



PATAGONIAN SCALLOP FISHERY (VIEIRA PATAGONICA)

Annual Surveillance Visit Final Report Required by the Marine Stewardship Council

2006-2007

Report N° 1

Prepared for: Glaciar Pesquera S.A., Argentina.

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Lic. R.J. Bridi, Río Negro Congress Advisor.

Title:

MSC Surveillance Visit 2007
REPORT for PATAGONIAN SCALLOP FISHERY

Preface

The information, opinions, and conclusions made in this report are the sole responsibility of Organización Internacional Agropecuaria. Advice was sought and provided by Dr. E.M. Morsan, Institute of Fisheries and Marine Biology “Alte. Storni”; Dr. H.J. Cranfield, Seabed Processes Consultancy; Lic. R.J. Bridi, Río Negro Congress Advisor.

Certificate Number: 010106/11

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Date of Summary: October 2007

2. General information**Name and contact information for the certified fishery:****Client contact:**

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General background about the fishery

The Patagonian Scallop (Vieira Patagonica) Fishery was certified in November 2006 by the Organización Internacional Agropecuaria (OIA) following the Principles and Criteria of the Marine Stewardship Council (MSC). The MSC requires that certified fisheries must undergo at least an annual surveillance inspection in order to ensure that the certification is in place and the fishery is fulfilling the conditional requirements imposed in the original certification. The fishery has completed its first period of fishing activity. At the end of the five year certification period, the requirements of the MSC are that the Fishery must complete a re-certification before the anniversary date of the original certification, in order to ensure the uninterrupted use of the certificate and the MSC logo. If the Fishery fails a surveillance audit or re-certification, the use of the Certificate and the MSC logo can be revoked by the MSC or simply lapse.

3. The certification/assessment process

Dates of the Surveillance Visit:

Sunday 30 September- Tuesday 2 October, Mar del Plata (see Appendix I)

Wednesday 3-Sunday 7 October, Buenos Aires (see Appendix I)

Members of the Surveillance team:

- 1) Dr. R.P. Pottinger, OIA Team Leader.
- 2) Dr. E.M. Morsan, Principle 1, Resource Biology and Ecology.
- 3) Dr. H.J. Cranfield, Principle 2, Environment.
- 4) Lic. R.J. Bridi, Principle 3, Management of the Fishery.

Assessment Process

This report represents the first annual surveillance, after OIA had notified the client Glaciar Pesquera S.A. where and when the Annual Surveillance Visit would take place. All Stakeholders who had expressed interest and contributed to the Full Assessment, were directly contacted by e-mail and later by telephone. As well the intention to conduct the Annual Surveillance Audit and the programme were posted on the MSC and OIA websites. A list of Stakeholders directly contacted is appended (Appendix II). Stakeholder opinion, including managers, scientists, industry and environmental NGO's was sought on the performance of the fishery in relation to any of the relevant conditions of the certification or other issues following the MSC's Principles and Criteria for Sustainable Fishing.

The Assessment Team chosen, had all been involved in the Full Assessment process. Specifically it concentrated on review of:

- 1) Potential or actual changes in management systems.
- 2) Changes or additions/deletions to regulations.
- 3) Changes in scientific personnel, management and industry in order to evaluate impact on the management of the fishery.
- 4) Changes in the scientific base of information, including stock assessment.

No significant issues which could affect the sustainability and conduct of the fishery that require further investigation were identified, so procedures to embody such events were not required in the Assessment process.

The Assessment Team audited compliance with, and progress and performance against certification conditions; documenting progress with justification for its judgment, following TAB Directive D-013, and MSC Fisheries Certification Methodology.

As all conditions accepted in the Client Action Plan are still in progress, no re-scoring of all relevant performance indicators and scoring guideposts relating to the Conditions set in the Final Full Assessment Report was required.

The inspection by the Assessment Team (See Appendix I) involved:

- A. In Mar del Plata: **Glaciar Pesquera S.A.**, CPN Eduardo Gonzalez Lemmi; **INIDEP** (National Institute of Fisheries Research and Development), including Dr. Otto Wohler, National Director for Fisheries Research; Lic. Mario Lasta, Chief, Patagonian Scallop Research Group and his team; and Dra. Claudia Bremec, CONICET-INIDEP, Head, Benthic organism research; the **National University of Mar del Plata** scientists involved in research on Patagonian Scallop, lead by Dr. Oscar Iribarne; and the following Stakeholder

representatives: **CAIPA** (Fishing Industry Chamber), Sr. Mariano Pérez; **FVSA** (Argentina Wildlife Foundation), Lic. Guillermo Cañete; **Argentine Prefecture**, PM Rubén D. Bellines and AM Julio Bibbo; **Wanchese S.A.**, Sr. Pedro Böhnsdalen; **CeDePesca**, Lic. Romina Cutuli. A letter was received and considered from Custom Forwarding Agent, Sr. Jorge Shepherd.

- B. In Buenos Aires: The **Federal Fishery Council** (Consejo Federal Pesquero, CFP), the National Director of Fisheries Coordination, Ing. Marcelo Santos. The members of the Consejo Federal Pesquero are included in the minutes presented in Appendix III.

The methodologies used have been previously outlined in the Assessment Process.

General context

This report is the first surveillance audit of the Patagonian Scallop Fishery in Argentina.

Scope and history of assessment

The Assessment followed the MSC Certification Methodology (FCM) for Surveillance Report, version 6 and the TAB Directive, D-013.

The Fishery was certified as an MSC Sustainable Fishery in November 2006 and this Surveillance Audit is the first conducted on it.

Stakeholder consultation:

- **Cámara de la Industria Pesquera Argentina (CAIPA) - President, Mariano Pérez**

The only issue that CAIPA raised against the fishery, was that the fishery was not within the Law, because the CFP did not establish transferable quotas according to Law 24922.

The issue was presented to the Assessment Team during the Full Assessment, but was not accepted as valid on the basis that no objective evidence, including technical, written and anecdotal sources, to support their suggestions, was presented.

After discussion with the Assessment Team, CAIPA did not continue with this complaint. It was noted that they failed to use the Objection Process after the Final Report was published, and the available legal channels to them.

New evidence, written or oral, was not provided to the Assessment Team during the Surveillance Visit.

- **Argentine Coastguard/Prefecture and Argentine Customs**

PM (Major Prefect) Bellines and AM (Auxiliary Prefect) Bibbo (Argentine Prefecture), and Sr. Jorge Shepherd (Customs Forwarding Agent) both indicated that the fishery is well managed and that there are no changes in their respective areas of interest over the past two years.

- **Argentina Wildlife Foundation (FVSA), Lic. Guillermo Cañete and Lic. Claudia Bruno**

They considered that the fishery was well managed and sustainable. FVSA suggested that attention should be given to mortality of juvenile scallops returned to the sea by both companies. They

presented no specific data. The Assessment Team discussed this with INIDEP scientists. See Principle 2 discussion.

- **Centre for Defense of Fishing (CeDePesca)**, Lic. Romina Cutuli.

CeDePesca believes that the fishery is functioning normally and there are no changes in the conduct of the fishery or changes in the level of bycatch. Because of the level of sustainability achieved, they have no concerns for this fishery.

- **Wanchese S.A.** General Manager Argentina, Sr. Pedro Böhnsdalen

Sr. Böhnsdalen stated that if recruitment was highly variable, the current higher level of production could result in overfishing. It was noted that the management authority monitors both, recruitment and production, and thereby maintains sustainability of the resource.

Wanchese S.A. comply with all management decisions and the details of the certification requirements.

Wanchese S.A. use similar factory vessels and fishing methods as Glaciar Pesquera S.A.. In the past year, Wanchese S.A. have installed similar processing systems in both vessels to that used by Glaciar Pesquera's vessels. The company has purchased a replacement vessel and over the past year has operated with the permitted number of two vessels.

- **National Institute of Fisheries Research and Development (INIDEP, Directorate)**

The Assessment Team had a valuable discussion with the Director of Science, Dr. Otto Wohler who explained the new research policy of INIDEP. His comments have been incorporated within the body of the report. The Director of INIDEP, Lic. Enrique Mizrahi was absent from Mar del Plata.

Methodologies

The Assessment followed the MSC Certification Methodology (FCM), version 6 and the TAB Directive, D-013.

4. Results, conclusions and recommendations

Status of the Principles

All the conditions apply to Principle 1 and some of the recommendations apply to each of the Principles.

A. Principle 1. The resource.

Conditions are presented here as all of them apply to Principle 1.

Conditions

▪ Condition 1

Performance Indicator 1.1.1.3

The population dynamics of the species (including age at maturity, natural mortality, growth, and fecundity) are understood.

Required Action: Within a maximum of 4 years, starting from the certification of the fishery it will be necessary to study the variability of the natural mortality rate for each bed, within each management unit.

A new estimate of natural mortality has been made using an indirect method based in correlation of M with growth parameters. The model assumes age-specific rates and was applied to the growth data set of four beds (Beagle, Tango B, Reclutas and Uruguay) spread across the entire spatial distribution (Milesi 2007). This work will be extended to develop information on spatial variability of natural mortality rates over the next 3 years.

Trends in the age structure of populations within two sampling boxes of 67.01 km² with high and low fishing activity over six years (2000 – 2005) were analyzed and total mortality Z estimated. The estimates of Z did not differ between the two populations. This may indicate that natural mortality is so high that the fishing mortality has little impact on total mortality. Continuation of this research on other beds may elucidate this (Anon.2007b).

This is a difficult area to investigate but its importance warrants increased research effort. (Milesi 2007 and Anon. 2007b).

Research on this Condition is considered to be “on target”.

▪ Condition 2

Performance Indicator 1.1.3

Appropriate reference levels have been developed for biomass and fishing mortality rate.

Performance Indicator 1.1.6.1

[The overall population is at appropriate reference levels.](#)

Required Action: In a maximum period of 1 year from the fishery certification, biological reference limits must be established based on the resource biology, regarding biomass and fishing mortality rate. Limit reference levels for each bed in each management unit (to be considered in management decisions) will need to be initiated within the current certification period.

The present management continues to use the biomass biological references point of 60% of the average biomass. The fishing reference level is 40% of the commercial size scallop (exploitation rate).

Variation in growth rates and age at size based on analysis of shell structure has been studied on a number of beds (Lomovasky et al, 2004, 2005a, 2005b, 2007a, 2007b, 2007c). These are used as reference levels. The reproductive cycle has been described (Campodónico et al, 2007) and the size and age at sexual maturity on different beds determined (Lomovasky 2007).

The reference fishing mortality F_{max} has been estimated as 0.54 by a simulation study that incorporates all the relevant ecological characteristics on the Patagonian scallop (Kittlein 2007). Milesi (2007) estimated Z (total mortality) in two different boxes obtaining estimates of 0.70 and 0.75, respectively. Both can only be considered as preliminary calculations.

Research on this condition is considered to be “on target”, but still requires refinement to fully meet it.

▪ Condition 3

Performance Indicator 1.1.5.3

[The assessment, including any assumptions, has been appropriately tested by simulation or other methods and considers uncertainties which are reflected in management advice.](#)

Performance Indicator 1.1.5.4

The assessment evaluates the consequences of harvest strategies and evaluates the status of the fishery relevant to reference levels.

Performance Indicator 1.1.6.1

The overall population is at appropriate reference levels.

Required Action: Within a maximum period of 4 years from the fishery certification, the precision of the estimates in the stock evaluation must be improved, taking into account the uncertainty of the initial data and testing of the sensitivity of the results.

Development of the possible changes in exploitable biomass, relative to the catch strategy currently applied, under different fishing scenarios will need to be initiated within the current certification period.

Initial simulation modelling of the population dynamics (Kittlein 2007) integrates the most relevant ecological characteristics of the species to simulate alternative exploitation rates to implementing a rotational fishing strategy. The age-structured model with different spawner-recruit relationship, known variability in growth parameters (Lomovasky et al., 2007a and 2007b), and size/age at first maturity (Campodónico et al., 2007). Variability in model parameters was assessed through simulation of population trajectories with exploitation at variable fishing rates. The results of this preliminary approach ($F_{\max} = 0.54 \text{ year}^{-1}$) is consistent with the threshold established to close areas to fishing (removal of 40% of adult biomass).

This model is the first step in developing a simulation model to test the implementation of a rotational fishing strategy. Continued development of the model and acquisition of growth, mortality, and age at maturity parameters from all beds are keys to achieving this condition.

The primary settlement of scallop larvae on hydroids (Bremec et al., 2007) has the potential to limit recruitment. Thus recruitment would be proportional to the density of hydroids rather than to the reproductive capacity of the scallop population. This may allow the development of a new concept in population reference points, for example a reference biomass level for hydroids in commercial bycatch or survey samples.

Research on this condition is “on target”.

▪ **Condition 4**

Performance Indicator 1.3.1

There is adequate information on the population structure and reproductive capacity of the resource.

Performance Indicator 1.3.2

The age/sex/genetic structure of the resource is monitored to detect significant impairment of reproductive capacity.

Required Action: Within a maximum period of 1 year from the fishery certification, the relative fecundity per size or weight must be established for each bed, and within a maximum period of 2 years from the fishery certification, a study on the oceanographic variables involved in relation to recruitment must commence.

Additionally, within a maximum period of 3 years after the certification of the fishery correlation over time with the changes in size, age and sex structures of each bed must commence in order to evaluate the impact of the fishery on the reproductive capacity of the stock.

The age structure of populations is being determined from shell sections (Lomovasky et al 2007). Internal growth lines had a pattern of translucent and opaque shell. Samples of shell from these

alternating bands tested for values of isotopes ^{18}O and ^{13}C , showed they were laid down at different temperatures validating their annularity.

Age and length keys will allow the age structure of each scallop population to be determined in future studies.

The reproductive cycle has been described (Campodónico et al., 2007) and the size and age at sexual maturity on different beds determined (Lomovasky 2007). Once fecundity of the species has been determined, these data in conjunction with the age-length key will allow the reproductive capacity of individual scallop populations to be determined.

An approach to understanding the reproductive capacity of individual populations has been determining how much of the larval production is retained on that bed. This is approached indirectly by genetic studies of how closely populations are related genetically. Research is developing a methodology to study the genetic distance between beds to analyze the possible genetic flux between them. This is based in the identification of species-specific markers (using Inter Simple Sequence Repeats, ISSR, methodology). Two other investigators, Dr. O. Gaggiotti and Dr. D. Ruzzante, from the Universities of Grenoble and Dalhousie, in France and Canada, respectively, attended the Genetics Workshop 2007, in Mar del Plata, financed by Glaciar Pesquera. The workshop was designed to strengthen the current INIDEP project on Patagonian scallop genetics. If finance is obtained, complementary research studies will be initiated at Grenoble and Dalhousie.

A second approach to the understanding the reproductive capacity of the resource is to determine the likelihood of larval retention in the current systems of the shelf break environment. Modelling studies at the Universidad Nacional del Sur (Dr. Elbio Palma, Bahía Blanca, Argentina) are investigating the relationship between the genetic constitution of populations and oceanographic fronts.

Larval drift and its correspondence with the frontal system of SW Atlantic is being studied. Cross-frontal variation in recruitment and adult abundance of the Patagonian scallop on shelf break front beds (Mauna, et al, in prep., a). This study integrates data from commercial fleet, research surveys, sea surface temperature and chlorophyll-a concentration. Eighteen years of sea surface temperature has been analyzed to study interseasonal variability of the Patagonian shelf break front and thermal fronts have been found offshore and inshore to the main shelf break front (Franco et al., in press).

Spatial variability of size-mass relationship, condition indexes and isotopic signature in soft parts, between scallop beds has been analyzed (Mauna et al., in prep.b). As all these biological measures are related to sea surface temperature gradients and chlorophyll-a concentration, the relationship between scallop recruitment and the shelf break front is being analyzed.

Samples have been taken from each bed, in order to assess the relative fecundity per size or weight. This will be analyzed during this coming year by scientists of the University of Mar del Plata.

Overall it is deemed that research on this Condition is “on-target”. However there is a need for negotiation in regard to the lack of some information between the Client and the Assessment Team on the Proposed Action Plan. The Action Plan has differences in scale to the Conditions of the Certification. Considerable effort, more than expected, has been done in some areas, and less than expected in others.

The revised Client Action Plan is presented as Appendix III.

B. Principle 2. The environment.

See **Recommendations**. These are presented here as most of the recommendations made in the Certification Report, belong to this principle.

Recommendations

Recommendation 1 Larval studies and settlement, and

Recommendation 6. Identify settlement habitat.

Upon certification, INIDEP commenced investigations to identify primary settlement surfaces of scallops. Spat were discovered on two species of hydroid (*Symplectoscyphus* sp. and *Grammaria magellanica*) from among an assemblage of 18 hydroids (Bremec et al., 2007). The density and size range of spat indicate that these hydroids are the preferred substrates for primary settlement and spat may migrate to secondary surfaces (including scallop shells) before they grow larger than 4mm. Spat morphology has been analyzed and shows typical planktotrophic characteristics (Schejter et al., 2007 d). This information has important implications for recruitment (availability of habitat could be the major factor driving recruitment variability) and fishing methodology should aim to optimize the preservation of emergent bushy habitat.

Recommendation 2. Incidental mortality.

A comparison of damage and scarring of scallop shells pre-fishery in 1995 and in 2003 shows that more scallops exhibited shell scarring before the fishery commenced. Direct experiments with undamaged scallops have shown that the majority of them (96%) survive a single trawling event. Scallops damaged by dredging however, might not survive so well. The lower proportion of scarred shells in 2003 may be the result of any scallops damaged by fishing dying or the higher proportion of larger scallops in the 1995 population (Schejter & Bremec, 2007 c). Further investigation is required to establish the survival of the smaller size groups discarded during fishing.

One of the institutions (FVSA–Argentina Wildlife Foundation) interviewed suggested survival of juveniles varied between the two companies fishing. Interviews failed to reveal any substantial variation in fishing methodology and scientists were of the opinion that variation in bycatch density (especially in polychaete abundance) had more influence on the sorting of juveniles than any inter-vessel difference. Direct investigations of juvenile mortality should be instituted.

Recommendation 3. Improve selectivity for scallops, and

Recommendation 16. Minimise bycatch.

Use of square mesh in the trawl is being investigated to reduce benthic bycatch and increase selection of scallops. Technical difficulties in this investigation are still being overcome. We recommend that Glaciar Pesquera should continue work in this area.

Recommendation 4. Develop rigorous stock assessment methodology.

Initial development of yield per recruit model for one population has estimated F_{\max} , and as the study is extended to all populations, it will be used to model rotational fishing strategies.

Recommendation 5. Study genetic structure of resource and identify its dynamics

This recommendation partly overlaps with Condition 4 relating to the connection between local stocks.

The first study aims to elucidate connections between local stocks by passively drifting larvae held within the shelf break fronts. The spatial pattern of recruitment (estimated as recruits-CPUE) and scallop adult abundance (estimated as adults-CPUE) showed the highest values located at central-

western positions of the front, matching the highest gradient of chlorophyll *a*. The observed spatial variability in scallop recruits and adult abundance is strongly related to spatial front variability and the primary ocean productivity at the surface (Mauna et al., in prep.a). The spatial variation of production has been related to spatial variation in scallop condition and indicates oceanographic factors are important in benthos-pelagic coupling (Mauna et al., in prep.a). The historical sea surface data has been re-analyzed to delineate the shelf break front more precisely and demonstrate its variability (Franco et al., in press).

The second study aims to elucidate connections between local stocks from genetic studies. The results of earlier research and new methods were discussed at a workshop held in September 2007 (Anon. 2007 a). Preliminary results of Inter Simple Sequence Repeats based on the study of micro satellites, showed high numbers of polymorphic loci. Clear differences existed between beds at the extremes of distribution and the method shows promise for analyzing the intervening stocks (Trucco, 2007).

Recommendation 7. Identify position of scallops in food web, and

Recommendation 11. Impact of scallops on structure and function of ecosystem.

Stable isotope analysis of the food web of scallop beds, indicated at least three consumer trophic levels. Scallops had a ^{13}C signature between 18 and 19% in muscle and 21 and 23% in gonad. These values increase in larger scallops suggesting they are feeding higher in the food web. The scallop signature is higher than that of associated benthic species which are utilizing different food sources. Isotopic signatures suggest that the gastropods *Fusitriton magellanicus magellanicus*, *Odontocymbiola magellanica*, *Adelmelon ancilla* and the starfish *Labidiaster radiosus* species feed on scallops. The starfish *Calypttrasta* sp. appears to be the top predator feeding on these gastropods but not on scallops (Botto et al., 2006). Removal of this top predator has the potential to instigate a trophic cascade. No change has been observed in the abundance of this starfish so this is unlikely to occur.

The hypothesis that changes in scallop density can influence the composition and structure of the food web is being investigated currently.

Recommendation 8. Tabulate and compare quantitative bycatch data, and

Recommendation 9. Analyse inter-annual and inter-bed changes in bycatch.

The commercial bycatch is sampled in the fishery observer programme. The data from 1509 trawl shots between 1997 and 2005 have been tabulated (Diez et al., 2006). Initial analysis shows that scallop biomass dominated the samples (ranging from 99 to 3161 g.100m⁻²), and bycatch biomass ranged from 32 to 503 g.100m⁻². Echinoderms dominated bycatch on most beds forming 86% of biomass but one bed was dominated by brachiopods which formed 94% of the biomass. This database will permit future analysis of differences between beds and long-term ecological effects of fishing and the relationship between intensity of fishing and benthic community structure (Escolar et al., 2007).

The epibenthic bycatch has been analyzed using PRIMER to test for changes in composition and abundance over the history of the fishery. The data showed no substantive changes (Bremec et al., 2006). Most species (~70 spp) occurred on all beds, northern beds tended to have higher diversity (MDS analysis), but variation in diversity was frequently related to the number of samples (Schejter & Bremec 2007 b). The epibionts on scallop shells from all beds were identified and scored for percentage cover. The shells provided an important settlement substrate and contributed greatly to species richness of the benthos, hence removal of scallops by fishing has the potential to reduce benthic diversity (Schejter & Bremec 2007 a).

Recommendation 10. Evaluate changes in biomass of fragile taxa in bycatch.

The on-board observer programme sampling protocol has been modified to record fragile taxa in the bycatch. The evaluation of bycatch samples by INIDEP should be widened to allow the analysis of the biomass and distribution of hydroids.

Recommendation 12. Investigate impact of bycatch removal on structure and function of ecosystem.

The development of data bases that allow monitoring of changes between 67.01 km² squares will allow comparison of bycatch between reserve and fished areas of each bed.

Recommendation 13. Investigate fishery impacts on habitat structure.

No use of video cameras to observe habitat structure has been reported.

Recommendation 14. Investigate sources of funding.

Since certification, the CFP, The National Authority and INIDEP have changed policy so that fishing companies may no longer fund stock assessment research. As a consequence Glaciar Pesquera now directly funds research outside of INIDEP. For example, research at the University of Mar del Plata (food web studies, ageing studies, analysis of bycatch and structure of benthos). As well, negotiations are underway with the University of Comahue in regard to studies on larval development, subject to funding being available. Many of these studies are carried out in collaboration with CONICET scientists. CONICET is the prestigious National Research Institute of Argentine. Dr. Oscar Iribarne, a senior CONICET scientist coordinates many of the joint studies between CONICET and University of Mar del Plata, in collaboration with INIDEP.

Recommendation 15. Analyze usefulness of no take zones to control exploitation.

Although no data have been provided the management authority still has an active interest in the creation of reserves.

Recommendation 17. Management responds to external reviews.

The MSC certification consultation constituted a major external review. Management of the fishery is vested in CFP. The CFP responds to the advice given by INIDEP scientists. The speed at which INIDEP and University of Mar del Plata/CONICET scientists responded to the certification conditions and recommendations and their advice flowing on to CFP, illustrates how well management responds to external review.

Continued review of the certification will ensure that external review will continue on an annual basis.

The revised Client Action Plan is presented as Appendix III.

C. Principle 3. The management.**Management system**

The management system of the Argentine Patagonian Scallop Fishery (*Vieira Patagonica*, *Zygochlamys patagonica*) has changed in response to the certification of this Fishery under the MSC Principles and Criteria. These changes have been positive. They will improve the management, yield/performance and sustainability of the fishery in the long term.

The Surveillance Team has identified two main areas where changes have occurred since evaluation of the fishery.

The client provided information that showed aspects of the research system have changed. Some of the changes are due to changes in research policy, whilst others are due to changes in operational systems.

1) Changes in the Research System.

Lic. Enrique Mizrahi has been appointed as National Director of INIDEP and Otto Wohler appointed as Director of Science.

The National Institute of Fisheries Research and Development (INIDEP), is the technical organization responsible for the investigations on the Argentine fishery resource. INIDEP has modified its general research policy and adopted long-term, ecosystem-focused programmes, rather than the previous single species approach. This decision applies to all fisheries. However, the Patagonian Scallop is the only species in the newly defined Benthic Resources Programme (INIDEP Resolutions N° 8/07 and N° 9/07).

INIDEP has approved Internal Resolution N° 08/07 (Article 8) that has created a Fishing Resources Assessment Group which internally evaluates all research, including that of the Patagonian Scallop team (INIDEP Resolution N° 209/07). There has been an increase in staff on Patagonian scallop research at the University of Mar del Plata. The new projects and scientists in charge are listed in the footnote on page 12.

The financial support from Glaciar Pesquera S.A. has changed with more of the funding being directed to the University of Mar del Plata science team. This has diversified research on the Fishery and the associated benthic environment. The result of the increased funding has been an increase in the number of scientists working in the Patagonian Scallop programme. Their salaries are paid by the Federal Government, but the operational costs of the research are paid by Glaciar Pesquera S.A. The new scientists have introduced new ideas, experience from other fields, and methodology to expand the scope of the research. This has significantly advanced research on the Fishery.

The CFP, the National Authority and INIDEP, informed the Assessment Team that the Federal Government guarantees the financial support for the stock assessment for all Argentine fishery resources, including the Patagonian scallop fishery. This policy encourages industry to fund research in the Universities and other institutes. The new management plan established by CFP Resolution N° 9/2006 (Art. 8°), however requires that every vessel in the Scallop Fishery will be available to undertake up to 20 days of investigation on the resource each year, or pay for the equivalent effort by INIDEP research vessels. (This is the same as earlier resolutions).

All changes in the Research System have a positive effect on the operation of the Fishery. The research and the associated publication and reporting achieved over the past two years are impressive¹.

¹ **New Projects and Scientists in Charge:**

1.- Food Webs: Interaction of various species in the ecosystem: Dr. Florencia Botto and Dr. Oscar Iribarne (CONICET) working at UNMdP.

Research has ensured that all of the conditions in the Certification Report are on target. Continuation of these initiatives will ensure that the conditions are met within the certification period. Although the Client action plan has not addressed all the needs of the conditions, the research organizations/team involved have established the basis to achieve the conditions within the certification period.

Multi-Beam equipment on loan to INIDEP for three years was used to survey the sea bed for 32 of the 55 days agreed. The loan period has finished and the equipment will now be returned to Canada.

2) Changes in the Administrative System.

Implementation of precautionary management approach has resulted in changes in the Administrative System of the Fishery.

CFP Resolution N° 9/2006 has re-defined the management units of the Fishery by reducing their size and numbering them. The CFP Resolution N° 2/2007 also states that no fishing vessel can fish management units that do not have an established TAC. An estimate of the Biologically Acceptable Catch is required before fishing can commence. This will normally require a research survey, unless INIDEP can provide provisional approval based on known biological indicators.

Meetings of the Scallop Commission provide a mechanism for fishing companies to present their ideas on management of the resource. Such meetings are held as needed. (CFP Resolutions N° 9/2006 and 2/2007).

The smaller management units allow more precise management. The new system numbers the units from north to south as 1.1, 1.2, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13. Four new management units were established below the former south zone. The new management units include all of the areas within the resource that have been fished. See Figure 1, in which the new numbering system is correlated against the names of former beds.

It is possible that new beds will be discovered in the future. Under the existing provisions, if a new bed is found, the discoverer must publicly communicate the finding within 48 hrs. to the National Direction of Fishing Coordination and INIDEP (Art. 4 and Annex II of CFP Resolution 9/06).

2.- Genetics Markers: Locate genetic markers to investigate differences in distribution and biological characteristics of the banks (genetic distance): Lic. Maria Inés Trucco (INIDEP).

3.- Genetic Modelling Studies: To enhance studies conducted by Maria Ines Trucco in relation to oceanographic variables: Daniel Ruzzante (Dalhousie University – Canada) and Oscar Gaggiotti (Grenoble University – France), financed by Glaciar Pesquera S.A..

4.- Population dynamics to establish rotational fisheries management: Establish the principles, bases of recruitment and growth for each bed, by simulation modelling: Dr. Marcelo Kittlein (UNMdP). Financed by Glaciar Pesquera S.A..

5.- Size-age relationship and its variability through scallop latitudinal range: Growth and age at first maturity. Five beds have been analyzed on the Shelf Break Front and research will continue on others using curated material: Dr. Bettina Lomovasky (CONICET) working at UNMdP.

6.- Water movement in relation to recruitment onto the beds: Lic. Barbara Franco (University of Buenos Aires– Doctoral scholarship), initially financed by Glaciar Pesquera S.A.

7.- Analysis of Natural Mortality: Andres Milessi (UNMdP).

8.-The Assessment Team did not receive an update on the research of Dr. Maria Eugenia Bogazzi, University of Washington.

All other regulations promulgated from October 2005 to October 2007 establish Total Allowable Catches (TAC) for specified management units. The TAC's are valid for a 12-month period, from the date established.

The interval of notification of vessel catch to the authority has been reduced from 72 to 24 hrs and is communicated by e-mail. Vessels are still required to present a detailed capture report after each fishing trip. A new monitoring system has been adopted by the authority and allows control of the smallest areas and lower volumes of catch more efficiently.

Satellite monitoring of the fleet continues as in the past. These data are compared with the final trip report of each vessel.

The biomass captured is calculated by transformation of scallop muscle weight using a conversion factor of 7.14. This conversion factor has remained unchanged. Catch data from 1995 to 2006 is presented on Figure 2.

CFP Regulations require that the fishing companies are notified when the capture levels attain 90% of the TAC. In practice, closure of management units occurs before the TAC is reached ($99 \pm 1\%$). The authority notifies the Coastguard. The Coastguard informs all captains who must then stop fishing that unit. The Coastguard controls the closure and the fishing. The fishing companies notify their captains as well.

The Fishery Administration has decided to control the impact of the Fishery on by-catch fin-fish. In spite of the low catches recorded, the crews are being trained to recognize report and release skate species. They are also being trained to release sharks less than 1.40 m long. These responsible fishing practices are based on FAO recommendations, now applied to Argentine Fisheries. The Authority is also concerned on the impact of fishing on benthic communities. The Patagonian Scallop Fishery has already established a record of excellence in avoiding environmental damage as demonstrated in the high score achieved by Principle 2 in the certification.

3) Glaciar Pesquera Corporate Social Responsibility.

As a result of the high 40% poverty rate in Argentina after the political, economic and social crisis, during 2002-2003 Glaciar Pesquera S.A. decided to take action and collaborate with other organizations involved in helping needy people in a sustainable manner.

The company is a responsible employer. Glaciar Pesquera S.A. has a Department of Corporate Social Responsibility, which co-ordinates the various programmes that it sponsors, and it is a unique Argentine fishing company in this regard. It does not process Patagonian Scallop in Argentina but balances this situation by returning profits in a socially responsible way to the community. It is involved in several projects related to health, education and self employment, in the Mar del Plata area, including:

- a. Health assistance in needy neighborhoods
- b. Self-sufficient food production
- c. Rescue of street-kids (Ñandeyará Program)
- d. Housing improvement in poor neighborhoods
- e. Supply of construction-expertise and materials in poor neighborhoods
- f. "Grameen" micro-credits program in needy Mar del Plata neighborhoods

Since initiation of assistance in these areas, Glaciar Pesquera S.A. has received 5 awards including the CCIAF Corporate Social Responsibility Award (2005), Social Entrepreneur Award (Health, 2005) and Corporate Citizenship Award (2006); and invitations to participate in forums organized by the Unilist Nation Development Programme.

Issues identified

Interactions with the Client and the scientific teams involved in the research have been excellent, cordial and productive. The scientists have been responsive to all suggestions from the Assessment Team.

A step in the Assessment procedures that could allow the Client and the Assessment Team (Team Leader and a local member of the Assessment Team) to discuss the whole Action Plan to achieve the conditions set. This meeting should be before finalization of the audit each year. It would strengthen achievement of full sustainability.

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Appendixes List

Appendix I. Stakeholder Interview Schedule and Stakeholders consulted.

Appendix II. List of Stakeholders contacted by e-mail and telephone in regard to the Patagonian Scallop Fishery 1st Annual Surveillance Visit 2007.

Appendix III. Client Action Plan 2nd Year.

Figure 1. Spatial distribution and location of the new numbered fishing areas for the Patagonian scallop.

Figure 2. Annual yield of scallop muscle (callo, tons), and Patagonian scallop caught (tons) and the trawls (lances)

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- CFP Resolutions N° 9/2006.
- CFP Resolutions N° 2/2007.
- INIDEP Resolutions N° 8.
- INIDEP Resolutions N°9.
- INIDEP Resolution N° 209/07.

- **Appendix I. Stakeholder Interview Schedule and Stakeholders consulted.**

A. MAR DEL PLATA, 30 September-3 October 2007**Sunday 30 September**

- Assembly of the Assessment Team in Mar del Plata

Monday 1 October

- 8.00 hrs Team discussion
- 10.00 hrs Eduardo González Lemmi, Glaciar Pesquera S.A. Client Company.
- 13.00-14.00 hrs Lunch
- 14.00 hrs Lic. Mario Lasta. INIDEP
- 16.00 hrs Dr. Oscar Iribarne. Univ. de Mar del Plata
- 21.00 hrs Interviews completed.

Tuesday 2 October

- 8.00 hrs Team discussion
- 9.30 hrs Enrique Mizrahi, Director INIDEP. Dr. Otto Wohler, Science Director
- 10.00-11:30 hrs Mario Lasta, Claudia Bremec and other Patagonian Scallop scientists of INIDEP.
- 11.30-12.00 hrs Gabriel Blanco, INIDEP, On Board Observer Representative.
- 12.15-13.00 hrs Mariano Pérez, President of CAIPA.
- 13.00-14.00 Lunch
- 14.00 hrs Guillermo Cañete and Claudia Bruno, FVSA.
- 15.00 hrs PM Miguel A Viola, Argentine Prefecture. Deputies: PM Rubén Darío Ballines and Ay. Mayor Julio Bibbo.
- 16.00 hrs Pedro Böhnsdalen, Wanchese S.A.
- 17.30 hrs Lic. Mario Lasta, INIDEP and Dr. Marcelo Kittlein, Univ. of Mar del Plata.
- 18.30 hrs Ernesto Godelman, CeDePesca. Deputy: Lic. Romina Cutuli
- 20.00-22.00 hrs Team discussion

B. BUENOS AIRES**Wednesday 3 October**

- 08.30 hrs Assessment Team returned to Buenos Aires.
- 15.00 hrs Assessment Team met with Federal Fishery Council.
- 18.00-22.00 hrs Team discussion.

Thursday 4 October

- 08.30-09.30 hrs Team discussion.
- 10.00 hrs Assessment Team met with the deputy of President of the del Federal Fishery Council (CFP) and National Director of Fishery Coordination, Ing. Marcelo Santos.
- 13.00-22.00 hrs Continue analysis of information and compilation of report, OIA Martínez.

Friday 5 October

- 08.30- 22.00 hrs Report writing, OIA Martínez.

SATURDAY 6 OCTOBER

- 08.30-22.00 hrs Report preparation, OIA Martínez.

SUNDAY 7 OCTOBER

- 08.30-15.00 hrs Report finalization, OIA Martínez.

Appendix II. List of Stakeholders contacted by e-mail and telephone in regard to the Patagonian Scallop Fishery 1st Annual Surveillance Visit 2007.

- Glaciar Pesquera S.A.
- Wanchese Argentina S.A.
- SSPyA (Sub-Secretariat of Fisheries and Aquaculture)
- SAGPyA Secretariat of Agriculture, Livestock, Fisheries and Food
- Mar del Plata Fishing District – Control Inspectors
- FFC (Federal Fishery Council)
- PNA (Argentine Prefecture)
- INIDEP (National Institute of Fisheries Research and Development)
- CENPAT – National Patagonian Research Institute
- UNMdP (National University of Mar del Plata)
- CONICET - Technical and Scientific Federal Council
- UBA – University of Buenos Aires
- UNLP – National University of La Plata
- FVSA (Fundación Vida Silvestre Argentina)
- CEDEPESCA Center for Defense of Fishing
- CAIPA Fishing Industry Chamber
- Custom's Agent - "Shepherd and Associates"
- CAPECA Fishers and Ship-owners Chamber, Freezing Fishery Chamber
- CEPA- Argentine Fishing Enterprise Council
- CAPA – Cámara de Armadores Poteros de Argentina
- CAPIP - Cámara Patagónica de Industrias Pesqueras
- Cámara Argentina de Industriales del Pescado
- Cámara de Armadores de Buques Pesqueros de Altura
- UDIPA Unión de intereses pesqueros argentinos
- SOMU Sindicato Obreros Marítimos Unidos
- FVSA Argentina Wildlife Foundation
- IBMPAS Institute of Fisheries and Marine Biology "Almirante Storni"
- Secretariat of Environment and Sustainable Development
- Sub-secretariat of Natural Resources of Tierra del Fuego
- Sub-secretariat of Fishing Activities of Buenos Aires
- Directorate of Fishing, Río Negro Province
- Secretariat of Fishing, Chubut Province
- Sub-secretariat of Fishing, Santa Cruz Province
- National Direction of Fishing Coordination
- Cancillería (Ministry of External Affairs)
- Greenpeace
- Patagonian Nature Foundation (FPN)
- CADIC Austral Scientific Research Centre
- Research Centre of Puerto Deseado – Santa Cruz

Appendix III. Client Action Plan 2nd Year.**ACTION PLAN 2nd YEAR**

BY GLACIAR PESQUERA S.A.

DATE: 26 October 2007

GLACIAR PESQUERA S.A.: CONTADOR EDUARDO GONZALEZ LEMMI

This action plan follows the conceptual considerations of the previous action plan (2006) , with only minor modifications in order to ensure continuity with adjustment in relation to the Conditions set by the Assessment Team, according to the capability of the research resources available.

CONDITION 1

- | | |
|--------------------------|--|
| Year 1 (milestone 1) | <p>Identify a) areas within each bed associated with the Continental Shelf Break Front, in which fishing effort is negligible and define the position of each for the particular year,</p> <p style="padding-left: 40px;">b) Identify beds, which have good records of Total Mortality (Z), Fishing mortality (F) in each of the above beds.</p> |
| Year 2 – 3 (milestone 2) | <p>a) Z, F and M will be estimated for each of the statistical sampling boxes (each approximately 67 km²) located in each bed (1.2 – previously known as MdQ bed, 2 - previously known as Reclutas, 3 - previously known as San Blas). These results will permit estimation of variability of these parameters within the spatial distribution of the resources in the three beds located at the northern sector of the fishery.</p> <p>b) Sex ratio in relation to intensity of fishing activity, will be estimated, which will also allow:</p> <p style="padding-left: 40px;">i) Growth studies to establish age-size relationship in each of the remaining beds along the shelf break front.</p> <p style="padding-left: 40px;">ii) Studies of relative fecundity per size or weight (samples have already been taken) within the shelf break front beds.</p> <p>c) Documentation of all information obtained into a scientifically acceptable standard.</p> |
| Year 4-5 (milestone 3) | <p>Prepare a paper on the variability of natural mortality rate for each bed located in the vicinity of the Continental Shelf Break Front and summarize all other relevant results.</p> |

CONDITION 2

- | | |
|----------------------------|---|
| Year 1 and 2 (milestone 1) | <p>Calculate variation in the parameters for the following key biological reference points.</p> <p style="padding-left: 20px;">a. size/age at first maturity</p> <p style="padding-left: 20px;">b. age on each of the major Shelf Break Front Beds.</p> |
|----------------------------|---|

- Year 2 – 3 (milestone 2) A preliminary model for the Rotational Fishing Strategy (RFS) will be further developed.
- Year 4 - ∞ (milestone 3) Refinement of the Rotational Fishing Strategy model year by year. This is an “exceptional circumstance” as model by their nature need to be upgraded as new quantitative data became available. It is an ongoing process.

CONDITION 3

- Year 2 (milestone 1) Within two years a Stock Evaluation Model will be developed using geostatistical techniques.
- Year 4 (milestone 2) Analysis of changes that may occur in exploitable biomass under different fishing scenarios will be completed, but it will be an on-going revisable project.

CONDITION 4

- Year 1 (milestone 1) Development of methodology without production of definitive results in order to prepare an Oceanographic Model which will estimate
a) larval drift.
b) the potential of genetic mixing / isolation between beds.
- Year 2-5 (milestone 2) Annual sampling following the techniques developed in milestone 1 above, culminating in a definitive model in year 5 from the certification of the fishery. Sample data tabulated ready for analysis and inclusion in the definitive model each year.
- Year 4- ∞ (milestone 3) Within a four year period an International – Argentine group will commence development of markers which will allow establishment of between beds variation in scallop genetics.

Signed: CNP Eduardo Gonzalez Lemmi

Date: 28 October 2007.

Figure 1. Spatial distribution and location of the new numbered fishing areas for the Patagonian scallop. (From Lomovsky, 2007)

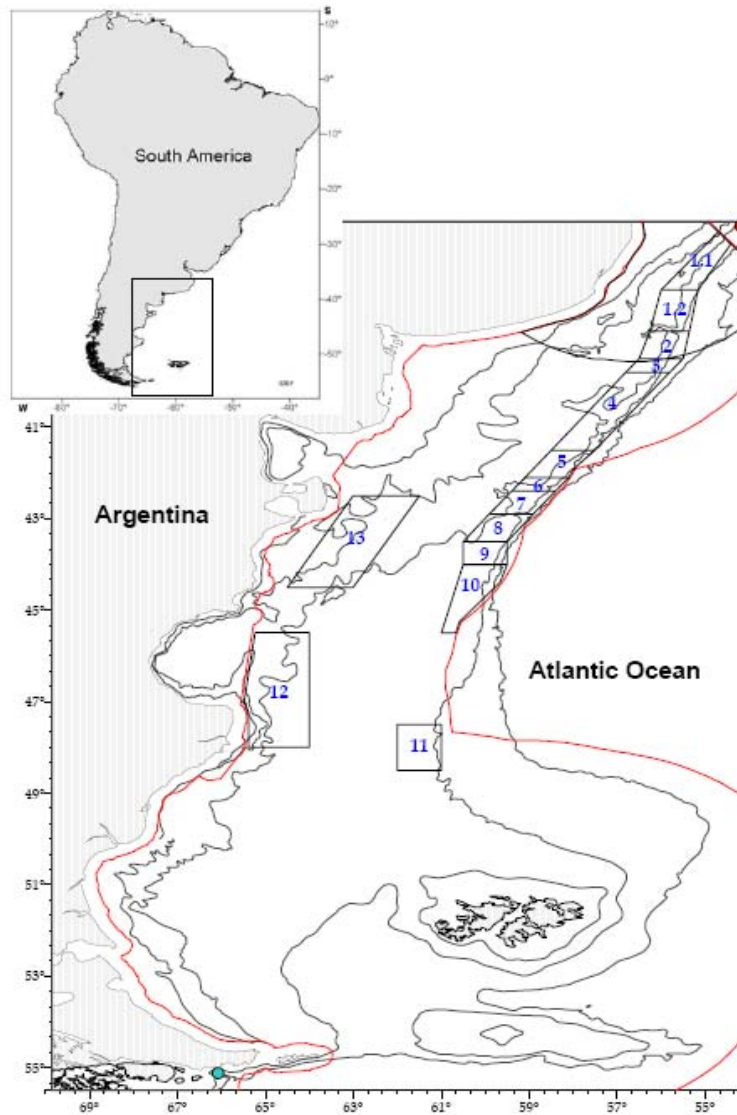


Figure 1. Spatial distribution of the Patagonian scallop *Z. patagonica* beds sampled on the Uruguay-Argentina Continental Shelf, SW Atlantic. Each bed is considered a management unit within two administrative sectors (south and north 39°30'S). 1.1: MDQ Norte or Area A; 1.2: MDQ; 2: Reclutas; 3: San Blas; 4: SAO; 5: SW SAO; 6: Valdes; 7: Tango B; 8: SW Tango B; 9: FUSM; 10: Sector 10; 12: Tres puntas; 13: Sea Bay; Red point: Uruguay; Green point: Beagle.

Figure 2. Annual yield of scallop muscle (callo, tons), and Patagonian scallop caught (tons) and the trawls (lances).

