Surveillance Report

Assessment against MSC Principles and Criteria for:
PATAGONIAN SCALLOP FISHERY
(*Zygochlamys patagonica*)
Certificate code: F-OIA-P-0101

May 8th, 2013

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CLIENTS: *Glaciar Pesquera S.A. and Wanchese Argentina S.A.*

FIRST SURVEILLANCE VISIT

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PATAGONIAN SCALLOP FISHERY
(*Zygochlamys patagonica*)

May 8th, 2013

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1. General background about the fishery.

The re-certification process for the Patagonian scallop fishery started in April 2011, and it was re-certified as sustainable against Principles and Criteria of the Marine Stewardship Council (MSC) by Organización Internacional Agropecuaria (OIA), therefore is well managed and sustainable fishery.

The certificate of compliance F-OIA-P-0101 extends from March 26th 2012 to March 25th 2017. GLACIAR PESQUERA S.A. and WANCHESE ARGENTINA S.A. are entitled to use this certificate to enter from certified fishery into the certified chains of custody.

The Client Group was met in Mar del Plata, where information on the surveillance process as well as the timescales and milestones of Action Plan were presented. GLACIAR PESQUERA S.A. and WANCHESE ARGENTINA S.A. have supported and collaborated in the accomplishing of conditions.

The MSC requires certified fisheries to be audited periodically against MSC standard to ensure that the certification is in place and the fishery is complying with the conditional requirements imposed by the Assessment Team in the full-assessment process.

Table 1: Summary of fishery and vessels certified

Species	Patagonian scallop (*Zygochlamys patagonica*)		
Location	Argentine Continental Shelf, between the latitudes 36º45' to 48º SL and the longitudes 54º20' to 65º20' WL, in waters approximately 60-120m deep, between the northern boundary with Uruguay and a line drawn between Malvinas Islands and Tierra del Fuego in the South.		
FAO statistical area	41		
Fishing method	Benthic Otter Trawl Net		
Vessels	0350	ATLANTIC SURF I	Glaciar Pesquera S.A.
	02030	ATLANTIC SURF III	Glaciar Pesquera S.A.
	0537	ERIN BRUCE	Wanchese Argentina S.A.
	02439	MISS TIDE	Wanchese Argentina S.A.
Number of fishery	1		
Actual eligibility date	August 1st, 2011		

The fishery has completed its first fishing year since re-certification. The surveillance team finds that the Patagonian scallop fishery still complies with the MSC standard and therefore recommends maintaining the MSC Fishing Sustainable Certificate.

2. Assessment process.

2.1 Determination of the surveillance level

Table 2: Criteria to determine surveillance score (Table C3, 27.22.1.1 – MSC CR v1.2)

Criteria	Surveillance Score
1. Default Assessment Tree used?	0
2. Number of conditions	2
3. Principles Level Scores	0
4. Conditions on outcomes PIs?	2
Total scoring:	**4**

2.2 Date(s) of the surveillance visit

Table 3: Surveillance level and summary of certification

Certification Date	March 26th, 2012
Expiry date of certification	March 25th, 2017
Surveillance score (from Table C4, MSC CR v1.2 – 27.22.1.3)	4 (Normal Surveillance)
Surveillance stage (from Table C4, MSC CR v1.2 – 27.22.1.3)	Year 1 – On site visit surveillance audit
On –site visit activities	March 11th to 12th, 2013. Mar del Plata March 13th to 26th, 2013. Capital Federal
Reference of the MSC requirements used in the surveillance	MSC Certification Requirements version 1.2, 10th January, 2012

2.3 Surveillance team

The surveillance team selected with knowledge of stock assessment, ecosystem impact and management framework applicable to Patagonian scallop fishery, has been part in the re-certification process.

Dr. E. Morsan, Team Leader and Principles 1 and 3 expert

Dr. Morsan has 25 years experience as a fisheries scientist and 13 years as Professor in Marine Biology and Fishery in Universidad Nacional del Comahue, Argentina. He is a specialist in stock assessment of molluscs and has considerable experience in marine invertebrate biology, ecology and resource assessment, and improvement fishing methods, particularly in relation to the overall fishery in San Matías Gulf.

He has been invited as specialist science reviewer for the MSC Assessment of the Patagonian scallop fishery (2006 and 2012), including Pre-Assessment and several surveillances. He has work in experimental evaluation of fishery of Samborombom bay mullet (*Mugil lisa*), applying of small-diagnosis and assessment of sustainable of artisan fishery of Southern red king crab (*Lithodes santolla*) and soft-shell red crab (*Paralomis granulosa*) in Beagle Channel and the Southern red king crab fishery full assessment process.

Dr. L. B. Prenski, Principles 2 and 3 expert

Dr. Prenski is a fishery scientist, with over thirty years of experience in policy and management fishery issues. Among many others, he has been a Technical Director of CAPECA (Argentinean Freezers Fishery Association), Demersal and Inland Fisheries Research Area Coordinator, Research at INIDEP (National Fishery Research and Development Institute, Argentina) and actively participates at ICSEAF (International Commission for the Southern Atlantic Fishery, Poland).

He has been a member of the Animal Health and Food Sanitary Service (SENASA), administration council in representation of the fishery sector, external adviser in Foreign Office of Commission of Joint Marine Front between Argentina and Uruguay, and technical coordinator on CCAMLR (Commission for the Conservation of the Marine Living Resources). Actually, he is Assistant in FAO Argentina.

Dr. Prenski has served as team member in Argentine hoki (*Macruronus magellanicus*) (2012) and Argentine anchovy (*Engraulis anchoita*) (2011) against Principles and Criteria of the MSC.

Dr. H. J. Cranfield, Principle 2 expert

Dr. Cranfield has over 40 years experience as a fisheries scientist involved in fisheries management issues and fisheries research in New Zealand with the Ministry of Agriculture and Fisheries, then as a senior scientist with the National Institute of Water and Atmosphere Research Limited, and latterly as a fisheries consultant.

He has expert knowledge of the biology and ecology of shellfish and specialist in stock assessment of molluscs and the effects of fisheries on the seafloor. He has experience on how fishing modifies sediment composition of the seafloor, how fishing affects benthos, and how these changes alter physical and biological processes at the seabed and affects fishery production.

Dr. Cranfield has as team member in MSC certification and re-certification process of Patagonian scallop fishery (2006 and 2012).

Lic. R. J. Bridi, Principle 3 expert

Lic. Bridi holds the position of Natural Recourses General Director of Río Negro Province, Argentina. He has almost 20 years experience and the practical knowledge on both fisheries policy and fisheries management and enforcement under Argentinean legislation. He has integrated the main argentine fishing authority – Federal Fishing Council (CFP) – and has worked as Fisheries Director of Río Negro Province for eight years between 1992 and 1999, as Secretariat of Fishing, and lead assessor in Argentinean Fishing and Aquaculture National Sub secretariat and Río Negro Province Congress.

He has worked with the senior management teams of public sector bodies, and advised corporate managers on various aspects of policy, reform, and development and improved decision-making, both in national and provincial governments.

Lic. Bridi has previously been involved in MSC assessment for Patagonian scallop fishery (2006 and 2012), Argentine anchovy fishery (2011) and Argentine hoki fishery (2012) certification assessment.

2.4 Description of the audit process

This report represents the first annual surveillance, after OIA has notified the Client Group where and when the Annual Surveillance Visit would take place. All stakeholders who had expressed interest and contributed to the Full-Assessment process were directly contacted by email and later by telephone. The intention to conduct on-site visit was posted on the MSC and OIA websites.

The surveillance audit was carried out following the Marine Stewardship Council (MSC) Certification Requirements Version 1.2, January 2012. It was documented progress of conditions as “on target”, “ahead of target” or “behind target”, as well as its rationale for such a judgement. If progress against the measurable outcomes, expected results or milestones specified when setting the condition is judged to be “behind target”, it will specify the remedial action, and any revised milestone, that are required to bring process on track at the next surveillance audit to achieve the original condition by the original deadline.

The Surveillance Team reviewed the fishery status analyzing whether the fishery was complied with the required conditions set forth in the original certification report, and whether current scenarios compromises the performance of the fishery in regard to the MSC Standard.

The annual surveillance audit process was comprised of the following parts:

- **Provision of information:** The Audit Program, the Conditions established by the Surveillance Team for Certification and the Action Plan elaborated by the Client Group and its experts, were provided to all stakeholders, including the Client Group, fisheries management authorities and scientist previously to the meetings.
- **Meetings:** Individual meetings started with the Client Group and followed with scientists and NGOs, amongst other stakeholders; wherein an exchange of relevant information and documents regarding the first surveillance audit took place. All interesting parties were invited to consultation, which took place in the INIDEP, Mar del Plata, on March 11th and 12th 2013, and continuing in the next days. The meetings were conducted by the Surveillance Team and focused on the ongoing activities associated with the Certification Conditions established on the fishery as well as the eventual changes occurred after the achievement of MSC Sustainable Fishing Certification. In addition, stakeholders provided with responses to questions regarding the following issues:

  a) Any potential or actual changes in the management systems.

  b) Any changes or additions/deletions to regulations.

  c) Any changes in the science, management and industry staff to evaluate impact of the management of the fishery.

  d) Any potential changes in the scientific base of information, including stock assessments.

- **Documentation:** Relevant documents in regard to the progress of the Action Plan add related issues were provided to Assessment Team by Client Group and stakeholders prior and during the meetings. After these, follow up emails were sent to stakeholders to request additional information.

The Surveillance Audit ended on March 29th, 2013. For more information, you can find meetings from Appendix section. The information received allowed the Surveillance Team to assess the advances in the implementation of the Action Plan made by the Client in order to comply with the conditions established for certification.

Table 4: Outline of surveillance activities

Stakeholders notification: surveillance visit scheduled	February 1st, 2013
Surveillance year 1: visit on-site	Mar del Plata, March 11th and 12th, 2013
MEETING ATTENDEES AND ORGANIZATIONS	
Day 1: March 11th, 2013 *Opening surveillance meeting with Client Group*	
Name	**Affiliation**
Mr. Gabriel Suarez	*GLACIAR PESQUERA S.A.*
Mr. Marcelo Bocian	*GLACIAR PESQUERA S.A.*
Mr. Tomas Hudecek	*GLACIAR PESQUERA S.A.*
Mr. Pedro Ibar Bohnsdalen	*WANCHESE ARGENTINA S.A.*
Dr. Oscar Iribarne	*Universidad Nacional Mar del Plata*
Group meeting	
Name	**Affiliation**
Lic. Mario Lasta	*INIDEP*
Lic. Mariana Escolar	*INIDEP*
Mr. Ronaldo Díaz	*INIDEP*
Mr. Matías Schwartz	*INIDEP*
Dr. Griselda Garaffo	*INIDEP*
Eng. Cecilia Mauna	*INIDEP*

Mrs. Susana Herrera	*INIDEP*
Day 2: March 12th, 2013 *Individual meetings*	
Name	**Affiliation**
Dr. Claudia Bremec	*INIDEP*
Lic. Alejandra Cornejo	*CEDEPESCA*
Eng. Daniel Valdovinos	*CEDEPESCA*
Lic. Guillermo Cañete	*Fundación Vida Silvestre*

2.4.1 Scope and history of assessment

The re-assessment process followed the MSC Certification Requirements (CR) v.1.2 and the Risk Based Framework on Outcomes Indicators for bycatch, habitat and ecosystem components, while the MSC default narrative and metric, including the Scoring Guideposts (SGs), were applied to the rest of the Performance Indicators (PIs).

The fishery was re-certified as an MSC Sustainable Fishery in March 2012 and this is the first surveillance audit after re-certification, conducted under the MSC Certification Requirements (CR) v.1.2 and MSC Fisheries Standard v.1.1.

2.4.2 A statement on the fishery's position in relation to the scope criteria

Tasks to comply with the conditions (established at certification and accepted by the Client through its Action Plan) are still in progress. No re-scoring of the performance indicators where conditions were established was required.

Table 5: Summary of Performance Indicators with conditions.

Performance Indicators	*Status of conditions*
1.2.4	*On target*
2.2.1	*Behind target*
2.2.2	*Behind target*
2.2.3	*Behind target*
2.4.1	*Behind target*
2.4.3	*Behind target*

3. Results, conclusions and recommendations.

3.1 Discussion of findings and statement confirming the status of the certification

a) Principle 1 – Stock status and harvest strategy

For the first surveillance, it is presented a historical summary of Patagonian scallop fishery, a technical report of fisheries statistics in 2011 (Campodónico & Herrera, 2012), and a report of the Workshop on stock assessment and harvest strategy of certified fishery.

The landing of scallop callus during 2011 estimated by INIDEP was 6,628t. The green catch of scallop size commercial estimated with a rate conversion of 7.14 was 47,325t. During 2011, there were 32 tides, where into 31 opportunities were embarked Observers on board and only one has embarked an Inspector appointed by National Direction of Fisheries. The fleet was oriented fishing activities into Management Unit located in the Argentinean Slope Front. The total nets deployed by fleet in both sectors of fishery was 87,983 t in 2011 (in 2010 was 80,704 nets deployed). The area swept by fleet during 2011 (assuming non-overlapping sets) amounts to 2,236km2 (in 2010 value was 1,868km2).

For another hand, the Workshop on "Stock assessment procedures and criteria to establish harvest strategies" was held in Mar del Plata by INIDEP from February 7th and 8th, 2013. The Workshop was attended by 21 experts variety of disciplines and backgrounds to discuss alternative methods to analyze the history of the fishery, the collection and use of data in the management of the fishery. It was concluded and recommended the following:

- The fishing efficiency of the dredge used during the surveys conducted by the research vessel of the INIDEP should be estimated. This is important since management of the stock relies on direct evaluations. Working values of 0.35 (1998 to 2005) and 0.5 (2005 to 2008) have been used, however direct estimations are lacking, particularly for the heavier dredge used between 2005 and 2008. The efficiency of the dredge used between 1998 and 2005 was estimated relative to the efficiency of the commercial gear by Valero (2002), with values around 0.43 and 0.48.
- Obtain a set of standardized fishing gear designed to be used specifically in scallop surveys. This could be designed for trawl surveys (nets, doors), dredge surveys or other sampling gear such as for oceanographic variables.
- Plan and conduct experiments to estimate the efficiency and selectivity of the sampling gear used in scallop surveys.
- Once the method to be used in future surveys is agreed, it should be calibrated with the previous dredge to maintain comparability with methods and data collected during surveys between 1998 and 2008.
- Experiences in estimating selectivity and efficiency of commercial gear were conducted in the early years of the fishery (Lasta & Iribarne, 1997). Given changes in fishing gear used by the commercial fleet it would be important to plan and conduct field experiments to estimate its efficiency and selectivity. This would improve the estimation and interpretation of changes in commercial CPUE.
- Alternative methods to estimate the total capture of the commercial fleet should be evaluated. Such estimation can be conducted at present by either converting total production to total capture (using a time and space constant production conversion factor) or a visual estimation of fishing net fullness. Alternative methods could incorporate improvements to indirect methods such as visual estimation, volumetric techniques, time and space dependent conversion factors or direct weighting of whole fishing net using scales.

- A preliminary age-structured integrated model using the Stock Synthesis software package was conducted prior and during the workshop by Dr. Valero. The model was a first cut exercise to illustrate the capabilities of model and should not be taken in any way as a formal stock assessment of Patagonian Scallops. The model was structured as a pooled one area of the entire distribution and dynamics of the stock and its fishery between 1995 and 2011. This implies averaging a number of fishery (fishing mortality, gear selectivity) and population processes (growth, natural mortality, recruitment) that are know to vary markedly of sedentary resources in general and the Patagonian scallop in particular. Even with this caveats, the model produced goods fits to the data and reasonable population and fishery trends. The use of this or similar model approaches should be planned and evaluated at relevant population fishery and management spatial scales.
- Planning the evaluation of the current and alternative management strategies should be considered.
- An evaluation of the ability to estimate the incidental capture of Patagonian scallops from observed not target fleets should be considered.
- Priority should be given to experiments to estimate the survival of discarded undersize scallops. Experiments should be planned to include relevant variables such as the effect of multiple captures, survival of juvenile scallops, survival as a function of processing time, survival as a function of time the experiment.
- For most of the recommended work it is critical to redesign the Patagonian scallop data base. In its current format it is not usable and thus it is recommended to develop a new platform
- Planning for follow up meetings should be undertaken during the next months. Meetings should include stakeholders from fishing companies, INIDEP and Escuela Nacional de Pesca in order to resolve logistic issues and follow up on the recommendations of the workshop.
- Results should be transferred to the authorities (Federal Fisheries Council, INIDEP) in a timely way.

b) Principle 2 – Ecosystem impacts from fishing

It is proposed an abstract submitted and accepted in the 19th International Pectinid Workshop "Bycatch in the Patagonian Scallop fishery: composition and damage to main non-target species" and a technical report with preliminary results of the experience on board during the stock assessment of Patagonian scallop in 2012 (September – November, 2013). Also, included a description of sorting mechanisms, which was provided by companies involved in certification. In commercial vessels of Patagonian scallop fishery, through different selection mechanisms, is discarded bycatch species and scallops of non-commercial size. Selection process on board influences not only on the target species, but also on different groups of catch. The index average damage increased after the selection process in most species analyzed, showing greater impact on fragile species. The rest of species studied showed a medium-low index average damage, although several of them for their body size were retained in processing line. The damage observed is species-specific and would be related to the morphology of individuals.

For another hand, a report of the workshop "Fishing gears in the Patagonian scallop fishery" is provided. The Workshop was held in Mar del Plata from December 4th and 5th, 2012. It is organized as a condition of MSC re-certification process and was attended by 25 experts from a variety of disciplines and backgrounds to:

- Discuss alternative gear methods to increase fishing efficiency and selectivity but reducing seafloor impact.
- Develop action plans to test at seat promising new or improved devices.
- Produce a technical report summarizing results and providing evidences that a strategy (either partial or total) for managing bycatch has been successfully implemented.

It was concluded and recommended the following:

- It is imperative to analyze with captains the more convenient operational form for conducting the experiments, both for efficiency and selectivity estimates. It was agree to discuss this matter during March 2013 in the ENP.
- It is recommended to choose an experimental area (A) relatively large (with good prospects for capture) and scaled to possibility of the fishing operation.
- It should be done an accurate spatial positioning system (GPS), to allow repeatability of the tow
- It is necessary to estimate by means of a scale, the magnitude of successive captures during the depletion experiments. This requirement will produce necessary information to adjust the relationship between visual estimation and real catch weight.
- It was considered very important that the areas for depletion experiments (to estimate efficiency) must be heterogeneous and include, whenever possible different conditions such as sedimentary composition and scallop density.
- However, the areas corresponding to the experiments to compare the "standard" gear vs. prototype or modified gears "type" should be as uniform as possible. Thus, the predominant effect will be the one corresponding to the differences between the gears and avoiding the effect causes by the bottom heterogeneity.
- Selectivity experiments must be performed in areas with mix cohorts.

It is presented a technical report by Diez *et al.* (2006) and a scientific paper (Escolar *et al.,* 2009), which summarize information about bycatch from data obtained by Observers on board during 1998-2005. The Technical Report by Escolar *et al.* (2013) shows preliminary results, the database with information obtained by observers was updated to the period 2006-2009. There are two other reports, one analyses bycatch sorted by the functional group (Chaparro & Lasta, 2013) and the other analyses whether the 10L bycatch samples are adequate or not (Lasta, 2013).

At the same time, it is provided the Research Survey Plan presented in the INIDEP to answer this goal. A report about scallop distribution in relation to sediment (Lasta, 2013) and a proposal to analyze the distribution of bycatch (Bremec *et al.,* 2013) are presented. It was concluded the following:

- Current data base system has several problems. The functionality of the existing system should be port into new technology to improve performance, enhance the feature set to include new reports and data collection capabilities, and resolve performance issues and failures of the present software. The solutions here proposed will ensure data reliability for future studies.
- Fishing beds of the Patagonian scallop fishery were defined in this report, updating information with trawl data up to December 2011. Current bed definition, changed slightly from former definition made by Bogazzi (2008), beds appear more aggregated, but the geographic range of the fishing distribution has not changed.
- Fishing effort has been allocated sequentially to fishing beds. There are evidences of alternation in fishing activity between the two major fishing beds, and between fishing opportunities. Further studies should integrate information of scallop density, catch rate, events of recruitment and temporal closures, to better understand the relationship between fishing effort allocation and abundance of recourse. Particularly, to understand the alternation among the most intensively fished beds and what are the factors that explain the pattern.
- Reserve areas surface are less tan 3.8% of Management Unit areas, and less than 4.8 % of major fishing beds areas. This information should be updated with latest bed definition.
- According to data used in this report, Reserve Areas have been efficient in excluding fishing once them have been established.

Principle 3 - Management and regulation

Management System

During the first surveillance, the Assessment Team consulted with officials of the Under-Secretariat of Fisheries and Aquaculture (SSPyA) and INIDEP. In parallel, websites of the Ministry of Agriculture, Livestock and Fisheries (www.minagri.gob.ar); Federal Fisheries Council (www.cfp.gob.ar) and INIDEP (www.inidep.edu.ar) were also consulted. Since the re-certification of the fishery, there have been no changes at the level of system management structures. All administrative and supervisory structures remain the same missions, roles and responsibilities held at time of Fishery's recertification. Similarly, no structures or INIDEP research programs have been modified.

In the Argentina fisheries management, the same organization and agencies have been maintained, as shown in the following figure:

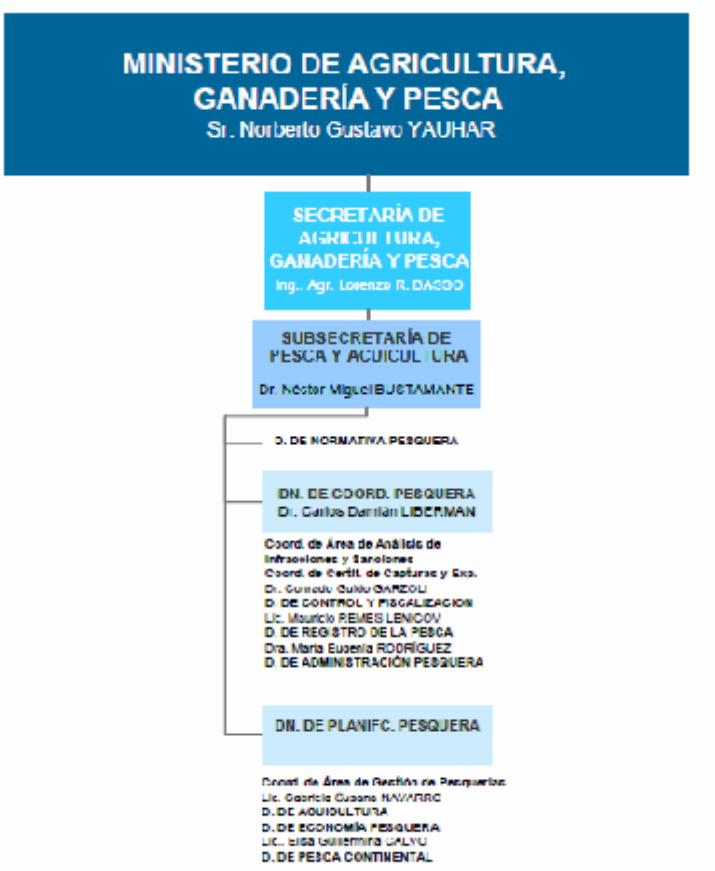


Fig. 1. Ministry of Agriculture, Livestock and Fisheries fishing sector institutional flowchart (Source: www.minagri.gov.ar)

It has not been detected that the fishery is in any controversy incurring any international treaty or systematic failures to current regulations. In consultations with stakeholders, none of them found any new information that might be changed in any aspect of the certification or the scoring assigned during the assessment process.

Legal frame and TAC

Since the re-certification of the fishery, excluding the establishment of the Total Allowable Catch (TAC) by the Federal Fisheries Council there have been a few new regulations applying specifically on Argentine Scallop Fishery, (see section 4. "Catch" and section 5.5 of Appendix). The information has been confirmed in three different ways: a) review of the official websites (www.infoleg.gob.ar,

www.cfp.gob.ar, www.minagri.gov.ar), b) consultation with stakeholders; and c) by telephone interview with the person in charge of the SSPyA National Directorate of Fisheries Planning, Lic. Gabriela Navarro.

The Total Allowable Catch has been established, following INIDEP recommendations. It should be remember FFC Resolution Nº 04/2008 establishing that fishing is not allowed for those Management Units without a TAC.

The most important change in the management system is the geographic redefinition of Management Units and the change of name of the new areas. From the recommendations of the Technical Report INIDEP Nº 1/2012 "Proposed Amendments in limits and names of the Management Units scallop fishery (*Zygochlamys patagonica*)." As well as the Monitoring Committee of the Patagonian scallop fishery, it was decided to redefine the names and geographical limits of the management units, through the adoption of Resolution FFC Nº 15/12 (see section 5.5 of Appendix). The previous UM 13 was discarded based on resource scarcity and commercial activity registered.

Also maintained the delimitations of Exclusion Areas, so that some of the new UMs contain two of them. The delimitations and surfaces Exclusion Areas can be seen in Annex II of Resolution FFC Nº5/12 (see section 5.5 of Appendix).

Table 6: The new Management Units names and locations

New areas	Latitude	length	Observations
UM A	36º42'42''	54º41'76''	Applicable to UM 1.1
	36º59'42''	54º23'45''	
	38º00'11''	55º10'13''	
	37º59'60''	56º00'05''	
UM B	37º59'65''	56º00'26''	Applicable to UM 1.2, 2 and 3
	38º00'12''	55º10'21''	
	39º52'60''	55º53'56''	
	39º52'60''	56º35'19''	
UM C	39º52'83''	56º35'68''	Applicable to almost all of the four UM
	39º52'60''	55º53'56''	
	41º25'08''	57º25'98''	
	41º23'93''	58º22'47''	
UM D	41º24'04''	58º22'69''	It is south of UM 4 UM 5, and almost all of UM 6
	41º25'58''	57º26'18''	
	42º17'74''	58º24'34''	
	42º17'74''	59º16'97''	
UM E	42º17'52''	59º17'45''	Applicable south of UM 6, 7 and UM No. 8
	42º18'06''	58º24'46''	
	43º02'10''	59º08'69''	
	43º02'10''	60º02'52''	
UM F	43º02'43''	60º02'87''	Applicable to UM 8 and 9
	43º02'43''	59º08'81''	
	44º11'82''	59º35'77''	
	44º11'82''	60º30'53''	
UM G	44º11'97''	60º30'67''	Applicable to UM 10
	44º12'09''	59º35'99''	
	44º23'49''	59º39'72''	
	44º54'46''	60º11'04''	
	45º15'38''	60º33'68''	
	45º15'38''	60º55'11''	

UM H	East of the line outside the ZEEA, to the outer edge of the Argentine mainland, between the Parallel 45 º and 47 º south latitude		Applicable to UM 14
UM I	47º30'00''	61º00'00''	Applicable to UM 11
	48º30'00''	61º00'00''	
	48º30'00''	62º00'00''	
	47º30'00''	62º00'00''	
UM J	48º00'00''	64º00'00''	Applicable to UM 12
	48º00'00''	65º23'00''	
	47º15'00''	65º23'00''	
	47º00'00''	65º29'00''	
	45º30'00''	65º14'19''	
	45º30'00''	64º00'00''	

The decision was taken in order to achieve a better match between the biological distribution of the resource concentrations (banks) and the geographical boundaries of the areas (polygons) that contain, based on the experience and knowledge gained in recent years.

Another management system change was produced by Resolution FFC Nº1/13 (http://www.cfp.gob.ar/index.php?inc=resoluciones&lang=es), which were corrected as administrative aspects and form such as the organization and systematization of existing legislation and were taken administrative measures on justification of inactivity fees, transfer procedures, maximum accumulation rates of fees and expiration thereof.

Table 7: TAC during recent years

Period	Management Unit	TAC (Tons)	INIDEP Technical Information	FFC Norm
5/1/09 to 4/30/10	1.1	**2.000**	TR 26/09	Res. N° 11/09
	1.2	**11.837**		
	2	**9.917**		
5/1/10 to 4/30/11	1.1	**2.000**	TR 27/10	Res. N° 11/09
	2	**6.451**		
7/1/10 to 6/30/11	3	**1.233**	TR 27/10	Res. N° 11/09
	4	**3.400**	TR 10/10	Res. N° 1/10 and 2/11
	5	**20.437**		
	6	**2.072**		
	7	**5.633**		
	8	**5.000**	TR 11/10	Res. N° 6/10
	9	**4.966**		
	10	**4.984**		
	11	**1.000**		
	12	**1.000**		
	13	**1.000**		
	14	**1.000**		
7/1/11 to 12/31/11	4	**4.100**	TR 4/11	Res. N° 6/11
	5	**12.230**		
7/1/11 to 6/30/12	3	**2.535**	TR 30 and 31/08	Res. N° 7/11
	6	**2.521**		
	7	**9.921**		
	8	**14.508**		
1/1/12 to 6/30/12	4	**4.100**		Res. N° 16/11
	5	**12.230**		
1/1/12 to 12/31/12	11	**1.000**	Note INIDEP N° 196/12	Res. N° 1/12
	12	**1.000**		
	13	**1.000**		

	9	**1.576**	2/12	Res. N° 3/12
	10	**2.841**		
	14	**2.000**		
7/1/12 to 12/31/12	3	**1.268**	Note INIDEP N° 1155/12	Res. N° 8/12
	4	**4.100**		
	5	**12.230**		
	6	**1.261**		
	7	**4.961**		
	8	**7.259**		
1/1/13 to 12/31/13	B (ex 1.1, 1.2, 2 and partially 4)	**19.765**	TR 33 and 34/12	Res. N° 24/12
	D (ex 5 and partially 4 and 6)	**14.020**		
	E (ex 7 and partially 6 and 8)	**1.136**		
	F (ex 9 and partially 8 and 10)	**31.577**	TR 41/12	Res. N° 27/12
	G (ex 10)	**3.558**		

After analyzing the new measures, the assessment team understands that none of them modify any aspect of the rating originally given to the fishery in recertification. These measurements demonstrate the adaptive system that handles the Patagonian scallop fishery, in the intention of the authorities and scientists to optimize the exploitation of the resource and its associated environment.

3.2 Status of previously raised conditions

- Condition 1:

1.2.4 Assessment of stock status		**SCORE: 75**
There is an adequate assessment of the stock status		
SG 60	**SG 80**	**SG 100**
▪ The assessment estimates stock status relative to reference points. ▪ The assessment identifies major sources of uncertainty.	▪ The assessment is appropriate for the stock and for the harvest control rule. ▪ The assessment takes uncertainty into account. ▪ The assessment of stock status is subject to peer review.	▪ The assessment takes into account the major features relevant to the biology of the species and the nature of the fishery. ▪ The assessment takes into account uncertainty and is evaluating stock status relative to reference points in a probabilistic way. ▪ The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored. ▪ The assessment has been internally and externally peer reviewed.

Condition 1.2.4:

Technical reports, containing the evaluation of the stock and harvest control rules must be audited by external peer reviewers. It can be done at request of INIDEP National Direct of Research or CFP.

Action Plan	Timescales/Milestones
YEAR 1: Starting the peer review process of technical reports related to stock assessment and harvest strategy by doing a workshop to review and discuss these issues. A report of the results of this workshop will be produced.	YEAR 1: Provide information that a peer review process for technical reports related to stock assessment and harvest strategy has being commenced.

Progress on conditions:

The workshop on Stock assessment procedures and criteria to establish harvest strategies was held in Mar del Plata, Argentina, INIDEP, from February 7 to 8, 2013. The participants of the workshop included external researchers (Dr. Juan Valero, Center for the Advancement of Population Assessment Methodology and Inter-American Tropical Tuna Commission), the staff of Project Benthic Molluscs of INIDEP, and personnel of Wanchese and Glaciar Pesquera (Engineerings, Captains and Managers). The key issues treated were:

- Fishery situation: historical evolution of catch and recruitment to the bottom
- Use of data in direct evaluations
- Estimating the relative efficiency between fishery and survey fishing gears used for the Patagonian scallop
- Recruitment variability of the Patagonian scallop: patterns and potential processes
- A preliminary 'Stock Synthesis' stock assessment model for the Patagonian scallop
- Discussion on alternative harvest strategies, taking into account spatial and ecosystem considerations
- Discussion on methodology used to estimate weight of the catch based on visual estimates of the fullness of the commercial nets.
- Juvenile-adult interactions in the Patagonian scallop and implications for management of its fishery
- Spatial dynamics, recruitment trends and sustainability of Pacific NW geoduck clams (*Panopea generosa*)

All these topics constitute the core of the stock assessment of the Patagonian scallop fishery and the workshop opened the discussion over them with interested parties, and same priorities were defined. The conclusions of the workshop were:

The fishing efficiency of the dredge used during the surveys conducted by the research vessel of the INIDEP should be estimated. Management of the stock relies on direct evaluations using efficiency values of 0.35 (1998 to 2005) and 0.5 (2005 to 2008), however direct estimations are lacking for the heavy dredge used since 2008. It is needed to design standardized fishing gear to be used in surveys and experiments to estimate efficiency and selectivity. The CAB recommends studies addressed to this issue, because its relevance on biomass estimation and to establish TAC.

- Alternative methods to estimate the total catch of the commercial fleet should be evaluated.
- Experiments to estimate the survival of discarded undersized scallops are priority.
- Redesign the data base.

This workshop must be the first step of a process of consecutive meetings addressed to find solutions for priorities defined here and follow up on the recommendations of the workshop.

Status on conditions:

The Assessment Team considered that the progress of the condition 1 is **"On Target".**

- Condition 2:

2.2.1 Bycatch species outcome		SCORE: 80
The fishery does not pose a risk of serious or irreversible harm to the bycatch species or species groups and does not hinder recovery of depleted bycatch species or species groups.		
SG 60	**SG 80**	**SG 100**
▪ Main bycatch species are likely to be within biologically based limits (if not, go to scoring issue b below). ▪ If main bycatch species are outside biologically based limits there are mitigation measures in place that are expected to ensure that the fishery does not hinder recovery and rebuilding. ▪ If the status is poorly known there are measures or practices in place that are expected to result in the fishery not causing the bycatch species to be outside biologically based limits or hindering recovery.	▪ Main bycatch species are highly likely to be within biologically based limits (if not, go to scoring issue b below). ▪ If main bycatch species are outside biologically based limits there is a partial strategy of demonstrably effective mitigation measures in place such that the fishery does not hinder recovery and rebuilding.	▪ There is a high degree of certainty that bycatch species are within biologically based limits.

Conditions 2.2.1:

To provide documentation and scientific reports which describe in detail the sorting mechanism and scoring of damage to bycatch and to identify how this occurs, and to provide documentation and scientific reports on the measurement of the subsequent mortality obtained from experiments on board ship or on the seafloor, in order to achieve enough knowledge that it is highly likely (greater or equal to the 70th percentile in the distribution) that main bycatch species are within biologically based limits.

If main bycatch species are found to be outside biologically based limits; to develop mechanisms to mitigate damage and mortality, and to introduce these mitigation measures developed in a partial strategy of demonstrably effectiveness such that the fishery does not hinder recovery and rebuilding.

Action Plan	Timescales/Milestones
YEAR 1: Production of a technical report with the description of the sorting mechanisms on all four vessels. Characterizing and documenting in a technical report damage caused to main bycatch species (especially echinoids) during the catch sorting.	YEAR 1: Describe and document the sorting mechanisms on all four vessels. Define and document damage caused to main bycatch species (especially echinoids) during sorting of catch. Provide documentation to Surveillance 1.

Progress on conditions:

A. Describe and document the sorting mechanisms on all four vessels.

To provide documentation and scientific reports which describe in detail the sorting mechanism

The client provided a three page report describing the cylindrical sorting drum that is inclined at approximately 15^{o} and revolves at between 15 and 30 rpm. The report has three engineering drawings that show the general construction of the drums and the four pipes through which water appears to be sprayed on the bycatch revolving inside the drum. The dimensions of the drum, size of the holes in the drum and water volume sprayed into the drum, are not provided.

During the certification of this fishery the certification team were informed that the bycatch was sorted “in a rotary drum cushioned in water so it should remain undamaged” (p33, Morsan et al., 2012). One part of condition 2 required that the evidence for this be provided to the certification team.

The engineering drawings provided indicate that the sorting drum rotates in free space presumably with an underlying conveyer belt or channel to pick up bycatch sorted and discarded by the drum. Details of this mechanism and the height bycatch falls from the drum into it should be provided.

There can be no cushioning effect of water on the rotating bycatch in the drum during sorting, as the water, like the debris must escape through the holes in the inclined drum under centrifugal force. It was expected that the researchers in their study of damage to bycatch would have studied the sorting in progress and have directly observed how damage did occur on landing of the catch and during the sorting process. This information has not been provided.

B. Define and document damage caused to main bycatch species during sorting of catch.

To provide documentation and scientific reports which score damage to bycatch and to identify how this occurs, and to provide documentation and scientific reports on the measurement of the subsequent mortality obtained from experiments on board ship or on the seafloor, in order to achieve enough knowledge that it is highly likely (greater or equal to the 70th percentile in the distribution) that main bycatch species are within biologically based limits.

Escolar et al., (2013a, 2013b) (a, an earlier English summary of b) describe sampling of bycatch during stock assessment cruises in 2012 on F/V *Atlantic Surf I*, *Erin Bruce* and *Atlantic Surf III*. Catch was sorted on each in rotating drums but *Atlantic Surf III* has added a series of screw gears on the conveyer belt before the drum (the functionality of which are not discussed). Catch was sampled from ten trawls in areas where echinoids were common. Three pseudo-replicate 10L samples were taken (1) from the catch as it was landed, and (2) after the catch had been sorted in the drums and was being discharged over the side and (3) the sorted catch passing into the hopper before processing.

The sorting process altered the composition of the catch from landing to discharge. Landed catch composition was 34% Echinodermata, 25% *Z. patagonica*, 23% Gastropoda, 13% Porifera, 3% Ascidiacea, and 2% Cnidaria. The composition of the catch sorted out of the drum and discharged over the side directly, was 58% Echinodermata, 24% Porifera, 12% undersized *Z. patagonica*, 2% Gastropoda, 2% Cnidaria, 1% Ascidiacea, and 1% Polychaeta. The commercial sized scallops and larger organisms in the catch were retained in the sorting drum and delivered to hopper of the processing factory. The composition of this part of the catch was 35% Gastropoda, 32% *Z. patagonica* 13% Echinodermata, 11% Porifera, 5% Ascidiacea, and 4% Cnidaria. Hence most of the gastropod bycatch and a significant portion of the Porifera and Echinodermata Ascidiacea and Cnidaria bycatch did not get returned to the seafloor alive as it was steamed along with the commercial scallops.

The loss of these bycatch organisms should be quantified and scaled up to the entire catch. Using the best estimate of the efficiency of trawls in catching these organisms (trawl efficiency measure for scallops, estimated to be between 0.21 and 0.31 (Lasta & Iribane, 1997), will be a reasonable estimate), estimate how this population loss will impact the entire population of these organisms along the trawl track.

Escolar et al., (2013b) measured the damage to bycatch discarded organisms during the sorting process utilizing a four point scale in this trawl scallop fishery based on that developed by Veale et al., (2001) and used by Jenkins et al., (2001) to score damage in a scallop dredge fishery.

Table 8: Damage scores for major megafaunal groups in bycatch.

	1	2	3	4
Asteroids and Ophiuroids	No damage	Arms missing	Worn and arms missing/minor disc damage	Major disc damage/dead
Urchins	No damage	<50% spine loss	>50% spine loss/minor cracks	Crushed/dead
Crabs	No damage	Legs missing small carapace cracks	Major carapace cracks	Crushed/dead
Gastropods	No damage	Edge of shell chipped	Shell cracked or punctured	Crushed/dead

Mean damage index in seventeen species of the bycatch on landing (and before sorting) was mostly higher than 1.4 and in three cases above 2 and may be attributed to damage during trawl capture. This damage level is comparable to that which the dredges caused to the bycatch organisms in the Isle of Man scallop fishery (Jenkins et al., 2001).

Escolar et al. (2013) found little or no relationship between size and level of damage in bycatch organisms among the species that had numbers over a wide size range.

Thirteen species occurred in the bycatch in sufficient numbers to allow statistical comparison of MDI before sorting and after sorting. Seven of these species, smaller echinoids, ophiuroids and one starfish were in the live discard stream. The damage index indicates that three of them, the already quite damaged *Ophiura lymani*, and *Ctenodiscus australis* and *Pteraster aff lebrun* were not significantly damaged further in the process. However, *Ophiocantha vivipara* (MDI from 1.69 to 1.98), *Ophiactis asperula* (MDI from 1.64 to 1.88), were significantly further damaged and the urchins *Austrocidaris canaliculata* (MDI from 1.25 to 2.56), and *Sterechinus agassizii* (MDI from 1.77 to 3.91), were damaged very greatly so much so that at a MDI of 3.91 (MDI 4 is crushed/dead) almost none could survive on return to the sea.

The impact of damage by sorting is irrelevant to subsequent mortality of the larger organisms because they are killed by steam along with the scallops and they are returned to the sea dead with the shucked scallop shells after processing. Although all these larger organisms were damaged by trawling when initially landed, they all showed significant increases in MDI through sorting: *Gorgonocephalus chilensis* from 1.51 to 1.76, *Diplasterias brandti* from 1.11 to 1.23, *Diplopteraster clarki* from 1.13 to 1.36, *Fusitriton magellanica* from 1.17 to 1.80, *Zygochlamys patagonica* from 1.83 to 2.34, *Adelomelon ancilla* from 2.17 to 2.76, and *Odontocymbiola magellanica* from 2.06 to 3.7.

Thus a fishery that was purported to be gentle and ecologically friendly by catching scallops in trawls, on closer inspection looks to be as damaging as those that capture scallops by dredging. Furthermore the sorting system the Certification Team was told was gentle, as bycatch was sorted "in a rotary drum cushioned in water so it should remain undamaged" (p33 Morsan et al., 2012), also turns out on closer examination, to be far more damaging to bycatch than the worst dredges. The mechanical sorting system has the appearance of getting the scallops into the factory as fast as possible and not by any ecological imperative to protect and conserve the bycatch organisms. Nor does it have an imperative to return all bycatch alive to the sea as fast as possible.

Mortality experiments on board ship should be adequate to relate damage levels in each group with subsequent mortality.

The fishery shall modify the sorting system and reduce the trawling damage to comply with this condition within timeframe all ready established.

Status on conditions:

The Assessment Team considers that important questions need to be developed to complete this condition in the certification period. No evidences that allow comply with Action Plan for the first year. It is consider that progress is **"Behind Target"**. It recommended develop and install the new sorting systems into vessels and mitigate the bycatch damage.

Important questions need to be answered:

Firstly, the damage trawls used here imposed on the bycatch were as great as dredges imposed on the bycatch of the Isle of Man scallop fishery see Jenkins et al. (2001). This dredge fishery failed Marine Stewardship Council Certification due to the damage dredging causes to benthic habitat. However, the trawl fishery for scallops in the Isle of Man attained the sustainable fishery standard as the trawls had so much less effect on the environment. In the Argentinean fishery, either the trawls used or the method of fishing them requires modification to attain a better ecological outcome.

Secondly, during the certification of this fishery the certification team were informed that the bycatch was sorted "in a rotary drum cushioned in water so it should remain undamaged". The information provided by the client exposes the error of our misconception. Water cannot cushion the bycatch in the rotating drum during sorting, as the water, like the debris must escape through the holes in the angled drum under centrifugal force. The high level of crushing and impact damage occurring among bycatch organisms that go through this process is consistent with this lack of cushioning.

Thirdly, about half the bycatch accompanies the scallop catch into the factory and is killed when the scallops are steamed. It does not get returned to the sea alive within 30 minutes as Certification Team understood (p33, Morsan et al., 2012) during the certification process. This part of the bycatch is returned to the sea dead, with the shucked scallop shells from the factory.

- Condition 3:

2.2.2 Bycatch species management strategy		**SCORE: 75**
There is a strategy in place for managing bycatch that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to bycatch populations		
SG 60	**SG 80**	**SG 100**
▪ There are measures in place, if necessary, which are expected to maintain main bycatch species at levels which are highly to be within biologically based limits or to ensure that the fishery does not hinder their recovery. ▪ There measures are considered likely to work, based on plausible argument (e.g. general experience, theory or comparison with similar fisheries/species).	▪ There is a partial strategy in place, if necessary, that is expected to maintain main bycatch species at levels which are highly likely to be within biologically based limits or to ensure that the fishery does not hinder their recovery. ▪ There is some objective basis for confidence that the partial strategy will work, based on some information directly about the fishery and/or the species involved. ▪ There is some evidence that the partial strategy is being implemented successfully.	▪ There is a strategy in place for managing and minimising bycatch. ▪ Testing supports high confidence that the strategy will work, based on information directly about the fishery and/or species involved. ▪ There is clear evidence that the strategy is being implemented successfully ▪ There is some evidence that the strategy is achieving its objective.

Conditions 2.2.2:

To provide documentation and scientific reports that on-board observers monitor the sorting and return of bycatch and the continued protection of the no-fishing zones, as evidence that the partial strategy for managing bycatch species at levels which is being implemented successfully.

To test experimentally and to document development of trawl gear that reduces bycatch.

To convene and document workshop(s) of skippers of the commercial vessels, along with gear technologists, to discuss different gears and rigging of the nets that could be utilized and developed to reduce impact of the fishery on the seafloor.

When a promising gear is found, to develop at least partial strategies to minimize bycatch, and to measure the changes in bycatch in order to provide at least some evidence, from scientific papers, that these strategies are being implemented successfully.

Action Plan	Timescales/Milestones
YEAR 1: To convene a workshop with skippers and gear technicians to discuss alternative gear methods that could increase efficiency and selectivity but reducing seafloor impact. Develop action plans to test at sea promising new or improved devices. Production of a technical report summarizing results and providing evidences that the partial strategy for managing bycatch has been successfully implemented.	YEAR 1: To provide documentation and scientific reports that on-board observers monitor the sorting and return of bycatch and the continued protection of the no-fishing zones. To convene workshop(s) and document results. Should promising gear be found, develop action plan and experimental design to test it. Document for Surveillance 1 and discuss the results and further action proposed with CAB.

Progress on conditions:

A. Observer Scheme Reporting

To provide documentation and scientific reports that on-board observers monitor the sorting and return of bycatch and the continued protection of the no-fishing zones, as evidence that the partial strategy for managing bycatch species at levels which is being implemented successfully.

This condition was requesting that the fishery provide hard evidence and the metrics that the on-board observers were indeed doing what they claimed to do. Thus very specific actions they were to do were provided by the fishery to the assessment team involved in the two Certifications.

<u>The 2006 Certification Report stated:</u>

"Size range of individual bycatch species are recorded in research dredge catches during biomass surveys and by observers from commercial trawl catches, with these data being entered into a developing database useful in analysing species life histories. (Pottinger *et al*., 2006) Quantitative estimates, providing a high degree of confidence, of the nature and extent of non-target catches and incidental mortalities by the fishery are available. They are based on a comprehensive observer program Monitoring of non-capture mortality is on-going. Sufficient information is available, for a selection of those species, to judge whether they are declining or depressed and whether the assessed fishery is causing a significant portion of their total mortality. An observer programme, required by law to cover 100% of vessels fishing (Resolution 4, section 9, Federal Fishery Council, 2005), records bycatch by species. Bycatch species are identified and a booklet with colour photographs provided for the guidance of observers and vessel staff (Bremec et al., 2003). Quantitative estimates of bycatch by taxonomic group are available from observer records of regular sub-samples of the commercial trawl catch. Observers sub-sample the catch of randomly selected tows daily, identify and count, weigh and measure maximum and minimum sizes of bycatch species and multiply the proportion of the sample to entire catch (Pottinger *et al*., 2006).

Quantitative information from on-board observers is available on the principle non-target species caught by the assessed fishery (Pottinger *et al*., 2006)."

The 2012 Certification Report stated:

"The other source of information on the state of the benthic habitat is gathered and recorded by the INIDEP Observers following their established protocols. On Board observers have estimated and weighed major groups of the bycatch in every tow landed by the fishery since its inception. In 2003, INIDEP developed an identification guide illustrating the most commonly caught species to help observers in this task (Bremec et al., 2003). Since the beginning of the fishery, observers have also taken a 10L sample of bycatch from one tow randomly each day and frozen it for later identification at INIDEP. All these data await comprehensive analysis and testing to reveal trends in the bycatch of the fishery. These data have the advantage of measuring change more directly and consistently but will require the development of statistical methods for their analyses" (Morsan *et al*., 2012).

The Argentinian National Action Plan – Sharks, identifies a number of at risk species and juveniles of one of these species, (a ray, *Dipterus chilensis*) is occasionally captured by the fishery. The numbers and species of fish caught are recorded by On Board Observers in every tow and returned to sea immediately (Morsan *et al*., 2012).

Schwartz & Herrrera (2013) do not provide the sampling protocol followed by on-board observers whose performance in 2011 was analyzed. There are no sampling metrics.

It is important to provide on bycatch damage information and reduce the impact that bycatch that it returned to the sea to comply with this condition.

B. Reducing Bycatch and Seafloor Impact of Trawl Gear

To convene and document workshop(s) of skippers of the commercial vessels, along with gear technologists, to discuss different gears and rigging of the nets that could be utilized and developed to reduce impact of the fishery on the seafloor.

The best strategy to manage bycatch populations is for the fishery to avoid catching bycatch species. The scallop fishery should have a strategy to avoid invertebrate bycatch by either not capturing these organisms or reducing their capture to low levels and thus ensure that the fishery does not pose a risk of serious or irreversible harm to bycatch populations. Modification of fishing gear is the most promising method of avoiding bycatch. Hence this Condition required a workshop of practical fishers and technologists to discuss this issue and come up with some practical solutions.

An Expert Workshop on Fishing Gears in the Patagonian Scallop *Zygochlamys patagonica* Fishery was convened at the Escuela Nacional de Pesca in Mar del Plata in December 2012 (Escuela Nacional de Pesca etal., 2013) and attended by 25 participants. The workshop had a good mix of 16 practical fishers and gear technologists but contrary to the intention and wording (see above) of the condition, included numerous marine scientists.

Fabian Ginaca skipper from Glaciar Pesquera, discussed gear changes tried since 2007 with different nets. Different materials, and doors. Tests from 2007 to 2011 did not show positive results. Tests of square mesh cod end and Euroline T90 mesh cod end gave higher catch and better selectivity. In November 2012 use of smaller doors (Garrido, model Camaron) are being tested to measure net opening by sensors and underwater camera, to reduce bycatch. These doors are lighter and are expected to have less impact on the seafloor. Discussion then focussed on modification of the cod end and technical benefits of water flow. Fabian Ginaca suggested lifting the doors to have less impact on the seafloor and Luis Martin, skipper Escuela Nacional de Pesca suggested using the footrope alone, eliminating tickler chain if possible. The use of latex treatment of netting to minimise sand deposition within the gear was also discussed by Pedro Telaga (Boatswain, Wanchese). The suggestion of a simple gear modification to reduce bycatch in a fishery for

Zygochlamys delicatula made in the condition does not appear to have been discussed. This species is ecologicaly and morphologically identical to *Z. patagonica*, occurs along the Otago Shelf Break in southern NZ at the same depths. Fishers were able to obtain clean scallop catches in trawls on a very complex benthic habitat of bryozoan thickets. They modified the gear to cause scallops to swim up from the seafloor by suspending short lengths of chain at intervals along the ground rope. The ground rope rode over the complex habitat but the swimming scallops were captured by the net.

Some of the workshop participants seem to have lost sight of the objective of this condition was fishing to reduce impact on the seafloor and to maintain populations of bycatch organisms within biologically based levels; and doing this by managing and minimising bycatch using strategies whose success can be measured objectively. Thus proposals to further test selectivity and efficiency of the gear do not relate to the objectives of this Condition. This fishery is being scored against the MSC standards hence discussion of "balanced harvest" is not relevant.

Some of the damage to bycatch organisms occurs on the seafloor when they encounter the gear but are not necessarily captured especially in dredge fisheries (Jenkins et al., 2001). In spite of the Patagonian scallop fishery being pursued by trawling, generally much less damaging to bycatch organisms, the level of damage found on bycatch organisms landed in this fishery is higher than dredge fisheries that have failed MSC Certification (see Condition 2). Damage to bycatch by seafloor encounter with the trawl might well be reduced by the new doors and different net configuration. The method used by Escolar et al., (2013b) could provide a simple objective measure of how successful such changes have been.

The level of damage identified by Escolar et al. (2013b) if this is sustained by official report; show this fishery must urgently address trawling damage to the bycatch.

Status on conditions:

Some data collected by Observer on Board and the trawling damage to bycatch organisms on the seafloor were not analysed and consequently the compliance with the milestone of Condition 2 for the first annual surveillance is **"Behind Target"**.

It considers that this fishery has an enormous amount of qualitative and quantitative bycatch data compared with most similar fisheries but this has not been analyzed at the first surveillance audit. For this reason it decides to strongly recommend the analysis of bycatch samples from OBOs. The processed information shall be required for the 2nd surveillance.

Important questions need to be answered:

- How many 10L bycatch samples taken in 2011?
- How many tows with estimated weight of main bycatch species?
- How many tows randomly subsampled have you estimated and weighed major groups of the bycatch in every tow landed?
- How many tows have been randomly sub-sampled the bycatch organisms caught identified and counted, weighed and measured with maximum and minimum sizes with the proportion of the sample multiplied up to entire catch?
- Where are the records of numbers of *Dipterus chilensis* returned over the side alive?

- Condition 4:

2.2.3 Information/monitoring		SCORE: 70
Information on the nature and the amount of bycatch is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage bycatch		
SG 60	**SG 80**	**SG 100**
▪ Qualitative information is available on the amount of main bycatch species affected by the fishery. ▪ Information is adequate to broadly understand outcome status with respect to biologically based limits. ▪ Information is adequate to support measures to manage bycatch.	▪ Qualitative information and some quantitative information are available on the amount of main bycatch species affected by the fishery. ▪ Information is sufficient to estimate outcome status with respect to biologically based limits. ▪ Information is adequate to support a partial strategy to manage main bycatch species. ▪ Sufficient data continue to be collected to detect any increase in risk to main bycatch species (e.g. due to changes in the outcome indicator scores or the operation of the fishery or the effectiveness of the strategy).	▪ Accurate and verifiable information is available on the amount of all bycatch and the consequences for the status of affected populations. ▪ Information is sufficient to quantitatively estimate outcome status with respect to biologically based limits with a high degree of certainty. ▪ Information is adequate to support a comprehensive strategy to manage bycatch, and evaluate with a high degree of certainty whether a strategy is achieving its objective. ▪ Monitoring of bycatch data is conducted in sufficient detail to assess ongoing mortalities to all bycatch species.

Conditions 2.2.3:

To analyze and document the data collected by the On Board Observer Programme that has been recorded from: tow by tow data and the 10L bycatch samples collected; and the quantitative bycatch data obtained during the annual research biomass surveys from the trawls or dredges in fished areas with those obtained from trawls or dredges in non-fished zones. The analyzed and documented information required above will allow getting sufficient qualitative information and at least some quantitative information on the outcome status with respect to biologically based limits, and the amount of main bycatch species affected by the fishery.

These requirements together with all information obtained by accomplishment of Condition 2, will support, if were necessary, at least a partial strategy to manage main bycatch species.

Action Plan	Timescales/Milestones
YEAR 1: 1. Production of a Technical Report that will include a summary of historical information from the OP discriminated by MU with annual breakdown of the information of main bycatch species. There will also be a discussion of alternative to analyze long and short term trends. 2. Production of a Technical Report documenting all 10L bycatch samples taken by OP, status of sorting and identification and discussion of how these samples will be analyzed for testing long term changes. 3. Production of a Technical Report documenting all bycatch samples taken on biomass surveys, status of sorting and identification and discussion of how these	YEAR 1: 1. Document all tow records of Observer program with annual breakdown by management unit and discussion of how long and short term trends can be analysed. Provide documentation to Surveillance 1. 2. Document all 10L bycatch samples taken by Observer program, status of sorting and identification and discussion of how these samples will be analysed for testing long term changes. Provide documentation to Surveillance 1. 3. Document all bycatch samples taken on biomass surveys, status of sorting and identification and discussion of how these samples will be analysed

samples will be analyzed for testing long term changes.	for testing long term changes. Provide documentation to Surveillance 1.

Progress on conditions:

One of the major sources of information on the state of the benthic habitat is gathered and recorded by the INIDEP Observers following their established protocols. On Board observers have estimated and weighed major groups of the bycatch in every tow landed by the fishery since its inception in 1995. In 2003, INIDEP developed an identification guide illustrating the most commonly caught species to help observers in this task (Bremec et al., 2003). Since the beginning of the fishery, observers have also taken a 10L sample of bycatch from one tow randomly each day and frozen it for later identification at INIDEP. Preliminary analyses have been made of only very limited portions of these data (Pottinger et al., 2006). Because the full analysis of these OB bycatch samples was promised, the continued taking of these samples resulted in high scores in bycatch monitoring PI in the original certification (Pottinger et al., 2006)

This On-Board Observer dataset commenced being gathered at the start of the fishery. It must be the most comprehensive bycatch record from any fishery in the world. These data have the advantage of measuring any change in bycatch over the whole area of the fishery directly. The full analysis of the data will provide valuable insights into how fishing has altered (or not) the benthic habitat of this Argentinean fishery. Because the promise was not met within the period of the first Certification, Condition 4 was written requiring a full report of the status of all samples, their comprehensive analysis and testing to reveal trends in the bycatch of the fishery and the plan for final publication.

During the audit, neither the client nor the INIDEP presented a report summarizing the historical information of the data collected by observers on board, discriminated by Management Unit to analyze long-term trends in populations of main species of bycatch. Different workgroups itself presented three papers in which is provided partially fragmented periods required information.

The client has provided two old reports that analysed 1509 On-board Observer bycatch samples from 10 scallop beds between 1997 and 2005 (Diez et al., 2006). The authors had to reject almost 22% (330 samples) of the samples which lacked weight of bycatch organisms. Observers were clearly not following protocols. Bycatch organisms were identified to lowest taxon (frequently species) from the technical guide developed by INIDEP (Bremec et al., 2003) but all these species were lumped in a single category, “bycatch” so little or no change was apparent.

Escolar et al., (2009) analyzed 575 (apparently rejecting 425 samples) On-board Observer bycatch samples. These were taken between 1997 and 2001 from 5 scallop beds. The bycatch was sorted into three major taxa (Echinoderms, sponges and gastropods). Large variations in density of these groups of invertebrates and total bycatch were found in relation to beds and years studies. The analysis did not show variability of bycatch density related with fishing effort, and it did not show different faunal conditions in different years that could indicate a general response of epifauna to trawling.

Escolar et al., (2013) analyzed 1768 On-board Observer bycatch samples. These were from 12 scallop beds between 2005 and 2009. They had to reject 1136 samples lacking weight data. Observers were still clearly not following sampling protocols. The bycatch organisms were identified to the lowest taxon (frequently species) from the technical guide developed by INIDEP (Bremec et al., 2003). The data were lumped in 10 major groups for analysis losing any ability to discriminate species loss or loss in richness. They present data in Table 3 with the number of samples by management unit (scallop beds) by year. The data show an average of 200-250 samples per year 2005 and 2006, halving to 119 samples in 2007, dropping to 47 in 2008 and only 6 in 2009. The failure to include Observer bycatch data from 2010 and 2011, (a requirement of Condition 4) suggest that no data was collected in these years at all. The lack of data mean no comparisons are possible, and they are not analyzed.

Two other reports, also prepared for the audit by INIDEP technical teams, refer to tests of principal component analysis for the study of the qualitative and quantitative composition of the community of Patagonian scallop (Chaparro & Lasta, 2013) and statistical analysis to identify the size of samples that allow to study the associated community the fishery of the species (Lasta, 2013). Both works represent an interesting test potential, but no practical application so far, so surely will be taken into account in future audit.

Based on the information gathered by the audit team and interviews with researchers INIDEP teams can be concluded that the analysis of samples collected by observers on board have severe weakness. It is definitely not providing any ecological safety net for the scallop fishery nor does it provide monitoring of how the fishery might be impacting bycatch populations.

Information documenting bycatch samples taken on biomass surveys, status of sorting and identification and discussion of how these samples will be analyzed for testing long term changes has not been provided. However, there is a document describing the species richness in most of MUs (Bremec et al, 2012). It indicates that, in 2008 - 2011 period, the number of species decreased in the sector South, in relation with previous samplings conducted with INDEP vessels, but the differences could be due to the different sampling gear.

Status on conditions:

The information provided has clearly insufficient to meet the milestone for the first year in Condition 4 and consequently progress is assessed as **"Behind Target".**

After the analysis done, the Assessment Team decides to encourage the analysis of bycatch samples from OBOs and strongly recommend the information required here shall be processed for the 2nd surveillance.

The progress being made by the fishery client to address conditions from previous assessment visit(s) shall be detailed.

- Condition 5:

2.4.1 Habitats outcome		**SCORE: 70**
The fishery does not cause serious or irreversible harm to habitat structure, considered on a regional or bioregional basis and function		
SG 60	**SG 80**	**SG 100**
The fishery is unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm.	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 evidence that the fishery is highly unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm.

Conditions 2.4.1:

To systematically sample each Management Unit, with an equal number of stations in fished areas and un-fished reserve areas, using a selective benthic sampling device, to describe the benthic habitat from these samples and to compare benthos between fished and un-fished areas and between Management Units; in order to be able to infer that the fishery is highly unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm.

Action Plan	Timescales/Milestones
YEAR 1: Complete the first survey with an equal number of stations in fished and un-fished reserve areas of all MU. Starting the sorting, identification, and weighing and counting to lowest possible taxon of all benthos species, with special emphasis on bryozoans. Production of a Technical report providing numbers and	YEAR 1: Complete the first survey with an equal number of stations in fished areas and un-fished reserve areas of all management units. Commence sorting, identification, and weighing and counting to lowest possible taxon of all benthos, with special emphasis on bryozoa which are likely to be an

locations of samples and the level of sorting achieved. The used gear will be clearly defined. Based on information required for other Conditions, there will be a clear justification of why this gear is used.	important component of the smaller benthos. Provide documentation of numbers and locations of samples and the level of sorting achieved to Surveillance 1.

Progress on conditions:

One of the management measures adopted from the inception of the scallop fishery was the setting aside of reserve areas in every management unit as a way to maintain reproductive aggregations (Lasta & Bremec 1998). These reserves also maintain areas free of disturbance from fishing providing control areas to monitor changes due to fishing in the same unit. Schejter et al., (2008) analysed the bycatch in 1998, 2001 and 2002 from 94 tows from the fished area of Reclutas bed compared with 23 tows from the unfished reserve area on this bed. Four invertebrate taxa, Austrocidaris canaliculata, Cosmasterias Ctenodiscus australis, and Porifera contribute more than 40% to the biomass of the SIMPER analysis of the community assemblage. Eight other taxa, Ophiactis asperula, Ophiocanta vivipara, Liboclaea granaria, Actinostola crassicornis, Fusitriton magellanicus, Calyptraster sp., Flabellum sp. and Volutidae contribute approximately 70% to the biomass. Benthic assemblages and species richness in both areas were similar. Comparison of taxa richness, scallop biomass, bycatch biomass, multivariate analyses, and Brey-Curtis similarity index between fished and unfished areas failed to establish any significance in differences (Schejter et al., (2008). Similar sampling on Reclutas bed in 2007 does show a significance decrease in bycatch biomass in fished areas between 1995 and 2007 as well as significant differences in species composition with higher biomasses of fragile sessile organisms, sponges tunicates and sea urchins in the unfished area compared to the fished area (Escolar et al., (2011). Sampling problems and lack of power in statistical testing have made this method of investigating the effects of fishing on benthic habitat difficult.

All these studies of the benthic community have been based on bycatch samples either of commercial trawls or of the dredge used in annual biomass surveys. In 2006 the bycatch of the standard dredge used for biomass surveys and a smaller less selective Picard dredge were compared at two sites along the Shelf Break Front (Sanchez et al., 2011). The bycatch from 16 tows of the scallop dredge contained 61 species, 11 of which were only caught with this gear. The bycatch of 7 tows by the Picard dredge contained 123 species. This figure grossly underestimates real numbers of benthic species as bryozoans, hydrozoans and porifera, major groups that sum up to nearly 60 species, were recorded as a single taxon in this study (Sanchez et al. 2011). These data have revealed a significant portion of the benthic community that is important in production, as well as in its diversity, and that will probably have major impacts on ecosystem services.

The Research Group presented reports on the analysis of relations between the Patagonian scallop abundance and grain size of the fund in banks, information from two research cruises conducted in 2005, using different sampling gear. They also report that information processed faunal composition of major species collected in picard dredge samples obtained in one of the Management Units (MDQ former, current UM B), in one of the research survey conducted in 2005.

Condition 5 was written because the inadequate amount of sampling of un-fished reserve areas comparing habitat structure with that of fished areas in the same management unit did not allow informed decisions on whether fishing was unlikely, highly unlikely to reduce habitat structure to a place where there could be serious and irreversible harm. The milestone (and Action Plan) requires for the year 1, to complete a survey in fished and un-fished reserve areas in all MU. The survey has not been executed for mechanical problems in the research vessel designated for that purpose, so that the aim of the present condition could not be reached.

Status on conditions:

This information is not sufficient for the purposes of achieving the proposed targets in the Client Action Plan for Condition 5 in the first year and consequently progress is assessed as **"Behind**

Target". Believes it is possible to grant more time to the fulfillment of the condition, by scaling time and some aspects of the condition.

The considerations are detailed below:

- It was required a commitment for the fishery that must have be taken on in whole management system and the research system, i.e. public institutions on which the client cannot be imposed, but only make petitions.
- To explore if the habitat structure is unlike to be affected by trawling it seems possible that not be necessary sampling performing all management units, but only those with higher, medium and no-fishing effort were applied.
- Dr. Bremec proposed that, if they can conduct the survey sampling unfished areas outside MU, useful information can be obtained to be compared with results inside the MU. For logistical reasons it seems reasonable idea.
- To PI 2.4.1, it has been decided to reformulate the targets of condition 5, as follow:
    - Year 2. Complete the first survey, using commercial vessels with an equal number of stations in fished and un-fished reserve areas of the 7 most fished MU and out of them. Starting the sorting, identification, and weighing and counting to lowest possible taxon of all benthos species, with special emphasis on hidrozoans. Production of a Technical report providing numbers and locations of samples and the level of sorting achieved. The used gear will be clearly defined. Based on information required for other Conditions, there will be a clear justification of why this gear is used.
    - Year 3. Complete sorting identification, and weighing and counting to lowest possible taxon of all benthos species. Analyze data comparing fished and unfished areas, between MU and with those samples obtained out of the MU. Production of a Technical report addressing the question if there are evidences that fishing seriously affect the benthic habitat. Report it in a draft of scientific papers or technical reports.
    - Year 4. Production of a draft papers and/or technical reports to Surveillance 4 with: 1. Complete analysis of benthic habitat. 2. Complete comparison of benthos of fished and un-fished areas and between management units, with tests for significance of differences. Analyzing if the evidence indicate that fishing has serious effects on benthic habitat. Production of scientific papers with these data. Complete second survey repeating what was done on Year 2 comparing fished and unfished areas and areas out of MU. This comparison will be done at the lowest possible taxonomical level, with special emphasis on hidrozoans. Production of a Technical (and draft of scientific paper) report providing numbers and locations of samples and the level of sorting achieved.

- Condition 6:

2.4.3 Habitats information		**SCORE: 75**
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 60	**SG 80**	**SG 100**
▪ There is a basic understanding of the types and distribution of main habitats in the area of the fishery. ▪ Information is adequate to broadly understand the nature of the main impacts of gear use on the main habitats, including	▪ The nature, distribution and vulnerability of all main habitat types in the fishery area are known at a level of detail relevant to the scale and intensity of the fishery. ▪ Sufficient data are available to allow the nature of the impacts	▪ The distribution of habitat types is known over their range, with particular attention to the occurrence of vulnerable habitat types. ▪ The physical impacts of the gear on the habitat types have been

spatial overlap of habitat with fishing gear.	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. ▪ 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).	quantified fully. ▪ Changes in habitat distributions over time are measured.

Conditions 2.4.3:

1. To perform an analysis to develop bottom classification ground and how the distribution of scallop beds relates to sediment distribution, in order 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).

2. To perform annual analyses of historic records from biomass surveys, in relation to how scallop distribution has changed over the years and how the distribution of fishing has varied with it; in order to investigate whether fishing has had any impact on scallop distribution.

3a.To carry out, and document, analyses of spatial fishing information, evidence of rotational fishing and contour scallop populations; related to analyse and document the overlay of the fishery with distribution of fishing effort in these years.

3b. To produce contour maps of present scallop populations, showing the individual reserve areas, for each management. To provide a plan showing how this goal will be achieved and by when. To analyse data from the fishery records of each management unit and to demonstrate how effective the reserve areas are in excluding fishing.

Action Plan	Timescales/Milestones
YEAR 1: 1. To perform an initial analysis of the swath-mapping investigation to develop bottom classification ground truthed by sediment sampling, followed by correlation analysis of sediment type, scallop abundance and biomass of accompanying fauna. Assess how the distribution of scallop beds relates to sediment distribution. Provide draft report of the analysis to Surveillance 1. 2. To carry out initial analyses of: - historic records from biomass surveys to map in detail, and distribution of scallops each year from the inception of the fishery in the five or six management units that have the best records. - historic records of positions fished on these beds (using precise tow by tow data where it is available) and records of catch (preferably with similar precision) or catch rates per tow. - data to show how scallop distribution has changed over the years in these units and how the distribution of fishing has varied with it; and to investigate whether fishing has had any impact on scallop distribution. Provide a report to Surveillance 1.	YEAR 1: 1. Production of a draft report of the initial analysis of the swath-mapping developing a bottom classification ground trusted by sediment sampling. This will include correlation analysis between sediment type, scallop abundance and biomass of accompanying fauna. 2. Production of a report carrying out initial analyses of: - Detailed map of historic biomass survey records, and distribution of scallops each year from the inception of the fishery in the MU with best records. - Historic records of positions fished on these beds (using precise tow by tow data if available) and records of catch (with similar precision if available) or catch rates per tow. - Data showing changed in scallop distribution over the years in these MU together with distribution of fishing effort. Analyze if there are evidences that fishing has had any impact on scallop distribution. 3a. Production of a scientific report with initial analyses of spatial fishing information for evidence

3a. To carry out initial analyses of spatial fishing information for evidence of rotational fishing in the five or six management units that have the best records and contour scallop populations from biomass surveys from each year of the fishery and overlay with distribution of fishing effort in these years. To analyse data for evidence of rotational fishing. To tabulate annual fishing effort, landings, and biomass estimates for all management units and test for broader scale rotational fishing between management units. Provide a draft report to Surveillance 1. 3b. To produce contour maps of present scallop populations for each management unit showing the individual reserve areas for each management unit. Where parts of the reserves were not established at the beginning of the fishery the boundaries and year of the addition should be recorded along with their previous fishing history. Where the area of the reserve is less than 20% of the MU and scallop beds, a plan should be provided showing how this goal will be achieved and by when. Data from the fishery records should be analysed to demonstrate how effective the reserve areas are in excluding fishing. Analyse evidence from each management unit for the effectiveness of reserve areas, not being fished. Provide draft Report to Surveillance 1.	of rotational fishing in the 5 or 6 MU with the best records and delineation of scallop beds obtained from biomass surveys from each fishing year overlaying their distribution of fishing effort. Tabulation of annual fishing effort, landings, and biomass estimates for all MU and testing the efficiency of broader scale rotational fishing between MU. 3b. Production of a draft scientific report showing contour maps of present scallop populations for each MU showing the individual reserve areas for each of them. Where parts of the reserves were not established at the beginning of the fishery the boundaries and the starting year should be recorded along with their fishing history. If the reserve area is less than 20% of the MU and scallop beds, a plan will be provided showing how and when this goal will be achieved. Data from the fishery records will be analysed to demonstrate how effective the reserve areas are in excluding fishing. Analyse evidence from each MU for the effectiveness of reserve areas, not being fished.

Progress on conditions:

6.1 Condition

As we mentioned in Condition 5, the specific survey to collect biological and sediments, was not able to be conducted. As consequence, an initial analysis to develop a classification of seafloor of fishing grounds with sediment types, and correlate it with bycatch and scallop abundance was not possible to be done.

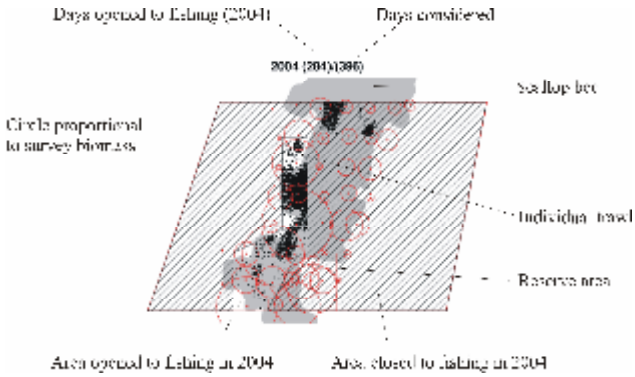
In the unique publication related with this issue of the Condition 6, Bremec et al (2013) describe the available information and how it will be analysed to study the distribution of the main species and their relation with sediments. This proposal would replace, at least partially, the analysis agreed in the action plan. Taken into account that the survey realization depends of the Research Authority (INIDEP), this issue could be advised during the next Surveillance.

The following issues for the condition 6 were addressed in an extended and detailed report by Bogazzi, Mauna & Lasta (2013) prepared for the re-certification. The report is an update of the previous work: PhD Thesis of Dr Bogazzi (2008). The authors explore the database of the fishery used by Benthonic Shellfish Fisheries Program (INIDEP), which contain all the information collected during surveys (1998 – 2011) and around 510000 fishing hauls in 13 MU, since the beginning of the fishery. Any haul is dated and geo-referenced.

6.2 Condition

The analysis was performed only for the MU 2, which received the highest fishing effort allocated for the fleet (67 % of the hauls for 2007-2008 period), and for the period 2005 – 2008 and 2010. Also, the authors explained advantages and disadvantages of several interpolation methods (inverse distance, kriging and GAM).

The report shows, year to year, number of days with effective closure and days open to fishing, and other spatial information in the way illustrated in the Figure.



The sequential-maps show details of the spatial allocation of fishing effort (individual haul positions in the Figure), areas opened and closed to fishing during any year and density from scallop surveys.

The analysis about matching between intensively fishing and scallop density recorded from surveys was done using kernel smoothed intensity model for trawl data, for the years 2005 – 2008 and 2010. Contour maps indicating hauls.cell^{-1}, overlapped with density estimated during surveys were provided.

The report remarks that catch per tow need to be considered with caution, because it depends of skipper decisions in front of the spatial pattern distribution of the density. In relation with both aspects Bogazzi (2008) define fishing opportunities (FO) areas which reflect the spatial allocation of hauls. Any FO can be composed by several areas within them with different fishing performances. As consequence, the catch per tow trend are influenced by the intensity of fishing in the FOs, the spatial overlapping of trawls, the discovery and activity of new FOs and the recruitment of new year classes.

Definition of fishing beds contours, previously designed by Bogazzi (2008) was updated. Current bed definition changed slightly when both contour are compared. The difference is that the current beds look more aggregated, but without any noticeable change in geographic distribution range of scallop distribution.

The authors consider that the Patagonian scallop fishery entails a substantial impact, both in extension and its intensity, but there is a degree of uncertainty which is inevitable. The reasonable way to address the problem is to elaborate robust management alternatives based in the more intense monitoring of fishing process. A modification of the database will allow to evaluate the harvest strategy using simulation model describing the population dynamic.

The condition require, for the first year, maps with distribution of scallops each year from the inception of the fishery in the five or six management units, but the analysis, even when it is exhaustive and detailed, was done for the MU 2. The author proposed to conduct further studies that should evaluate how scallop density and fishing activity matched in other beds, and MU intensively fished.

6.3a Condition

Related with this issue of the Condition 6, the report provide information about how the fishing effort has been allocated on fishing beds through the time, since the beginning of the fishery until 2011. The analysis was done considering the 4 main fishing beds. The large-scale fishing effort allocation shows sequential depletion: the fleet operated progressively more distant from the port. Two beds (2 and 7) were the primary target of the effort, alternating throughout 16 years period. Since 2002, fishing effort was extended to other beds which were exploited sequentially (beds 8, 9 and 11). Number of hauls in all 4 MUs analysed, related with the total number of haul in the fishery was indicated by year since the beginning of the fishery in a table. No data about landings and biomass estimates for these MUs were done.

The sequence of effort allocation also occurs on the scale of the FOs within beds. Fishing activity is concentrated on the densest FOs and sequential allocation occurs between them. Inside any FO fishers maily allocate effort in densest patches and, then on marginal areas, with low spatial overlapping between successive visits.

Analysis of the broader scale rotational fishing could be presented if the other MUs are analysed in the same way as was presented for the MU 2 in the previous section (Issue 6.2).

"Further studies should integrate, for the major beds, information of scallop density, catch rate, events of recruitment and temporal closures, to better understand whether fishing effort has been alternated among beds and what are the factors that explain the pattern" (Bogazzi, Mauna & Lasta, 2013).

6.3b Condition

The report presents a general map with contour beds updated, showing the position of reserves areas (RA) in all MUs. At small scale, the report shows swath-maps detailing the fishing activities inside each RA, for the 1999 – 2011 period. Some of RAs were implemented after 1996, or fishing closure has been suggested for certain period and area in the RA. Few hauls have been performed after the establishing data of each RA.

The information is detailed and appropriated with the action plan. The analysed period is acceptable considering that the current data base system have some constrains and need modifications.

Reserve Areas surface are ranging between 0.13% and 3.8 % of the MU areas, and between 1.3 % and 5.51% of the bed areas (with exception of RA 1.1, 36.68%, established in 2009 and RA 4, 56% established in 1996). One of the most intensively fished bed, number 2, has its RA out of bed area. A plan showing how this goal will be achieved was not provided.

Status on conditions:

The condition is lightly "**Behind Target"**, but during the next surveillance the analysis of the other main MUs must be required.

The report has consistent information about the spatial dynamic of the fleet and spatial distribution of abundance, RAs functioning and fishing intensity. However, the information analysed is from one or few MUs and some issues (like 6.1, between others) remain as proposal.

3.3 Conclusions and recommendations

Conclusions:

Several situations to remark were found during the First Annual Audit which are summarized below.

Risk of bycatch species (PI 2.2.1) : Some of the document received express that half the bycatch is killed in processing and discharged dead, the other half is damaged in trawling and sorting processes (Escolar et al., 2013) so probably 50% will die on return to the sea. The only mitigation measure the sorting and return of bycatch is a major cause of bycatch mortality (Escolar et al., 2013). This shall be clearly state in the new information.

Measures to manage the bycatch (PI 2.2.2.): The measures of water cushioning during sorting of bycatch has driven to consider that the damage is substantial (Escolar et al., 2013). Damage of Bycatch after sorting seems to be unlikely to survive. If so, necessary measure to reduce bycatch on board needs to be taken.

Bycatch information (PI 2.2.3.): Little or no Qualitative information is available on the main bycatch species affected by the fishery from the observer program (Diez et al., 2006, Escolar et al., 2009, Escolar et al., 2013). And even the sampling in this scheme has run down with no samples being taken in 2010 and 2011 (Escolar et al., 2013). Bycatch sampling by Observers seems to have ceased

(Escolar et al., 2013) and without their monitoring (Schwartz & Herrera 2013) there are no measures to manage bycatch.

Remedial actions are coincident with milestone for the 1st Surveillance:

To produce official report documenting all tow records of Observer program with annual breakdown by management unit and discussion of how long and short term trends can be analyzed. Information must include the period 2005 – 2011, demonstrating that the OBOs Program because the lack of data in the reports that include the bycatch from 2010 and 2011 suggest that they do not exist.

To produce official report documenting all bycatch samples taken on biomass surveys, status of sorting and identification and discussion of how these samples will be analyzed for testing long term changes.

Remedial actions are requested for next surveillances than those established for certification.

Therefore, the Surveillance Team recommends that the Patagonian scallop fishery maintains the certification to the MSC standard. The Client Group should continue meeting the objectives proposed in the Action Plan for the next surveillance audit.

Recommendation:

The Assessment Team strongly recommends studies to refine the estimation of efficiency for the fishing gear used in biomass surveys. The Workshops described in the condition 1 and 3 revealed that the estimations used are ambiguous due to both gear and vessels used in survey changed and the same estimation remain in use since the beginning of the fishery.

Timeframe: There is no previous agreement for this recommendation. However, the Assessment Team decides to use the conclusion of the Workshop and propose a logical timeframe.

In the second year (2014) design a definite fishing gears to be used in surveys and initiation of comparative studies. Experimental design for efficiency and selectivity study must be provided.

In the third year (2016) Estimation of gear efficiency and selectivity shall be completed.

4. Catch data.

Historical statistics of the fishery

It must be remembered that the total fishery is in the context of the client certification and represents the total number of companies and fishing vessels authorized.

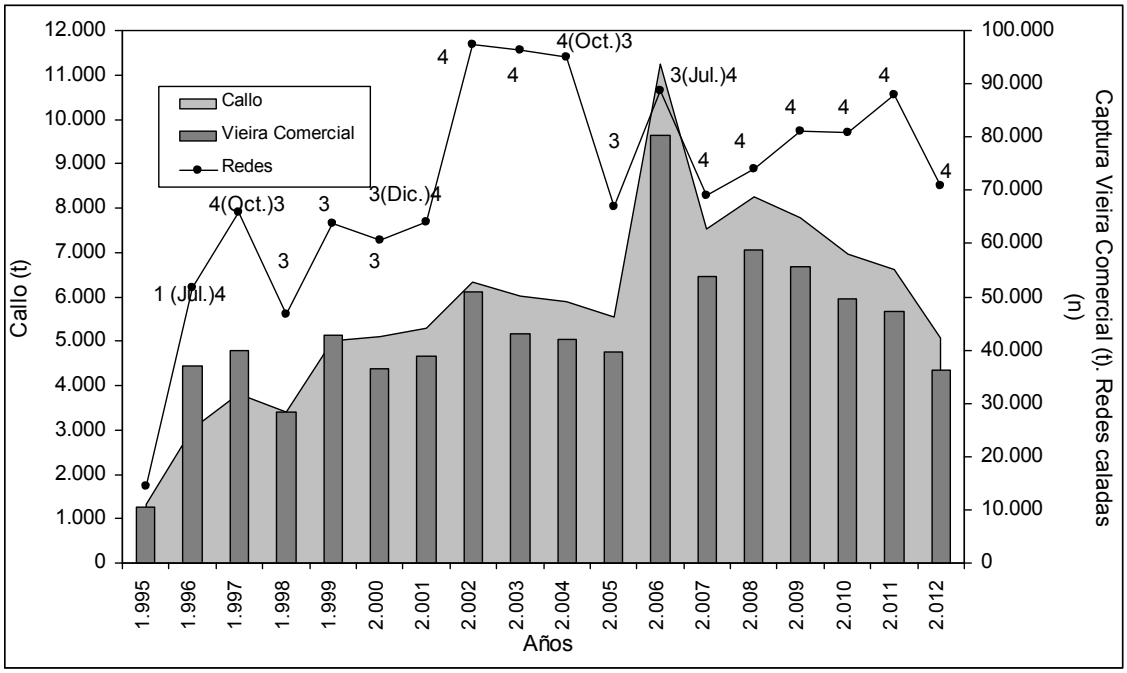


Fig. 2. Evolution of muscle production (t), commercial scallop catch (t) and fishing effort (nets). Number of vessels in activity.

Table 8: Annual muscle production (ton) for fleet and vessel.

Year	Fleet	Erin Bruce	Miss Tide	Mr. Big	Atlantic Surf I	Atlantic Surf II	Atlantic Surf III
1995	1313	1313					
1996	2993	1147		540	630	676	
1997	3761	965		1268	1029	499	
1998	3414	958		1395	1060		
1999	5025	1740		1607	1678		
2000	5112	2021		1373	1718		
2001	5455	2098		1173	2030		154
2002	6325	1668		1617	1576		1464
2003	6027	1445		1378	1733		1470
2004	5890	962		1346	1750		1832
2005	5535			1986	1853		1696
2006	11256		2453	2650	3129		3024
2007	7425	665	1804	357	2422		2177
2008	8241	1837	1774		1733		2897
2009	7771	1775	1783		1910		2303
2010	6947	1630	1805		2097		1415
2011	6628	1486	1654		1645		1843
2012	5061	1031	1125		1405		1500

Table 9: Muscle production (muscle kg/fishing day) by year for fleet and vessel (average, Sd and annual trips number).

	Fleet			Erin Bruce			Miss Tide			Mr. Big			Atlantic Surf I			Atlantic Surf II			Atlantic Surf III		
Year	Average	Sd	Trips	Average	Sd	Trips	Average	Sd	Trips	Average	Sd	Trips	Average	Sd	Trips	Average	Sd	Trips	Average	Sd	Trips
1995	7247	1821	15	7247	1821	15															
1996	4739	1525	33	6118	1285	11				5133	445	7	3695	1220	9	3317	404	6			
1997	4678	1385	33	4884	1341	10				5360	1221	11	3979	1217	9	3589	1574	3			
1998	5342	1264	30	4797	763	10				6189	1291	12	4752	1096	8						
1999	6690	2396	36	7049	2466	12				6591	2914	14	6398	1531	10						
2000	6995	2121	33	7945	2280	13				6709	2072	11	5972	1442	9						
2001	7941	2862	33	8911	2843	12				6250	1337	8	8771	3025	11				4311	1069	2
2002	6034	1643	38	6315	2220	12				6066	1545	11	5541	930	9				6156	1522	6
2003	6317	1433	37	6652	1285	10				6117	1668	10	6581	1678	10				5748	840	7
2004	6607	1273	34	6294	1681	7				6241	1297	10	6679	1133	10				7340	815	7
2005	8814	1766	28							8880	1798	13	9068	2198	9				8289	945	6
2006	12674	2496	54				12943	2833	14	12241	2416	17	13003	2768	14				12564	1835	9
2007	11829	2624	32	10485	1340	4	12832	3976	9	11628	2564	4	11423	1908	12				12120	2249	7
2008	11339	1642	34	10979	1879	10	11002	1788	8				10850	1067	8				12617	1176	8
2009	8031	2238	36	7626	2385	10	7370	2395	9				7599	1336	9				9767	2160	8
2010	8557	2131	34	8538	2342	9	8084	2157	9				8652	2465	11				9230	943	5
2011	7391	1527	32	7101	1059	8	7270	832	8				6824	1181	9				8588	2404	7
2012	6989	2263	26	5363	1288	7	6690	2092	6				7809	2166	7				8228	2647	6

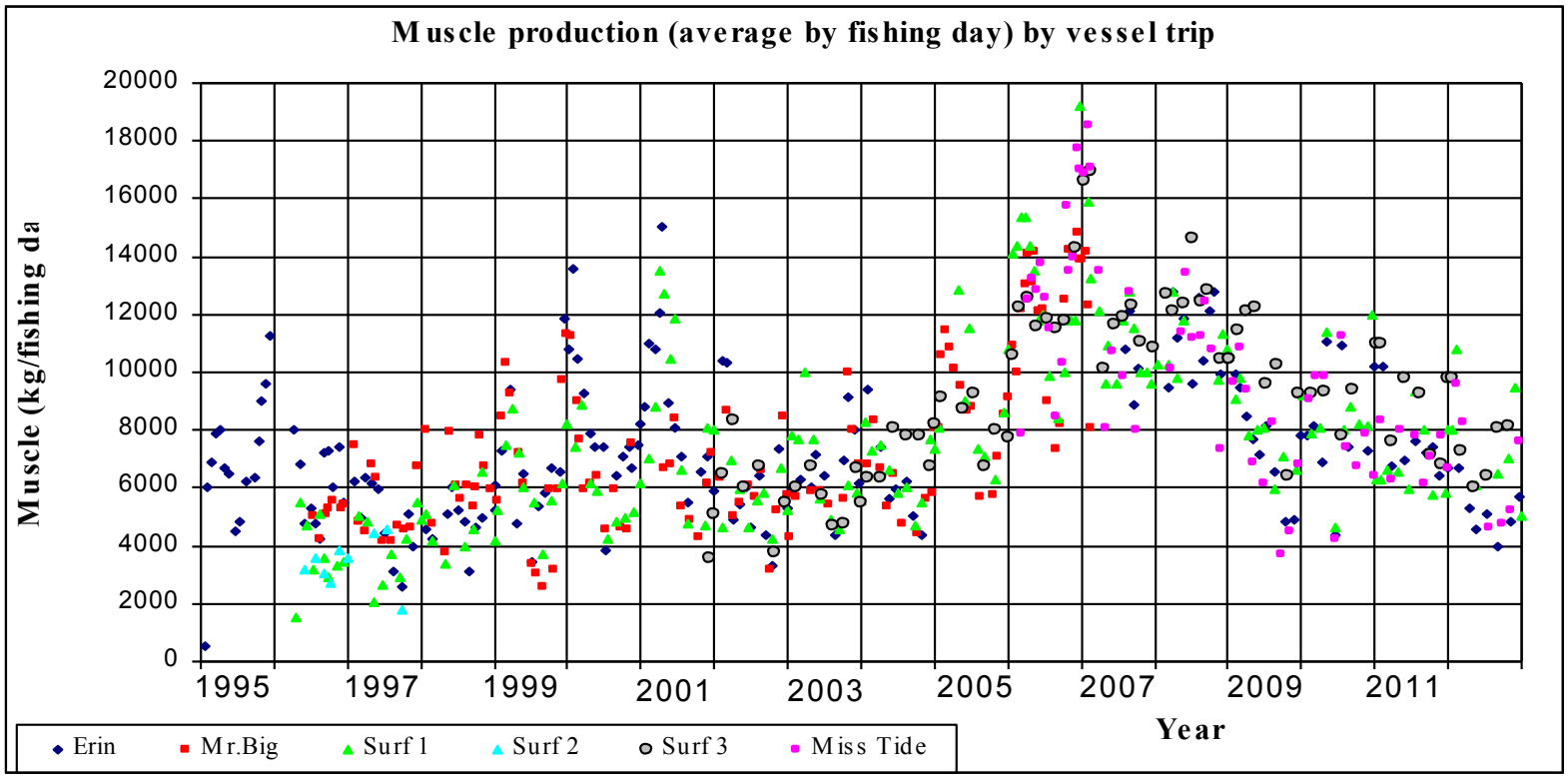
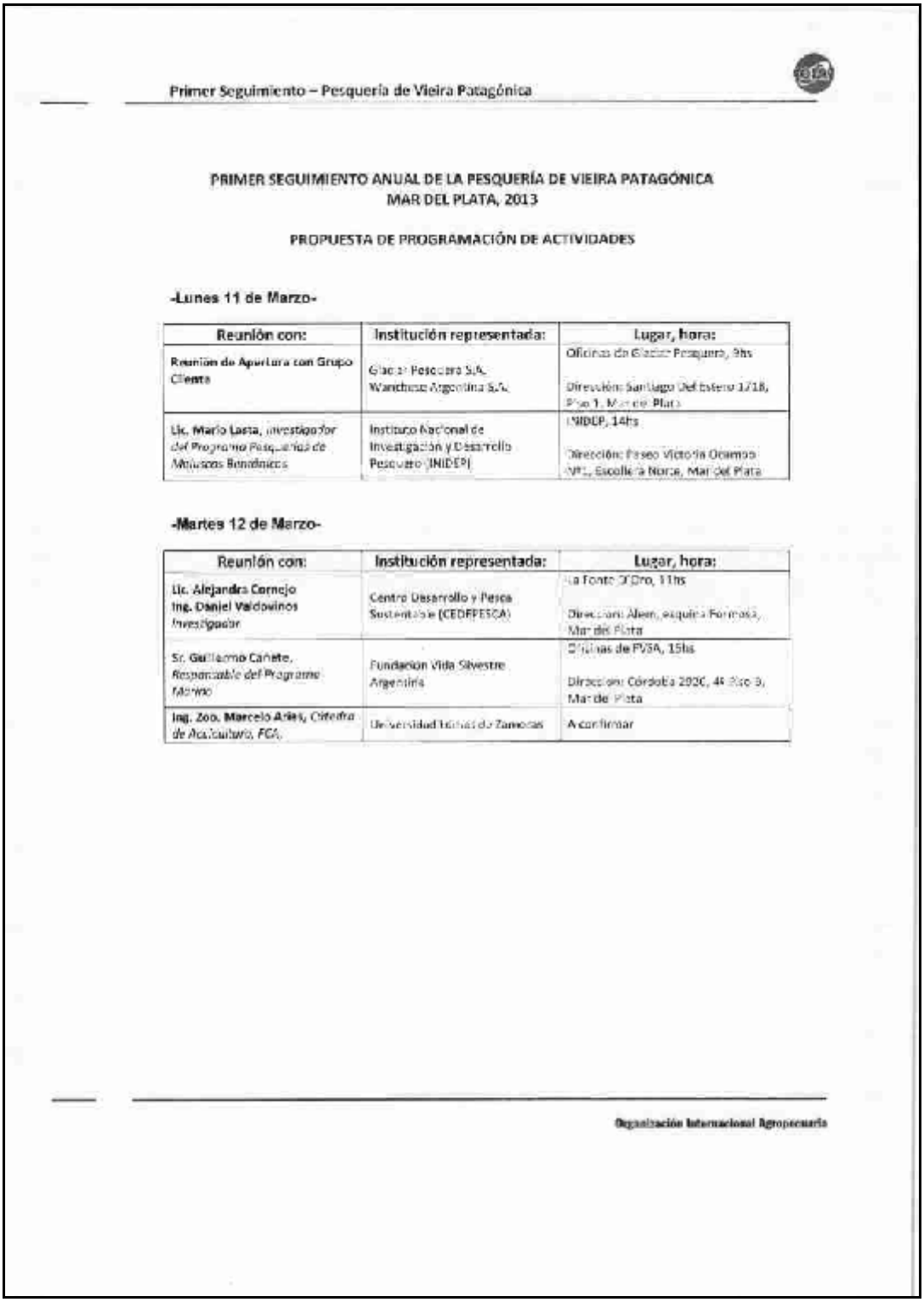


Fig. 3. Muscle production by fishing day for vessel trip.

5. Appendix.

5.1. Audit planning meetings



Primer Seguimiento – Pesquería de Vieira Patagónica

PRIMER SEGUIMIENTO ANUAL DE LA PESQUERÍA DE VIEIRA PATAGÓNICA
MAR DEL PLATA, 2013

PROPUESTA DE PROGRAMACIÓN DE ACTIVIDADES

-Lunes 11 de Marzo-

Reunión con:	Institución representada:	Lugar, hora:
Reunión de Apertura con Grupo Cliente	Glacial Pesquera S.A. Wanchese Argentina S.A.	Oficinas de Glacial Pesquera, 9hs Dirección: Santiago Del Estero 1218, Piso 1, Mar del Plata
Lic. Mario Lasta, *Investigador del Programa Pesquerías de Moluscos Bentónicos*	Instituto Nacional de Investigación y Desarrollo Pesquero (INIDEP)	INIDEP, 14hs Dirección: Paseo Victoria Ocampo N°1, Escollera Norte, Mar del Plata

-Martes 12 de Marzo-

Reunión con:	Institución representada:	Lugar, hora:
Lic. Alejandra Cornejo **Ing. Daniel Valdovinos** *Investigador*	Centro Desarrollo y Pesca Sustentable (CEDEPESCA)	La Fonte D'Oro, 11hs Dirección: Alem, esquina Formosa, Mar del Plata
Sr. Guillermo Cañete, *Responsable del Programa Marino*	Fundación Vida Silvestre Argentina	Oficinas de FVSA, 15hs Dirección: Córdoba 2020, 4° Piso 3, Mar del Plata
Ing. Zoo. Marcelo Arias, *Cátedra de Acuicultura, FCA.*	Universidad Nacional de Zamoras	A confirmar

Organización Internacional Agropecuaria

5.2. Opening surveillance meeting with Client Group

Organización Internacional Agropecuaria
— Certificamos confianza y calidad

ENTREVISTAS INDIVIDUALIZADAS

1era Auditoria de Supervisión a la Re-Certificación de Pesca Sustentable
Pesquería de Vieira Patagónica

Lunes 11 de Marzo de 2013
Mar del Plata, Argentina

NOMBRE	INSTITUCIÓN	FIRMA
Gabriel Suarez	Glaciar Pesquera	
Marcelo Bochan	Glaciar Pesquera	
Irigoyen, Osca	UNMdP	
Morsan, Enrique	OIA	
Pedro Isaac Schroeder	Wanchese Ars.	
Pedro A. Landa	OIA	
Bride, R. Jorge	OIA	
Leszek Gawlo Pawelski	Consultor	
Tomas Hodecek	Glacier Pesquera	
Carolina Medina F	OIA	

5.3. Group meeting

Organización Internacional Agropecuaria
Certificamos confianza y calidad

ENTREVISTAS INDIVIDUALIZADAS

1era Auditoria de Supervisión a la Re-Certificación de Pesca Sustentable
Pesquería de Vieira Patagónica

Lunes 11 de Marzo de 2013
Mar del Plata, Argentina

NOMBRE	INSTITUCIÓN	FIRMA
Mariana Escolar	INIDEP	
Diaz Ronaldo	INIDEP	
Matías Schwartz	INIDEP	
Griselda Garaffo	INIDEP	
A. Cecilia Mauna	INIDEP	
Pedro de Landa	OIA	
Susana Herrera	INIDEP	
Bridi Jorge	AT - OIA	
[illegible]	Consultor	
Mariano Lasta	INIDEP	
Morsan, [illegible]	OIA	
Carolina Medina	OIA	

5.4. Individual meetings

Organización Internacional Agropecuaria
— Certificamos confianza y calidad

ENTREVISTAS INDIVIDUALIZADAS

1era Auditoria de Supervisión a la Re-Certificación de Pesca Sustentable
Pesquería de Vieira Patagónica

Martes 12 de Marzo de 2013
Mar del Plata, Argentina

NOMBRE	INSTITUCIÓN	FIRMA
Brida R. Jorge	AT - OIA	
Brunner Claudio	INIDEP - CONICET	
Carolina Medina F	OIA	
Leszek Dawid Pawlak	Consultor	
Gordon, Enrique	AT - OIA	

Organización Internacional Agropecuaria
Certificamos confianza y calidad

ENTREVISTAS INDIVIDUALIZADAS

1era Auditoria de Supervisión a la Re-Certificación de Pesca Sustentable
Pesquería de Vieira Patagónica

Martes 12 de Marzo de 2013
Mar del Plata, Argentina

NOMBRE	INSTITUCIÓN	FIRMA
ALEJANDRA CARNEJO	CETEPESCA	
Patricia Valdovinos	CETEPESCA	
Brid. Rojas	AT - OIA	
Horacio, Enrique	AT - OIA	
Leszek Drozdowski	Consultor	
Carolina Medina Foucher	OIA	

Organización Internacional Agropecuaria
— Certificamos confianza y calidad

ENTREVISTAS INDIVIDUALIZADAS

1era Auditoria de Supervisión a la Re-Certificación de Pesca Sustentable
Pesquería de Vieira Patagónica

Martes 12 de Marzo de 2013
Mar del Plata, Argentina

NOMBRE	INSTITUCIÓN	FIRMA
Carolina Medina F	OIA	
Bordi, R. Jorge	AT - OIA	
Gerardo Caiella	FVSA	
Hansen, Enrique	AT - OIA	
Leszek Drewniak	Consultor	

Consejo Federal Pesquero
(Ley Nº 24.922)

BUENOS AIRES, 16 de agosto de 2012

VISTO la Resolución N° 4 de fecha 22 de mayo de 2008, la Resolución Nº 5 de fecha 12 de marzo de 2009, ambas del registro del CONSEJO FEDERAL PESQUERO, y

CONSIDERANDO:

Que por la primera resolución citada en el Visto se establecieron medidas de administración de la especie vieira patagónica (*Zygochlamys patagonica*), entre las que se encuentra la delimitación geográfica de las Unidades de Manejo del recurso.

Que por la Resolución del CONSEJO FEDERAL PESQUERO Nº 5 de fecha 12 de marzo de 2009 se establecieron Áreas de Exclusión de la Actividad Pesquera como Reservas Reproductivas en las Unidades de Manejo del recurso.

Que el CONSEJO FEDERAL PESQUERO ha tomado conocimiento del Informe Técnico Oficial del INSTITUTO NACIONAL DE INVESTIGACION Y DESARROLLO PESQUERO (INIDEP) Nº 01/2012: *"Propuesta de modificación, en límites y denominación, de las Unidades de Manejo de la pesquería de vieira patagónica (Zygochlamys patagonica)."*

Que en el citado informe, en virtud de la experiencia y el conocimiento adquiridos en los últimos años, y a fin de lograr una mejor correspondencia entre la distribución biológica de las concentraciones del recurso y la delimitación geográfica de las áreas que las contienen, el INIDEP analiza la posibilidad de modificar los límites y denominación de las Unidades de Manejo (UM) hoy vigentes para la

administración de la pesquería, con el objeto de optimizar las capturas en el plano espacial.

Que la modificación propuesta ha tenido en cuenta todos los antecedentes del esquema de manejo espacial de la pesquería, que comenzó en el año 1999 con la determinación de áreas administrativas que contenían a las concentraciones del recurso (bancos), y que continuó con la expansión de la actividad tanto de la flota comercial como la del INIDEP en sus campañas de evaluación, en función del incremento del conocimiento sobre el tamaño de los bancos, permitiendo localizar y redimensionar nuevas concentraciones en diferentes sitios de la plataforma.

Que en consonancia con lo expuesto, la Comisión de Seguimiento de la Pesquería de Vieira Patagónica, en la reunión de llevada a cabo en el mes de diciembre de 2011, propuso redefinir los límites de las UM, en función del actual y más cabal conocimiento de la distribución espacial del recurso, reducir su número y eliminar alguna de ellas por la escasa o nula presencia de actividad pesquera.

Que a partir de lo expuesto el INIDEP propone definir nuevas Unidades de Manejo por la proximidad de los bancos entre sí, a fin de evitar quiebres entre dos UM, respetar las extensiones de bancos de mayor envergadura, y suprimir la UM 13.

Que en el mismo informe, el INIDEP recomienda además mantener las Reservas Reproductivas, en límites y nomenclatura, definidas en el año 2009 a partir de la propuesta contenida en la Nota INIDEP Nº 0412 del 27 de febrero de ese año.

Que los fundamentos del establecimiento de las Reservas Reproductivas radican en la necesidad de evitar los arrastres de fondo en algunas Unidades de Manejo para la protección de ambientes y especies vulnerables y a las

etapas críticas de sus ciclos de vida, en la reducción de la mortalidad global de los recursos mediante la asignación de refugios para las poblaciones explotadas directamente o por *by-catch* y el incremento de las tasas de reclutamiento.

Que por las razones citadas, resulta conveniente modificar las Unidades de Manejo establecidas en la Resolución del CONSEJO FEDERAL PESQUERO Nº 4, de fecha 22 de mayo de 2008, y adecuar a -a las unidades que se definen en la presente- las Áreas de Exclusión de la Actividad Pesquera como Reservas Reproductivas definidas en la Resolución del CONSEJO FEDERAL PESQUERO Nº 5, de fecha 12 de marzo de 2009.

Que el CONSEJO FEDERAL PESQUERO es competente para el dictado de la presente de conformidad con el artículo 9°, incisos a) y f) y el artículo 17 de la Ley N° 24.922.

Por ello,

EL CONSEJO FEDERAL PESQUERO

RESUELVE:

ARTICULO 1º. Sustitúyese el ANEXO I de la Resolución del CONSEJO FEDERAL PESQUERO Nº 4 de fecha 22 de mayo de 2008 por el ANEXO I que se adjunta a la presente resolución.

ARTICULO 2º.- Sustitúyese el ANEXO I de la Resolución del CONSEJO FEDERAL PESQUERO Nº 5 de fecha 12 de marzo de 2009, por el ANEXO II de la presente resolución.

ARTICULO 3º.- Prohíbese la pesca por arrastre de fondo en las áreas establecidas en el artículo 2º de la presente.

ARTICULO 4º.- Las infracciones a la presente resolución serán sancionadas de conformidad con lo establecido por la Ley 24.922.

ARTICULO 5º- Incorpórase el gráfico con la ubicación de las Unidades de Manejo y las Áreas de Exclusión definidas según los artículos 1º y 2º de la presente resolución.

ARTICULO 6º.- La presente resolución entrará en vigencia a partir de la fecha de su publicación en el Boletín Oficial.

ARTICULO 7º- Comuníquese, publíquese, dese a la Dirección Nacional del Registro Oficial y archívese.

RESOLUCION CFP N° 15/2012

ANEXO I – RESOLUCION CFP Nº 15/2012

Ubicación geográfica y numeración utilizada para identificar cada una de las Unidades de Manejo de la pesquería de vieira patagónica.

Unidad de manejo: a los fines de la presente, es la fracción más pequeña de una población o grupo de poblaciones sobre la/s que se aplican medidas de manejo específicas.

Unidad de Manejo	Latitud	Longitud
UM A	36º4242	54º41'76
	36º5942	54º23'45
	38º0011	55º10'13
	37º5960	56º00'05
UM B	37º5965	56º00'26
	38º0012	55º10'21
	39º5260	55º53'56
	39º5260	56º35'19
UM C	39º5283	56º35'68
	39º5260	55º53'56
	41º2508	57º25'98
	41º2393	58º22'47
UM D	41º2404	58º22'69
	41º2558	57º26'18
	42º1774	58º24'34
	42º1774	59º16'97
UM E	42º1752	59º17'45
	42º1806	58º24'46
	43º0210	59º08'69
	43º0210	60º02'52
UM F	43º0243	60º02'87
	43º0243	59º08'81
	44º1182	59º35'77
	44º1182	60º30'53
UM G	44º1197	60º30'67
	44º1209	59º35'99
	44º2349	59º39'72
	44º5446	60º11'04
	45º1538	60º33'68
	45º1538	60º55'11

(Continuación)

Unidad de Manejo	Latitud	Longitud
UM H	Este del límite de la zona económica exclusiva, hasta el borde exterior del margen continental argentino, entre los paralelos 45º y 47º de latitud Sur	
UM I	47º30'00	61º00'00
	48º30'00	61º00'00
	48º30'00	62º00'00
	47º30'00	62º00'00
UM J	48º00'00	64º00'00
	48º00'00	65º23'00
	47º15'00	65º23'00
	47º00'00	65º29'00
	45º30'00	65º14'19
	45º30'00	64º00'00

ANEXO II – RESOLUCION CFP Nº 15/2012

Áreas de Exclusión de la Actividad Pesquera como Reservas Reproductivas en las Unidades de Manejo (UM) de vieira patagónica (*Zygochlamys patagónica*):

Reserva Reproductiva	Unidad de Manejo	Latitud	Longitud	Área Polígono (km2)	Área Banco (km2)	Área RR (km2)
1.1	A	37º28'00	55º04'00	7.534	----	25
		37º31'00	55º04'00			
		37º31'00	55º01'00			
		37º28'00	55º01'00			
1.2	B	38º27'00	55º37'00	7.661	2.458	41
		38º31'00	55º37'00			
		38º31'00	55º41'00			
		38º27'00	55º41'00			
2	B	39º20'00	56º00'00	5.670	1.893	216
		39º20'00	55º52'00			
		39º30'00	55º52'00			
		39º30'00	56º00'00			
3	B	39º44'00	56º13'00	2.855	605	41
		39º48'00	56º13'00			
		39º48'00	56º17'00			
		39º44'00	56º17'00			
4	C	40º43'00	57º00'00	15.960	----	53
		40º47'00	57º00'00			
		40º47'00	57º05'00			
		40º43'00	57º05'00			
5	D	41º47'00	58º06'00	5.666	1.856	62
		41º53'00	58º06'00			
		41º53'00	58º10'00			
		41º47'00	58º10'00			
6	D	42º12'00	58º31'00	2.877	622	25
		42º15'00	58º31'00			
		42º15'00	58º34'00			
		42º12'00	58º34'00			
7	E	42º29'00	59º15'00	4.525	1.417	41
		42º33'00	59º15'00			
		42º33'00	59º19'00			
		42º29'00	59º19'00			

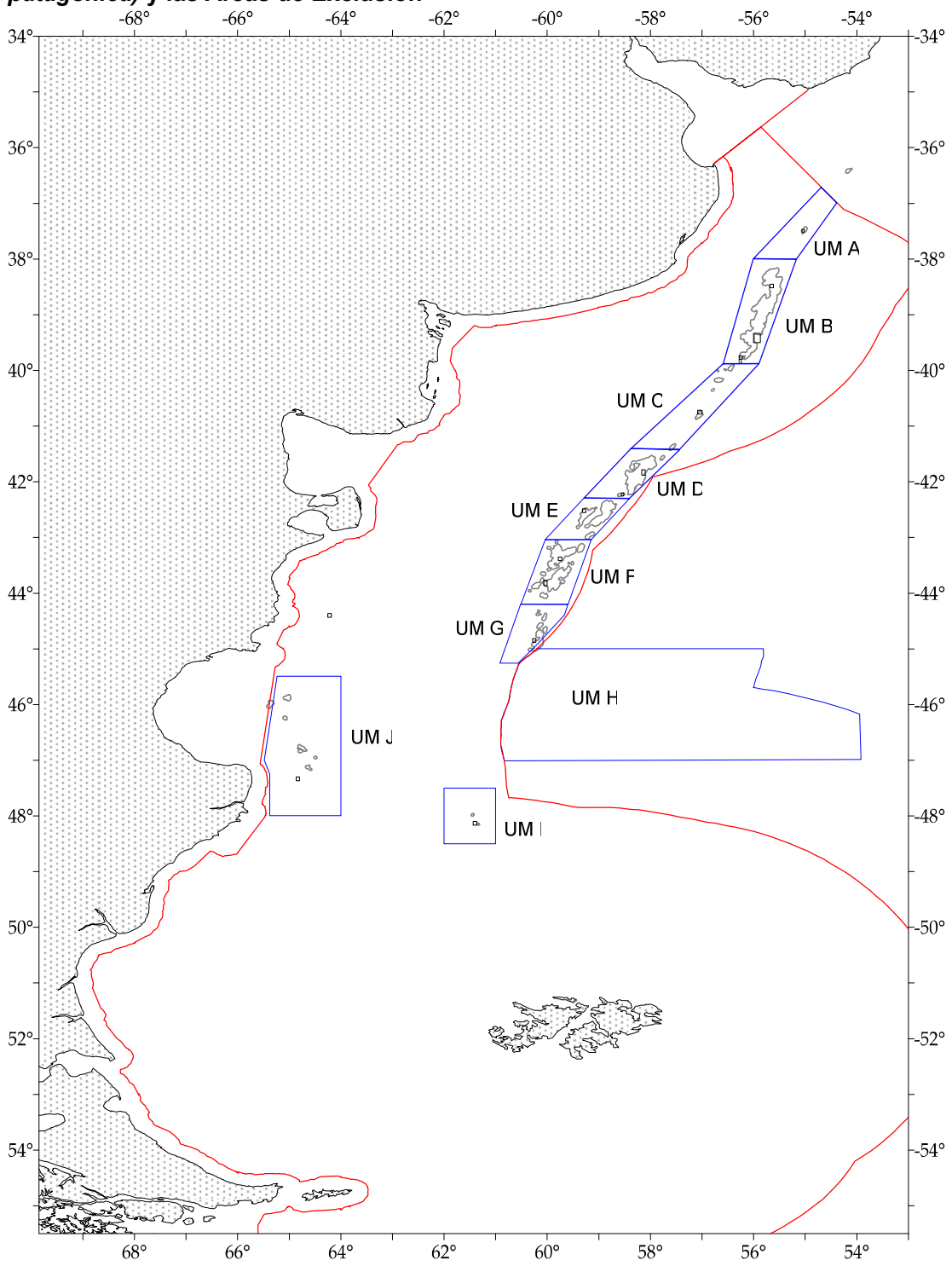
ANEXO II – RESOLUCION CFP Nº 15/2012

(Continuación)

Reserva Reproductiva	Unidad de Manejo	Latitud	Longitud	Área Polígono (km2)	Área Banco (km2)	Área RR (km2)
8	F	43º21'00	59º47'00	5.368	1.627	41
		43º25'00	59º47'00			
		43º25'00	59º43'00			
		43º21'00	59º43'00			
9	F	43º46'00	60º04'00	4.516	2.481	62
		43º52'00	60º04'00			
		43º52'00	60º00'00			
		43º46'00	60º00'00			
10	G	44º49'00	60º13'00	13.080	786	41
		44º53'00	60º13'00			
		44º53'00	60º17'00			
		44º49'00	60º17'00			
11	I	48º06'00	61º26'00	8.544	----	41
		48º10'00	61º26'00			
		48º10'00	61º22'00			
		48º06'00	61º22'00			
12	J	47º18'00	64º48'00	29.410	----	41
		47º22'00	64º48'00			
		47º22'00	64º52'00			
		47º18'00	64º52'00			
13	----	44º22'00	64º11'00	27.490	----	41
		44º26'00	64º15'00			
		44º26'00	64º11'00			
		44º22'00	64º15'00			

ANEXO III – RESOLUCION CFP Nº 15/2012

Ubicación de las Unidades de Manejo (UM) de vieira patagónica (*Zygochlamys patagonica)* y las Áreas de Exclusión



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