHILE”, UACH, Thesis to get the degree of Licenciado en Biología Marina.</p>

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
2.5.2	YES	YES	YES	The score of 65 is correct, and the condition nº 1 is appropriate taking into account that a better strategy for management should be developed by companies, and report annual results to authority. Furthermore, in order to valuate in better way the strategy or Plan, more details on content, deep and scope it would be need. In others word, Which are the measure to minimize the impacts?	
2.5.3	YES	YES	NO	The score of 75 is ok. The condition nº 2 should be reinforced. Develop a research plan to define variables to be collected is not the problem. The parameters or variables are sufficiently studied and for that, the Plan must contain a clear strategy to action and identify the parameters and scope of study.	Assesment team response: The condition should be done to achive the 80 guide post at the action plan, that will address the problem. The revant Authorities will be responsible of implementing a appropriate monitoring program to detect the risk. The monitoring program will be implemented as part of the action plan. The comprehensive of this program by the certification body will be during the annual surveillance audits.

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
2.6.1	YES	YES	NA	The score of 100 is ok.	
2.6.2	YES	YES	NA	The score of 95 is ok.	
2.6.3	YES	YES	NA	The score of 80 is ok.	
3.1.1	YES	YES	NA	The score of 90 is adequate. Nevertheless, the references in this PI should be improved. In the text of score many laws are mentioned, but in the reference are not included.	References are made to individual Articles within the General Law, which is referenced.
3.1.2	YES	YES	NA	The score of 85 is ok.	
3.1.3	YES	YES	NA	The score of 90 is ok.	
3.1.4	YES	YES	NA	The score of 80 is ok.	

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
3.2.1	YES	YES	YES	The score of 70 is Ok. The condition number 3 is underdeveloped. Something more information on the content of the Plan it would be recommended. Furthermore, the timetable to develop the Plan is too long. The mussel production cycle is annual, and for that, the Plan must be considered one year to the design and one year to development.	The client has informed the CAB that with the necessary involvement of Subpesca, the proposed timeframes are unworkable. The Assessment Team recognises that legislative change is a lengthy process outside of the client's control and therefore the condition's timeframe has been extended.

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
3.2.2	YES	YES	YES	<p>The score of 75 is Ok. The condition number 4 is underdeveloped in the part of Client action plan. Something more information on the content of the Plan it would be recommended.</p> <p>Futhermore, the timetable to develop the Plan is too long.</p> <p>In the table where PI is scored(pag 95), the number of condition is 3 but more ahead, in page 113, this appears as the condition number 4.</p>	<p>Numbering amended to condition 4.</p> <p>In setting the condition, the Assessment Team has identified what is required to achieve the 80 scoring guide post. The client must define in the Client Action Plan (CAP) how that will be met and where relevant, that the necessary agencies are in agreement with the CAP.</p> <p>The Assessment Team recognises that legislative change is a lengthy process outside of the clients control and therefore the condition's timeframe has been extended.</p>
3.2.3	YES	YES	NA	The score of 95 is OK.	

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
3.2.4	YES	YES	NO	<p>The score of 60 is Ok.</p> <p>The condition nº 5 should be reinforced. Develop a research plan to define variables to be collected is not the problem. The parameters or variables are sufficiently studied and for that, the Plan must contain a clear strategy to action and identify the parameters and scope of study. Timetable is to long.</p> <p>It is not observed the connection of this research plan with national research organizations working on the field, and they should be impartial observers in the monitoring.</p> <p><i>In the table where PI is scored(pag 98), the number of condition is 4 but more ahead, in page 114, this appears as the condition number 5.</i></p>	<p>In setting the condition, the Assessment Team has identified what is required to achieve the 80 scoring guide post. The client must define in the Client Action Plan (CAP) how that will be met and where relevant, that the necessary agencies are in agreement with the CAP.</p> <p>It is agreed that the CAP requires some revision to ensure the condition will be met.</p> <p>Numbering amended to condition 5.</p>
3.2.5	YES	YES	YES	<p>The score of 70 is good and the condition number 6 is Ok.</p> <p><i>In the table where PI is scored(pag 100), the number of condition is 5 but more ahead, in page 115, this appears as the condition number 6.</i></p>	<p>Numbering amended to condition 6.</p>

Any Other Comments

Comments	Conformity Assessment Body Response
<ul style="list-style-type: none"> - Data on Environmental Impact Assessment. The company must provide more information from 2009 until now, even when the company be under other certification of quality. - Carrying capacity. Information must be improved for calculating and monitoring in the areas of mussel aquaculture. <p>According McKindsey et al.(2006)⁴, <i>Models and tools for assessing the carrying capacity of an area of interest for bivalve culture can be classified according to their level of complexity and scope. One of the most contentious issues with respect to the development of mariculture throughout the world is the concept of “carrying capacity”. Debate on this concept is often fuelled by the lack of a clear and concise definition of the term, which can be interpreted on a wide scale of values that include physical, biological, and social variables.</i></p> <p><i>Thus, for the purpose of this discussion on carrying capacity for bivalve mariculture, we adopt the definitions of Inglis et al. (2000) who divide carrying capacity into four functional categories:</i></p> <ul style="list-style-type: none"> <i>i) Physical carrying capacity — the total area of marine farms that can be accommodated in the available physical space,</i> <i>ii) Production carrying capacity — the stocking density of bivalves at which harvests are maximized,</i> <i>iii) Ecological carrying capacity — the stocking or farm density which causes unacceptable ecological impacts,</i> <i>iv) Social carrying capacity — the level of farm development that causes unacceptable social impacts.</i> <p><i>In closing we suggest that the most pressing need for research with respect to determining the ecological carrying capacity for bivalve aquaculture includes the following subjects:</i></p> <ul style="list-style-type: none"> <i>– Studies must be done to better understand the environmental interactions (positive and negative) of various types of bivalve culture including all farming activities from seed collection to ongrowing, harvesting and processing. All farming activities need to be considered in models and Geographic Information Systems.</i> <i>– Existing models must be made spatially explicit.</i> 	<p>Assessment team response: The environment impact information corresponding to 2009 and 2011 are available. Instead of 2013, the monitoring are developing. (INFAs for mussel corresponding every 2 years).</p> <p>Assessment team response: Subpesca, as fishery authority, has understood that mussel farming sustainability, needs to manage the knowledge about the seeds availability, and keys which are involving. The study carrying out by C. Molinet et al, 2012 (encharged by Subpesca) : "Evaluación de los factores limitantes en el desarrollo de cultivos de mitílicos, para análisis de capacidad de carga, X Región de Los Lagos", recently finished was focused on the keys that are affecting the availability of seeds, is in the line of the peer reviewer comments in this documents. The results of this Project are</p>

⁴ Review of recent carrying capacity models for bivalve culture and recommendations for research and management. Christopher W. McKindsey, Helmut Thetmeyer, Thomas Landry, William Silvert.

- *Temporal variation must be built into existing models; this is especially true with respect to harvesting and other seasonal activities.*
- *Models must be validated in a number of locations to evaluate their generality.*
- *Appropriate management tools, such as Fuzzy Expert Systems, must be developed to aid in decision-making.*

From the above it can be extracted, on the one hand that carrying capacity is not only an environmental issue (as the case is calculated in the report), and on the other hand, regarding the environmental carrying capacity, even should activities be included seed collection, in addition to farming.

- **Client action plan.** Should be reinforced in contents, planning, parameters, and agent involved, and so on; and adjusted in terms of deadlines or timetable.

not published yet because are in analysis step. In this project, were studied mussel physiology, ecology and management, oceanography, phytoplankton and chemical composition of the water column, and a numerical model to apply.

It will expect that, this research continue with a second and long term part, The team assessment is agreed that for mussel farming, it should develop ecological carrying capacity studies.

Assessment team response: Further background information has been added explaining the setting of the milestones for specific action plans. The assessment team feels the action plans are adequately detailed, however, the action plans have been revised to be better understandable. In addition, the client will engage with the respective authority how to achieve the required outcome within the given timeframe and will specify the agency in the respective action plan.

For reports using the Risk-Based Framework:

Performance Indicator	Does the report clearly explain how the process used to determine risk using the RBF led to the stated outcome? Yes/No	Are the RBF risk scores well-referenced? Yes/No	Justification: Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response:
1.1.1	YES	YES	The consequence score of 2 is correct. (MSC score 80)	
1.1.2	YES	YES		
1.1.3	YES	YES		
1.2.4	YES	YES		

For reports assessing enhanced fisheries:

<i>Does the report clearly evaluate any additional impacts that might arise from enhancement activities?</i>	Yes/No	Conformity Assessment Body Response:
<u>Justification:</u> The report clearly evaluates the potential impacts (for example, by divers activities), but these impacts should be more detailed with respect to level of information, and after included in the monitoring plans. In general terms, although this fishery is known and at local level its effects are low, all this should be more clear explained and justified in the assessment.		

Appendix 3. Stakeholder submissions

Appendix 3.1.a Written submissions made by stakeholders during consultation opportunities

IMO received stakeholder comments on the nominated peer reviewers. The peer reviewers Christian Diaz Peralta and José Carlos Macias were proposed on the MSC website by IMO on the 22nd of May 2012. Stakeholder comments were received regarding the experience of the proposed peer reviewers in MSC procedures, the knowledge of the Chilean mussel cultures within the X region, the accredited expertise and academic qualification in principle 1 and 2. In addition, the stakeholders were concerned about the “standards and process used by IMO to select the peer reviewers which led to doubts about the efforts deployed by IMO in order to select suitable peer reviewers in a transparent and accountable manner”. Compliance and suitability of the two peer reviewers Christian Diaz Peralta and José Carlos Macias was revisited by IMO and found to be adequate. In addition, the MSC standard and process on requirements for the selection of peer reviewers was further explained to concerned stakeholders. Nevertheless, due to the stakeholder concerns, an additional peer reviewer Maria Manira Matamala Farran was appointed on suggestion of the stakeholders and proposed on the MSC website by IMO on the 2nd of August 2012. The start of the peer review was announced on the MSC website by IMO on the 8th of February 2013 with the deadline of completion on the 22nd of February 2013. The peer reviews of José Carlos Macias and Christian Diaz Peralta were received in time. However, the peer review of Maria Manira Matamala Farran was never received despite signed contracts being in place. All trials of correspondence by the head office, local representatives and the assessment team failed. The CAB continued to try and clarify what may have happened, but nothing was received and therefore this additional peer review is not part of this assessment.

Appendix 3.1.b All written and a detailed summary of verbal submissions received during site visits regarding issues of concern material to the outcome of the assessment

All stakeholder`s verbal submissions were taken into account by the assessment team. Please refer to the minutes in the following.

Minutes day 2 WWF skype

Date:	06.03.2012	
Start:	4.30pm (Mauricio left 7.20pm)	
Finish:	7.30pm	
Attendance:	Cristina Torres (WWF), Mauricio Galvez (WWF), Michèle Stark (lead assessor), Antonio Hervás (P1), Hilda Castro (P2), Rod Cappell (P3)	
Location:	Office Hilda	
Translation	Yes (after the call)	
responsible	topic	time
Hilda (P2)	Call and short introduction.	4.30
Antonio (P1)	Introduction of assessment team.	
	Information following appendix GCKA (review of assessment, purpose of	

	consultation and how information will be used, information in writing if possible, keep WWF informed, other opportunity for input). Introduction to MSC procedures including RBF. Questions following appendix GCKA (interest, concerns, recommendations, other experts, references, information for SICA etc)	
WWF (Cristina, Mauricio)	artisanal fisheries: impact on stock assessment RBF: why use RBF if information / monitoring is available.	
Antonio (P1)	Goes through SICA, briefly explains PSA.	
WWF (Cristina, Mauricio)	Give some input to the SICA. Concern: stakeholder consultation should be balanced and IMO should meet with artisanal fisheries. WWF sees artisanal fisheries as causing main risk. -> high score (6) in special Comment: Harvest control rules for mussels: no quota Main concern is really salmon and white fish	
Hilda (P2)	Introduces P2. Asks for inputs and supporting studies if available to the inputs given by WWF in this meeting.	
WWF (Cristina, Mauricio)	WWF has not much information in tenth region about ecosystems, ETP, Habitat and translocation regarding mussels. Their main general concerns were: <ul style="list-style-type: none"> - dolphins: restriction in moving around the lines and also because the lines block the channel causing change in reproductive behavior. - Bad management practices. - Some bad management of lost structures and indirect interaction with other species - Concerned that via Toralla this opens the market to Spain, which would be a concern for other species like white fish. - No estimate of carrying capacity, no baseline - Commented on c.c: varies, different in different areas 	
Rod (P3)	Introduces P3. Asks for any issues to do with management, governmental or fisheries management, mussel dialogues.	
WWF (Cristina, Mauricio)	Allocation of licenses issued to indigenous people. Comment: Harvest control rules for mussels: no quota Main concern is really salmon and white fish	
Michèle (lead assessor)	Gives background information on media outlets used to publish the MSC assessment, stakeholders contacted and how input can be given during the next assessments steps.	
Antonio (P1)	Closing summary	7.30

Minutes day 3 Toralla on-site audit

Date:	07.03.2012	
Start:	10.00am	
Finish:	03.00pm	
Attendance:	Pedro Miranda (Sernapesca), Pedro Herrera (Directemar), Gonzalo Castro (Directemar), Javier Hausdorf (Directemar), Felipe Zapata (Directemar),: Johanna Gonzalez(AmiChile), Michèle Stark (lead assessor), Antonio Hervás (P1), Hilda Castro (P2), Rod Cappell (P3)	
Location:	Office AmiChile	

translation	yes	
responsible	topic	time
Michèle (lead assessor)	Introduction all attendees Explanation of MSC procedures	
Toralla	Presentation Toralla	
Antonio (P1)	Explanation of MSC procedures continued	
Antonio (P1)	questions	
Rod (P3)	questions	
Hilda (P2)	questions	
AmiChile, Directemar, Sernapesca	<p>Discussions and information given on:</p> <ul style="list-style-type: none"> - Info on policies related to fishery management - Info on all aspects related to management & where to obtain it - SICA: seed collection is main activity causing risk (artisanal fishing/diving is minimal) - Spatial scale: consensus (6months seed collectors) - Overlap: due to seed collection, not diving - Temporal scale: 6m natural banks, 3, seed collection in centers 6, diving 5 - Intensity: 3-4 (interaction with other activities, incl. tourism, shipping, contamination) - Geographic range: 2 (can have locally high number of seed collectors, which might have effect on availability of spat, even though there is no evidence of any reduction in mussel availability) - In 90ies, they used to grow to market size in 8 months, today it is 13-15 months - Translocation is well managed, there is a decree 320, 309 <p><u>Experts summarise main inputs. All inputs from all stakeholders respected?</u></p> <p>P1 Input 1) worries about seed availability. How will it be addressed in future?</p> <p>P3 Input 2) social problems: regulation not so strict.</p> <p>P3 input 3) People are asking for specific regulation for mussels (currently made for salmon).</p> <p>P3 input 4) problem that lines are not removed from water when they should.</p> <p>P2 input 5) environmental reports should be more clear (benthic studies) and transparent.</p> <p>Additional information: Location of seed collection Not much information on environmental variables Low seeds in 2012, but don't know why. Critical. Not clearly regulated. Some sectors closed. What will happen in the future? Must include in regulation what will happen if there is little seed. Not constant</p> <p>P1 Not much impact, no significant risk for natural banks, quantitative information, artisanal fisheries, no real plan about seed availability</p> <p>P3 Generally good level of compliance, a lot of regulation, no subsidies, some issues with fishermen collecting seed, no research plan/strategy but research in place</p>	

Minutes day 3 Subpesca on-site audit

Date:	07.03.2012	
Start:	5.10pm	
Finish:	5.35pm	
Attendance:	Sergio Mesa (Subpesca), Max Montoya (Subpesca), Claudia Javalquinto (Subpesca), Michèle Stark (lead assessor), Antonio Hervás (P1), Hilda Castro (P2), Rod Cappell (P3), others	
Location:	Skype call; internet problems, meeting rescheduled for 08.03.2012 at 11.00am	
translation	yes	
responsible	topic	time
Hilda (P2)	Call and short introduction.	5.10
Antonio (P1)	Introduction of assessment team.	

Minutes day 4 Subpesca on-site audit

Date:	08.03.2012	
Start:	12.00am	
Finish:	2.40pm	
Attendance:	Sergio Mesa (Subpesca), Max Montoya (Subpesca), Claudia Javalquinto (Subpesca), Michèle Stark (lead assessor), Antonio Hervás (P1), Hilda Castro (P2), Rod Cappell (P3), others	
Location:	Video conference from office Sernapesca in Castro	
translation	yes	
responsible	topic	time
Antonio (P1)	Introduction of assessment team. Short introduction of principles. MSC procedure was presented to Subpesca in a workshop in December by Antonio.	12
Antonio (P1)	Question on: <ul style="list-style-type: none"> - Scale and type of artisanal fishery - Overlap - Minimum size - plan - Risks - Questions & discussions on SICA - responsibilities Explanation of consultation periods	
Hilda (P2)	Introduces P2 Specific questions on: <ul style="list-style-type: none"> - any feedback on carrying capacity - zones 	
Rod (P3)	Introduces P3 Questions on: <ul style="list-style-type: none"> - Licensing of artisanal fisheries - Identify in document or elsewhere if there are long-term objectives for the fishery management - Development fund for research - Modifications to regulation: process - How ensure if regulation is well implemented - Area management: what are limitations & how is it defined? - Consideration of carrying capacity in area management? - 1/50 ratio 	

	- Are conditions for revised policies possible	
Subpesca	<p>Answers:</p> <p>Artisanal fishing: no real risk, as they have no export markets. Also collect seed (normal collectors) and sell to factories.</p> <ul style="list-style-type: none"> - Description of activity - 6000 divers but chorito is not a priority species. Mainly for loco - Artisanal fisheries: very local and only when there is a demand on the local market - Explain legal scenarios: aquaculture license, area use, management area, AAA areas, 6months limited seed collection, collectors park planned but not yet implemented, - Indigenous group has priority over anything - Management area: return 10% of seed to natural population - SICA: didn't add numbers but gave general feedback that there is no effect and should score 100 <p>Some additional points:</p> <ul style="list-style-type: none"> - There is a register of harvest - Licenses for artisanal fisheries are not limited - Long-term fishery objective: politica nacional de cultura (sustainable, social and economic plan). Objectives of subpesca as an organization. National aquaculture commission to implement the policy: the commission has been transformed under the ISA and salmon problem. Only set up when required, not running on a permanent basis. Want to introduce a more regular system. This will include mussels. Regional committees include mussel producers and collectors. - Condition setting: possible <p>Asks for Hilda to prepare presentation to explain a little more about the MSC process.</p> <p>Will send copy of voluntary plan Will send AAA map Area manejo plan</p>	

Appendix 3.2a Written submissions made by stakeholders about the public comment draft report

Written submissions were only made by MSC. Changes were made due to these written submissions. Please refer to the following table.

Main ID	Sub ID	Page Reference	Grade	Requirement Version	Oversight/Description	PI	CAB Comment
323	3797	29	Guidance	*N/A vn/a	Reference "Table 4" seems to be for Table 6		Table number was fit into position.
323	3798	59	Major	CR-CC3.1.5c v1.3	In P122 no explanation is given on how harvest control rules act to reduce the risk as defined in the RBF, as unacceptable risk levels are approached.	1.2.2	Explanation was added into Table PI 1.2.2. No changes were made to scoring or conditions, the changes are basically clearer phrasing of the rationale.
323	3799	64	Guidance	*N/A vn/a	PI 231 SG100c is marked as met ("Y"), while Rationale and score granted indicate the opposite.	2.3.1	PI 2.3.1 SG 100 c was re-marked as not met ("N"). The scoring, rationale or conditions were correct but a typing error had occurred which was corrected.
323	3800	71	Major	CR-27.10.6.3 v1.2	PI 241 has a single scoring issue at SG 100 level, and therefore it is permitted to 'partially score' to obtain an intermediate score. However, rationale provided, does not clearly explain which aspects of the scoring issue are met.	2.4.1	Rationale was revised for explaining that SG 100 was partially met. No changes were made to scoring or conditions, the changes are basically clearer phrasing of the rationale.
323	3801	56-62	Major	CR-CK2.1.4 v1.3	The assessment shall be conducted on sources of seed stock used in the fishery. Rationales supporting the scores for PIs in the Principle 1 component Harvest Strategy (1.2.1, 1.2.2 and 1.2.3) should only include specific and relevant information related to the collection of mussel seeds (not to the on-growing stage)	1.2.1, 1.2.2, 1.2.3	Mentioned rationales were revised accordingly. No changes were made to scoring or conditions, the changes are basically clearer phrasing of the rationale.
323	3802	44	Guidance	CR-27.12.2 v1.3	Report says "All product within the UOC is eligible to enter further Chain of Custody" but does not say "and be eligible to carry the MSC ecolabel" as per CR 27.12.2		In 5.3 the sentences was extended by "and is eligible to carry the MSC ecolabel".

323	3803	44	Guidance	CR-27.12.2.1 v1.2	Report says (page 16) "All 13 supplier sites included in the UoC are owned by Toralla S.A or its subsidiary Cultivos Toralla S.A....". Could benefit if reference is also made in section 5.2 (Traceability within the fishery) that the list of 13 supplier sites could be found in the Table 4 (page 17) of PCDR.	In 5.2 a reference to table 4 was added.
323	3806	44	Guidance	CR-27.12.1.1 v1.2	There are boats involved into seed collection and into delivery of harvest from lines to shore. The Traceability section of PCDR could provide more clarification on the management system/ownership of these vessels and reference to where the list of boats could be found. This clarification and reference would strengthen the rationale that fishing outside UOC and occurrence of substitution prior to the landing is "highly unlikely" (p.44)	Chapter was revised accordingly.

Appendix 4. Surveillance Frequency


The surveillance score is calculated by IMO according to the Table C3 given by MSC:

Criteria	Surveillance Score	Score Given
1. Default Assessment tree used?		
yes	0	0
no	2	
2. Number of conditions		
Zero conditions	0	
Between 1-5 conditions	1	
More than 5	2	2
3. Principle Level Scores		
≥85	0	
≤85	2	2
4. Conditions on outcome Pls?		
Yes	2	
No	0	0

The surveillance score is 4 leading to a normal surveillance level that requires on-site audits annually.

Surveillance score from table above	Surveillance level	Years after certification of recertification			
		Year 1	Year 2	Year 3	Year 4
2 and more	Normal Surveillance	On-site surveillance audit	On-site surveillance audit	On-site surveillance audit	On-site surveillance audit & recertification site visit

Appendix 5. Client Agreement



TORALLA SOCIEDAD ANONIMA

Señores:
IMO Swiss AG
Oficina Suiza.

Estimados señores IMO Swiss AG, por medio del presente documento les informo lo siguiente:

Despues de Revisar el Informe Final del Full assessment Report MSC Fishery, le podemos indicar que, no tenemos objeción alguna al documento y que este ha sido aceptado y confirmado por nuestra empresa.

Sin otro particular le saluda atentamente.

Chonchi, Noviembre 19 de 2013.



José María Escobar,
Sub-Gerente General
Fonos: 672500 - 671880

C.Matriz: Camino a Queilen Km.6 – Chonchi, Chiloé – X Región – Chile
Fonos/Fax: (56-65) 672500 – 672501 – 671880 +671881 – 671882

Appendix 5.1 Objections Process

No objection was raised.