



**MSC Final Report**  
**PACIFIC SARDINE FISHERY**  
**Gulf of California, Mexico**

Version 4, March 2011

The fishery evaluated in this report:

Species: Pacific Sardine (*Sardinops sagax*)  
Geographic Area: Gulf of California, Mexico  
Fishing Method: Purse Seine  
Fishery Management: Federal Government of Mexico through the regulatory agency CONAPESCA

Accredited Certification Body:  
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## **Versions Issued**

| Version No. | Date          | Description Of Amendment       |
|-------------|---------------|--------------------------------|
| <b>1</b>    | 8 March 2010  | Draft Report for Client Review |
| <b>2</b>    | 17 March 2010 | Draft Report for Peer Review   |
| <b>3</b>    | June 2010     | Public Comment Draft Report    |
| <b>4</b>    | March 2011    | Final Report                   |
| <b>5</b>    |               | Public Certification Report    |

## **MSC scheme documents:**

MSC Accreditation Manual Issue 4

MSC Fisheries Assessment Methodology (FAM) Version 1

MSC TAB Directives

MSC Policy Advisories

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## **PREAMBLE**

This report is the sole responsibility of SCS. All advice and comments from Assessment Team members, peer reviewers, client, fishery managers and the MSC have been reviewed by SCS and incorporated into the report by SCS as deemed warranted.

## ABBREVIATIONS

|              |   |
|--------------|---|
| AHP          | Analytical Hierarchy Process  |
| ASI          | Accreditation Services International  |
| CANAINPES    | Cámara Nacional de la Industria Pesquera [Client]   |
| CB           | Certifying Body   |
| CCNN         | Comités Consultivos Nacionales de Normalización (National Consulting Normalization Committees)  |
| CEPA         | Consejos Estatales de Pesca y Acuicultura (State Councils for Fisheries and Aquaculture)  |
| CICESE       | Centro de Investigación Científica y de Educación Superior de Ensenada, Baja California   |
| CICIMAR      | Centro Interdisciplinario de Ciencias Marinas   |
| CITES        | Convention on International Trade of Endangered Species   |
| CNPA         | Consejo Nacional de Pesca y Acuicultura (National Council for Fisheries and Aquaculture)  |
| COI/IOCARIBE | Comisión Oceanográfica Intergubernamental/la Zona Costera de la región del Caribe (Intergovernmental Oceanographic Commission/the Caribbean Shoreline Zone) |
| CONAPESCA    | Comisión Nacional de Pesca y Acuicultura (National Commission of Fish and Aquaculture)  |
| CPUE         | Catch Per Unit Effort   |
| CRIP         | Centro Regional de Investigación Pesquera (Regional Center for Fisheries Research)  |
| ETP          | Endangered, Threatened and Protected species  |
| ERA          | Ecological Risk Assessment  |
| ESD          | Ecologically Sustainable Development  |
| F            | Fishing Mortality   |
| FAM          | Fisheries Assessment Methodology v2.1   |
| FAO          | Food and Agriculture Organization [of the United Nations]   |
| FCM          | Fishery Certification Methodology v6.1  |
| INAPESCA     | Instituto Nacional de la Pesca (National Fisheries Institute)   |
| IUCN         | International Union for Conservation of Nature  |
| LFMN         | Ley Federal Sobre Metrología y Normalización (Federal Law on Metrology and Standardization)   |
| LGEEPA       | Ley General del Equilibrio Ecológico y la Protección del Ambiente (General Law for the Ecological Equilibrium and the Protection of the Environment)        |
| LGPAS        | Ley General de Pesca y Acuicultura Sustentables (General Law for Sustainable Fishing and Aquaculture)   |
| MT           | Metric Ton  |
| MSC          | Marine Stewardship Council  |
| MSY          | Maximum Sustainable Yield   |
| NCMC         | National Coalition for Marine Conservation  |
| NGO          | Non-Governmental Agency   |
| nm           | nautical mile (1nm = 1.852 km)  |
| NOM          | Norma Oficial Mexicana (Official Mexican Norms)   |

|           |  |
|-----------|--|
| NOS       | Noroeste (northwest)   |
| PCAC-LME  | Pacific Central American Coast-Large Marine Ecosystem              |
| PI        | Performance Indicator  |
| SL        | Standard Length (from tip of closed mouth to end of fleshy body)   |
| SNI       | Sistema Nacional de Investigadores (National Investigators System) |
| SAGARPA   | Secretariat of Agriculture, Livestock, Fisheries and Food          |
| SCS       | Scientific Certification Systems                                   |
| SG        | Scoring Guidepost  |
| SSB and R | Spawning Stock Biomass and Recruitment                             |
| TAB       | Technical Advisory Board [of the MSC]                              |
| TAC       | Total Allowable Catch  |
| WWF       | World Wildlife Foundation  |

## 1. INTRODUCTION

The Marine Stewardship Council (MSC) is a non-profit organization dedicated to the long-term protection or “sustainability” of marine fisheries and related habitats. First started as a joint initiative between Unilever and the World Wildlife Fund (WWF), the MSC is now a fully independent organization that is governed by an independent Board of Directors advised by a panel of scientific, economic, and fishery experts.

The MSC’s updated mission reads,

“Our mission is to use our ecolabel and fishery certification programme to contribute to the health of the world’s oceans by recognising and rewarding sustainable fishing practises, influencing the choices people make when buying seafood, and working with our partners to transform the seafood market to a sustainable basis.”

Dedicated to promoting “well-managed” or “sustainable” fisheries, the MSC initiative intends to identify such fisheries through means of independent third-party assessments and certification. Once certified, fisheries will be awarded the opportunity to utilize an MSC promoted eco-label to gain economic advantages in the marketplace. Through certification and eco-labeling, the MSC intends to promote and encourage better management of world fisheries, many of which have been suggested to suffer from poor management.

The Marine Stewardship Council developed the original standards for sustainable fisheries management in a three-step process: 1) Assemble a group of experts in Bagshot (UK) to draft an initial set of Principles and Criteria; 2) Conduct an 18-month process to review the standard in 8 major international venues; and 3) Convene a second set of experts in Warrenton, Virginia (Airlie Conference Center, USA) to revise and finalize the MSC Principles and Criteria.

The MSC Fisheries Certification Methodology used for this report, the Marine Stewardship Council Fisheries Assessment Methodology (FAM) and Guidance to Certification Bodies Including Default Assessment Tree and Rick-Based Framework Version 1 was issued on 21 July 2008. Subsequently, version 2 of this document was released on 31 July 2009 and has since been used as the basis by which fisheries are evaluated under the MSC program.

## 2. SUMMARY

### 2.1 The Assessment Process

Scientific Certification Systems, Inc. conducted a pre-assessment of the Gulf of California Sardine fishery as recommended by the MSC program. After review of the pre-assessment, the applicants for certification authorized the formal, full assessment of the fishery. All aspects of the assessment process were carried out under the auspices of Scientific Certification Systems, Inc., an accredited MSC certification body, and in direct accordance with MSC requirements.

In order to ensure a thorough and robust assessment process, and a process in which all interested stakeholders could and would participate, SCS took the approach of allowing additional time as needed for both industry and stakeholders to respond to requests for information and participation.

To be thorough and transparent, SCS provided opportunities for input at all stages of the assessment process, whether required or not by MSC procedures. The general steps followed were:

- Team Selection (October 2006 – March 2007)  
At this first step of the assessment process, SCS sought input from interested parties. SCS sent out an advisory through direct email and posting on select web sites requesting comment on the nominations of persons capable of providing the expertise needed in the sardine assessment.



- **Setting Performance Indicators and Scoring Guideposts (July – August 2007)**  
 In accordance with the assessment procedures required by the MSC at the time, the assessment team prepared the 'Performance Indicators' and 'Scoring Guideposts' for use in assessing the sardine fishery in the Gulf of California, Mexico. This completed set was the product of 2 revisions from stakeholder comments.
  
- **Input on fishery performance (August 2007 – July 2009)**  
 Once performance indicators were finalized, SCS requested that the clients compile and submit written information to the assessment team illustrating the fishery's compliance with the required performance indicators. At the same time, SCS requested that stakeholders submit their views on the fishery management system's functions and performance. In the case of the sardine fishery, the client and CONAPESCA provided most of the information needed prior to the initial interviewing process (November 2007). However, a number of documents and/or data were provided on an ongoing basis as the assessment team, the managers, or the applicants found them to be relevant. The stakeholders also provided documents to the assessment team (January 2008) on their views of sardine management in the Gulf of California, Mexico. And again, SCS was able to both ask questions and receive answers from the stakeholders when reviewing the information and making sure the assessment team understood the information provided.
  
- **Additional Stakeholder Meetings (June – July 2008)**  
 SCS and the Assessment Team agreed to hold additional stakeholder meetings in both Bahia de Kino and in San Diego to allow stakeholders to further comment on the fishery and to advocate for the use of the new Default Assessment Tree developed by the MSC be used to address their concerns with the certification of a low trophic fishery.
  
- **Finalize use of the Fisheries Assessment Methodology (FAM v 1) (August 2009)**  
 After considerable external debate, stakeholder discussions and internal professional discussions, there was agreement to allow the assessment team to move the sardine fishery assessment forward using the default assessment tree. As required in the MSC assessment process, the assessment team reviewed the applicability of using the default assessment tree in the FAM (MSC 2008). The SCS assessment team found the default criteria of the FAM adequate for resuming the assessment and posted notice of its use with no modifications to the MSC website (24 August 2009) to allow stakeholders to provide comments. No comments were received regarding the use of the default assessment tree.
  
- **Input on fishery performance (August – September 2009)**  
 Once the use of the default assessment tree was finalized, SCS requested that the applicants compile and submit written information to the assessment team illustrating the fishery's compliance with the required performance indicators (PI). At the same time, SCS requested that stakeholders submit their views on the fishery management system's functions and performance. No stakeholder comments were received at this point.
  
- **Meetings with industry, managers, and stakeholders (September 2009)**  
 SCS planned for and conducted a second set of meetings with industry, fishery managers, and fishery scientists in Guaymas, Mexico on 24 September 2009. Stakeholders were invited to meet with the assessment team. However stakeholders declined meeting with the team and awaited the opportunity to comment on the draft report.

- Scoring fishery (September 2009)  
The assessment team scored the fishery using the required MSC methodology and the default assessment tree of the FAM and without any direct input from the client group or stakeholders.
- Drafting report (September 2009 – February 2010)  
The assessment team in collaboration with the SCS lead assessor, Dr. Chet Chaffee, drafted the report in accordance with MSC required process.
- Selection of peer reviewers (January – February 2010)  
SCS, as required, released an announcement (15 January 2010) of potential peer reviewers soliciting comment from stakeholders on the merit of the selected reviewers. No negative stakeholder comments were received.
- Extraordinary meeting to respond to peer reviewers comments (20-21 April 2010 in Ensenada)  
Stakeholders were invited to attend but advised that they will wait for the opportunity to comment on the draft report.
- Release of Public Comment Draft Report (June 2010)  
SCS releases this draft report for public comment, soliciting stakeholder response through posting on MSC website and direct email to known potential stakeholders. All of the supporting documents that are not in the public domain can be found at the following website:  
<http://www.inapesca.gob.mx/portal/component/content/article/21-foros-y-eventos/71-pesqueria-pelagicos>
- Extraordinary meeting at the time of the release of the PCDR in San Diego to discuss the report with stakeholders (15 June 2010)  
Stakeholder comments were received during the public comment period. These comments are attached to this report along with the Assessment Team responses (Appendix V).
- Release of this Final Report with Certification Decision (March 2011)

## 2.2 Scoring Methodology

The MSC Principles and Criteria set out the requirements for a certified fishery. The certification methodology adopted by the MSC includes default performance indicators (PI) and scoring guideposts (SG) to make the process more efficient and transparent. In order for the fishery to achieve certification, an overall score of 80 is considered necessary for each of the three Principles, 100 represents surpassing of the performance necessary and 60 a measurable shortfall.

## 3. CERTIFICATION RECOMMENDATIONS AND PERFORMANCE SCORES

The fishery achieved a normalized score of 80 or above on each of the three MSC Principles independently (Principle 1 – 84.4, Principle 2 – 81.7, and Principle 3 – 85.1). Although the evaluation team found the fishery in overall compliance (a score of 80 or above on each MSC Principle), it also found the fishery's performance on 8 indicators (1.2.4, 2.1.1, 2.1.2, 2.2.2, 2.2.3, 2.5.2, 3.2.1 & 3.2.4) to be below the established compliance mark (an un-weighted score of 80 for a single indicator). In these specific cases, the MSC requires that the Certification Body set 'Conditions for Continued Certification' that when met bring the level of compliance for the select indicator up to the 80-level score. **Table 3** below shows the overall results of the evaluation for Principle 1, 2 and 3.

**Table 3.** Performance Indicator & Principle Scores

| Principle                                      | Wt (L1)                            | Component        | Wt (L2) | PI No.                | Performance Indicator (PI)        | Wt (L3) | Weight in Principle                    | Score | Principle Score |     |       |
|--|------------------------------------|------------------|---------|-----------------------|-----------------------------------|---------|--|-------|-----------------|-----|-------|
| One  | 1                                  | Outcome          | 0.5     | 1.1.1                 | Stock status                      | 0.5     | 0.25                                   | 90    | 23.75           |     |       |
|  |                                    |                  |         | 1.1.2                 | Reference points                  | 0.5     | 0.25                                   | 85    | 21.25           |     |       |
|  |                                    |                  |         | 1.1.3                 | Stock rebuilding                  |         |  |       | 0.00            |     |       |
|  |                                    | Management       | 0.5     | 1.2.1                 | Harvest strategy                  | 0.25    | 0.125                                  | 80    | 10.00           |     |       |
|  |                                    |                  |         | 1.2.2                 | Harvest control rules & tools     | 0.25    | 0.125                                  | 80    | 10.00           |     |       |
|  |                                    |                  |         | 1.2.3                 | Information & monitoring          | 0.25    | 0.125                                  | 90    | 11.25           |     |       |
|  |                                    |                  |         | 1.2.4                 | Assessment of stock status        | 0.25    | 0.125                                  | 75    | 9.38            |     |       |
| Two  | 1                                  | Retained species | 0.2     | 2.1.1                 | Outcome                           | 0.333   | 0.0667                                 | 75    | 5.67            |     |       |
|  |                                    |                  |         | 2.1.2                 | Management                        | 0.333   | 0.0667                                 | 70    | 5.67            |     |       |
|  |                                    |                  |         | 2.1.3                 | Information                       | 0.333   | 0.0667                                 | 90    | 6.00            |     |       |
|  |                                    | Bycatch          | 0.2     | 2.2.1                 | Outcome                           | 0.333   | 0.0667                                 | 80    | 5.33            |     |       |
|  |                                    |                  |         | 2.2.2                 | Management                        | 0.333   | 0.0667                                 | 70    | 4.67            |     |       |
|  |                                    |                  |         | 2.2.3                 | Information                       | 0.333   | 0.0667                                 | 70    | 4.67            |     |       |
|  |                                    | ETP species      | 0.2     | 2.3.1                 | Outcome                           | 0.333   | 0.0667                                 | 80    | 5.33            |     |       |
|  |                                    |                  |         | 2.3.2                 | Management                        | 0.333   | 0.0667                                 | 80    | 5.33            |     |       |
|  |                                    |                  |         | 2.3.3                 | Information                       | 0.333   | 0.0667                                 | 85    | 5.67            |     |       |
|  |                                    | Habitats         | 0.2     | 2.4.1                 | Outcome                           | 0.333   | 0.0667                                 | 95    | 6.33            |     |       |
|  |                                    |                  |         | 2.4.2                 | Management                        | 0.333   | 0.0667                                 | 95    | 6.33            |     |       |
|  |                                    |                  |         | 2.4.3                 | Information                       | 0.333   | 0.0667                                 | 95    | 6.33            |     |       |
|  |                                    | Trophic function | 0.2     | 2.5.1                 | Outcome                           | 0.333   | 0.0667                                 | 80    | 5.33            |     |       |
|  |                                    |                  |         | 2.5.2                 | Management                        | 0.333   | 0.0667                                 | 75    | 5.00            |     |       |
|  |                                    |                  |         | 2.5.3                 | Information                       | 0.333   | 0.0667                                 | 85    | 5.67            |     |       |
|  |                                    | Three            | 1       | Governance and policy | 0.5                               | 3.1.1   | Legal & customary framework            | 0.25  | 0.125           | 95  | 11.88 |
|  |                                    |                  |         |                       |                                   | 3.1.2   | Consultation, roles & responsibilities | 0.25  | 0.125           | 85  | 11.25 |
|  |                                    |                  |         |                       |                                   | 3.1.3   | Long term objectives                   | 0.25  | 0.125           | 100 | 12.50 |
| 3.1.4  | Incentives for sustainable fishing |                  |         |                       |                                   | 0.25    | 0.125                                  | 85    | 10.63           |     |       |
| Fishery specific management system             | 0.5                                |                  |         | 3.2.1                 | Fishery specific objectives       | 0.2     | 0.1                                    | 75    | 7.50            |     |       |
|  |                                    |                  |         | 3.2.2                 | Decision making processes         | 0.2     | 0.1                                    | 85    | 8.50            |     |       |
|  |                                    |                  |         | 3.2.3                 | Compliance & enforcement          | 0.2     | 0.1                                    | 80    | 8.00            |     |       |
|  |                                    |                  |         | 3.2.4                 | Research plan                     | 0.2     | 0.1                                    | 70    | 7.00            |     |       |
|  |                                    |                  |         | 3.2.5                 | Management performance evaluation | 0.2     | 0.1                                    | 85    | 8.50            |     |       |
|  |                                    |                  |         |                       |                                   |         |  |       |                 |     |       |
| <b>Overall weighted Principle-level scores</b> |                                    |                  |         |                       |                                   |         |  |       | Principle Score |     |       |
| Principle 1 - Target species                   |                                    |                  |         |                       |                                   |         |  |       | 84.4            |     |       |
| Principle 2 - Ecosystem                        |                                    |                  |         |                       |                                   |         |  |       | 81.7            |     |       |
| Principle 3 - Management                       |                                    |                  |         |                       |                                   |         |  |       | 85.1            |     |       |

### 3.1 Meeting Conditions for Continued Certification

To be awarded an MSC certificate for the fishery, the applicants must agree in written contract to develop an action plan for meeting the required 'Conditions'; a plan that must provide specific information on what actions will be taken, who will take the actions, and when the actions will be completed. The Action Plan must be approved by SCS as the certification body of record. The applicant must also agree in a written contract to be financially and technically responsible for surveillance visits by an MSC accredited certification body, which would occur at a minimum of once a year, or more often at the discretion of the certification body (based on the applicant's action plan or by previous findings by the certification body from annual surveillance audits or other sources of information). The contract must be in place prior to certification being awarded. Surveillance audits will be comprised in general of (1) checking on compliance with the agreed action plan for meeting pre-

specified 'Conditions', and (2) sets of selected questions that allow the certifier to determine whether the fishery is being maintained at a level of performance similar to or better than the performance recognized during the initial assessment.

### 3.1.1. General Conditions for Continued Certification

The general 'Conditions' set for the Cámara Nacional de la Industria Pesquera, Delegación Sonora are:

- Client must recognize that MSC standards require regular monitoring inspections at least once a year, focusing on compliance with the 'Conditions' set forth in this report (as outlined below) and continued conformity with the standards of certification.
- Client must agree by contract to be responsible financially and technically for compliance with required surveillance audits by an accredited MSC certification body, and a contract must be signed and verified by SCS prior to certification being awarded.
- Client must recognize that MSC standards require a full re-evaluation for certification (as opposed to yearly monitoring for update purposes) every five years.
- Prior to receiving final certification, the Client shall develop an 'Action Plan for Meeting the Condition for Continued Certification' and have it approved by SCS.

### 3.1.2. Specific Conditions for Continued Certification

In addition to the general requirements outlined above, Client must also agree in a written contract with an accredited MSC certification body to meet the specific conditions as described in Section 11 and summarized below (within the timelines that have been agreed in the 'Action Plan for Meeting the Condition for Continued Certification' and approved by SCS).

Specific Conditions are:

1.2.4 There is an adequate assessment of the stock status.

Score 75

**Condition 1.2.4:**

By the 3<sup>rd</sup> annual surveillance audit the client shall provide evidence that the stock assessment has been modified to be more appropriate for the sardine stock. In doing so, the client shall consider the use of fishery independent data to assess the population biomass. The assessment shall continue to use adequate reference points and control rules, taking uncertainties into account and should be peer reviewed.

2.1.1 The fishery does not pose a risk of serious or irreversible harm to the retained species and does not hinder recovery of depleted retained species.

Score 75

**Condition 2.1.1:**

By the 3<sup>rd</sup> annual surveillance audit provide evidence to the CB that the main retained species (*Opisthonema* spp. and *Cetengraulis mysticetus*) are highly likely to be within biologically based limits, or if outside the limits there is a partial strategy of demonstrably effective management measures in place such that the fishery does not hinder recovery and rebuilding.

2.1.2 There is a strategy in place for managing retained species that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to the retained species.

**Score 70**

**Condition 2.1.2:**

By the 3<sup>rd</sup> annual surveillance audit provide basis for confidence to the CB that the partial strategy will work. In order to do so the client shall consider setting harvest rates and assessments for individual species and incorporate these into the management plan.

2.2.2 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.

**Score 70**

**Condition 2.2.2:**

By the 3<sup>rd</sup> annual surveillance audit provide some evidence, if necessary, that main bycatch species are highly likely to be within biologically based limits, or if outside such limits develop a partial strategy of demonstrably effective mitigation measures and provide some evidence to the CB that the strategy has been implemented successfully.

2.2.3 Information on the nature and amount of bycatch is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage bycatch.

**Score 70**

**Condition 2.2.3:**

By the 2<sup>nd</sup> annual surveillance audit provide quantitative and qualitative information on all main bycatch species of the Gulf of California Sardine fishery. The information shall be sufficient to support a partial strategy for the main bycatch species and shall continue to be collected to detect any increase in risk to the main bycatch species. In order to do so the client should consider developing a scientifically defensible and comprehensive monitoring and reporting system for bycatch species.

2.5.2 There are measures in place to ensure the fishery does not pose a risk of serious or irreversible harm to ecosystem structure and function.

**Score 75**

**Condition 2.5.2:**

By the 3<sup>rd</sup> annual surveillance audit, develop a strategy to restrain impacts of the Sardine fishery on the Gulf of California ecosystem and provide evidence to the CB that the strategy has been implemented successfully.

3.2.1 The fishery has clear, specific objectives designed to achieve the outcomes expressed by MSC's Principles 1 and 2.

**Score 75**

**Condition 3.2.1:**

By the 2<sup>nd</sup> annual surveillance audit evidence should be provided, that the short and long term objectives are explicit within the fishery's management system and consistent with achieving the outcomes expressed by MSC's Principles 1 and 2. Therefore the specific Management Plan for the fishery shall be completed and shall include proper and formal consideration of the role of the resource on the maintenance of the ecosystem and these considerations shall be incorporated into the harvest control rules.

3.2.4 The fishery has a research plan that addresses the information needs of management.

**Score 70**

**Condition 3.2.4:**

By the 1<sup>st</sup> annual surveillance audit, evidence shall be provided to the CB that information from the fishery (including data, analysis and minutes from the technical bodies) have been disseminated in a timely fashion to all interested parties. In addition, a research plan shall be made available to the public that includes a strategic approach to research and reliable information that is sufficient to achieve the objectives consistent with MSC’s Principles 1 and 2.

**3.2 Summary of changes in scores taking into account peer reviewer and stakeholder comments**

| <b>Performance indicator</b> | <b>Peer Review</b>                                     | <b>MSC comments to PCDR</b>                            | <b>Stakeholder comments to PCDR</b>                            |
|------------------------------|--|--|--|
| 1.1.1                        | Score changed from 95 to 90                            |  |  |
| 1.2.4                        | Score changed from 80 to 75 resulting in new condition |  | Timeframe changed to 3 <sup>rd</sup> annual surveillance audit |
| 2.1.1                        | Score changed from 90 to 85                            |  | Score changed from 85 to 75 resulting in new condition         |
| 2.1.2                        |  | Score changed from 85 to 70 resulting in new condition | Score changed from 85 to 70 resulting in new condition         |
| 2.2.1                        | Score changed from 85 to 80                            |  |  |

**3.3 Certification Determination**

It is the consensus judgment of the assessment team and of the SCS Certification Determination Committee that the Gulf of California Mexican Sardine Fishery complies with the MSC Principles and Criteria. Therefore, SCS as the certification body of record recommends that the fishery be issued an MSC Fishery certificate. The lead assessor for the assessment team presented all evidence to the SCS Certification Panel, which agreed with the assessment team’s decision and authorized certification of the fishery. The client has submitted for approval, and SCS has approved, an Action Plan (See Section 12) for meeting all Conditions placed on the certificate.

## **4. BACKGROUND TO THE REPORT**

### **4.1 Assessment Team/Authors**

Dr. Chet Chaffee, Project Manager, (formally of) SCS

Dr. Chaffee initially directed this assessment. Dr. Chaffee has over 20 years experience in the field of marine sciences, and more than 10 years of experience in environmental certification and eco-labeling. Dr. Chaffee has conducted or participated in certification projects for both small and large (Fortune 50) companies in a wide variety of industries from chemical manufacturing to food. Dr. Chaffee also has significant experience in conducting a variety of full assessments, from some of the largest and most complicated fisheries assessed and certified under the MSC program (Alaska salmon, British Columbia salmon, Bering Sea Pollock and Aleutian Islands Pollock - one of the largest commercial fisheries in the world, and Gulf of Alaska Pollock) to small community based fisheries (Lakes and Coorong Fishery in South Australia and Spiny Lobster in Baja California, Mexico). Among the fisheries assessed by Dr. Chaffee are pelagic net fisheries (pollock, sardines), bottom trawl fisheries (Chilean hake, Australian Mackerel icefish), and line fisheries (Pacific cod, US halibut, Canadian halibut, US sablefish), as well as estuarine fisheries in the Lakes and Coorong district in South Australia.

Dr. Daniel Lluch Belda, CICIMAR

Dr. Lluch is an internationally recognized fisheries scientist with more than 30 years experience in fisheries research and management. Dr. Lluch is a member of the Mexican Academy of Sciences; a professor at Instituto Politécnico Nacional, Centro Interdisciplinario de Ciencias Marinas, La Paz, México; and has been Regional coordinator of the PCAC-LME project, COI/IOCARIBE. Dr. Lluch has participated in and chaired a number of international scientific committees examining fisheries, oceanographic dynamics, and environmental effects in marine systems. He is a member of the National Investigators System (SNI, Level III). In addition, Dr. Lluch has been one of the primary fisheries scientists in Mexico conducting research on sardines and assisting in its overall management throughout the years. Dr. Lluch has also been a senior member of an MSC assessment team for the Baja California lobster fishery, which gives him the perspective necessary to provide guidance on other fisheries interested in the MSC process.

Dr. Oscar Sosa Nishizaki, CICESE

Dr. Sosa is a fisheries research scientist at Centro de Investigación Científica y de Educación Superior de Ensenada, Mexico (CICESE), where he teaches, at the graduate level, the Fisheries Ecology and Fish Population Dynamics courses, with 20 years experience. Dr. Sosa is the elected president of the Mexican Fisheries Society and Mexican Chapter of the American Fisheries Society, and member of the Mexican Academy of Sciences. Dr. Sosa has been member of national committees for the development of standard rules for the Elasmobranch fisheries and Sport fishing fisheries, and has participate in the assessment of large pelagic fisheries in Mexican waters. Dr. Sosa was one of the reviewers of the Baja California lobster fishery assessment report in the MSC process.

Dr. Sabine Daume, SCS

Dr Daume is responsible for leading SCS's Sustainable Seafood Certification program, which includes both fishery and chain of custody certification under the auspices of the Marine Stewardship Council (MSC), using the MSC methodology and standards. Dr. Daume has been involved and/ or lead numerous pre and full assessments, including the West Australia Rock Lobster fishery, Mexican Spiny Rock Lobster Fishery, Mexican Sardine fishery, Australian Icefish fishery, the Australian Lakes & Coorong fishery and the North Pacific Halibut fishery and the North Pacific Sablefish (Black Cod) fishery. Dr. Daume has been

trained by the MSC to use the Risk Based Framework (RBF) of the new Fisheries Assessment Methodology for data deficient fisheries. In addition, she is a certified lead auditor under the International Standard Organization (ISO) 90011:2008. Dr Daume is a marine biologist with special expertise in the biology and ecology of exploited marine resources. She has over 10 years experience working very closely with the fishing and aquaculture industry in Australia. In her role as the Senior Research Scientist at the Department of Fisheries in Western Australia, she led research projects related to fishery enhancement and fisheries habitats of temperate and tropical invertebrate species.

#### 4.2 Peer Reviewers

Two peer reviewers were nominated to conduct the review of this report. An advisory was posted on the MSC website for a period greater than 10 days advising stakeholders that comments were welcomed and would be considered in the final selection of the peer reviewers. No comments were received precluding the proposed peer reviewers from conducting the review.

In accordance with MSC Fisheries Certification Methodology v.6, the comments from the peer reviewers are un-attributed. The comments are presented in Appendix IV – Peer Review and team responses to Comments.

#### 4.3 Previous assessments

The fishery has not been part of any other previous assessments under the MSC standard.

#### 4.4 Summary of Meetings and People interviewed

The sites and people chosen for visits and interviews were based on the assessment team's need to acquire information about the management operations of the fisheries under evaluation. Agencies and their respective personnel responsible for fishery management, fisheries research, fisheries compliance, and habitat protection were identified and contacted with the assistance of the client group and stakeholders.

The assessment team met with managers and scientists on two occasions; the first in November 2007 and the second, following the decision to assess the fishery under the Default Assessment Tree, in September 2009. As with all assessments, there are always a number of issues that come to light when reviewing all the information with critical management and scientific personnel. Questions that arose after the both meetings were handled through email and phone calls with the client and any other necessary entities.

**Table 1.** Assessment and Stakeholder Meetings & Attendees

|  |  |   |
|--|--|---|
| <b>November 2007</b><br><b>Guaymas</b> | ▪ <b>Stock Status &amp; Harvest Strategy</b> | Leon Tissot Plant, CANAINPES<br>Manuel Otilio Nevárez Martínez, CRIP, INAPESCA  |
|  | ▪ <b>Ecosystems</b>                          | Subdelegado de Pesca in Sonora  |
|  | ▪ <b>Management</b>                          | Boat owners   |
| <b>December 2007</b><br><b>La Paz</b>  | ▪ <b>Stock Status &amp; Harvest Strategy</b> | Agustín Hernández, CICIMAR<br>Diana Gendron, CICIMAR  |
|  | ▪ <b>Ecosystems</b>                          | David Aurióles, CICIMAR   |
|  | ▪ <b>Management</b>                          | Casimiro Quiñones, CICIMAR  |
|  | ▪ <b>Stakeholders</b>                        | Roberto Felix, CICIMAR<br>Rubén Ramírez, CICIMAR  |
|  |  | Alejandro Rodríguez, WWF  |
| <b>January 2008</b><br><b>Ensenada</b> | ▪ <b>Stakeholders</b>                        | Gustavo Danemann, PRONATURA Noroeste<br>Enriqueta González, Universidad Veracruzana<br>Alejandro Rodriguez, WWF-Mexico<br>Arturo Ramirez, GECI<br>Rigaberto Sanchez, CRIP |



|                       |  |  |
|-----------------------|--|--|
|                       |  | <p>Pamela Lyons Gromen, National Coalition for Marine Conservation</p> <p>Juan M. Garcia, Sustainable Fisheries Partnership</p> <p>Isabel Granillo D., The Nature Conservancy</p> <p>Norma Herrera, CICESE</p> <p>Jennifer Martin, Point Reyes Bird Observatory Conservation Science</p> <p>Julie Sherman, Marine Fish Conservation Network</p> <p>Aida Navarro, Wildcoast</p> <p>Eva Coterio A, INP</p> <p>Carlos Reyes, Conanp Baja California</p> <p>Jose A. Zertuche, UABC Ensenada</p> <p>Jose R. Campoy, CONANP/SEMARNAT</p> <p>Walterio Garcia, Consultant</p> <p>Carlos Godínez, CONANP/SEMARNAT</p> |
| <b>June 2008</b>      | ▪ <b>Stakeholders</b>                        | Luis Bourillón, COBI   |
| <b>Bahia de Kino</b>  |  | Local Fishermen  |
| <b>July 2008</b>      | ▪ <b>Stakeholders</b>                        | Brad Ack, MSC Americas   |
| <b>San Diego</b>      | ▪ <b>MSC</b>                                 | <p>Jim Humphreys, MSC Americas</p> <p>Chris Nannes, MSC</p> <p>Luis Bourillón, COBI</p> <p>Ben Bowman, Food and Water Watch</p> <p>Hank Cauley, Pew</p> <p>Exequiel Ezcurra, San Diego Natural History Museum</p> <p>Marcela Gutierrez, WILDCOAST</p> <p>Kim Hanman, NCMC</p> <p>George Leonard, Ocean Conservancy</p> <p>Leslie Monroe, NRDC</p> <p>Julie Sherman, MFCN</p> <p>Enriqueta Valarde, San Diego Natural History Museum</p>  |
| <b>September 2009</b> | ▪ <b>Stock Status &amp; Harvest Strategy</b> | Leon Tissot Plant, CANAINPES   |
| <b>Guaymas</b>        | ▪ <b>Ecosystems</b>                          | Manuel Otilio Nevárez Martínez, INAPESCA   |
|                       | ▪ <b>Management</b>                          | Subdelegado de Pesca in Sonora   |
|                       | ▪ <b>MSC</b>                                 | Boat owners  |
|                       |  | Jim Humphreys, MSC Americas  |
| <b>June 2010</b>      | ▪ <b>MSC</b>                                 | Brad Ack, MSC Americas   |
| <b>San Diego</b>      | ▪ <b>Stakeholders</b>                        | <p>Jim Humphreys, MSC Americas</p> <p>Mike DeCesare, MSC Americas</p> <p>Luis Bourillón, COBI</p> <p>Phaedra Doukakis</p> <p>Exequiel Ezcurra, UC – UC Mexus</p> <p>Alejandro Robles, NOS – Noroeste Sustentable</p> <p>Juan-Manuel Caudillo, SFP – Latin America</p> <p>Via conference phone;</p> <p>Marcela Gutierrez, WILDCOAST</p> <p>Pam Byons Gromen, NCMC - National Coalition for Marine Conservation</p> <p>Stacey Marz, Pew</p>  |

#### **4.5 Submission of Data on the Fishery**

One of the most significant, and difficult, aspects of the MSC certification process is ensuring that the assessment team gets a complete and thorough grounding in all aspects of the fishery under evaluation. In even the smallest fishery, this is no easy task as the assessment team typically needs information that is fully supported by documentation in all areas of the fishery from the status of stocks, to ecosystem impacts, through management processes and procedures.

Under the MSC program, it is the responsibility of the applying organizations or individuals to provide the information required proving the fishery or fisheries comply with the MSC standards. It is also the responsibility of the applicants to ensure that the assessment team has access to any and all scientists, managers, and fishers that the assessment team identifies as necessary to interview in its effort to properly understand the functions associated with the management of the fishery. Last, it is the responsibility of the assessment team to make contact with stakeholders that are known to be interested, or actively engaged in issues associated with fisheries in the same geographic location.

In the sardine fishery the client provided a critical role in gathering information for use by the assessment team. Besides providing all documents/reports/memos/scientific analyses that were readily available, they proposed adding an amendment to the contract authorizing the assessment team additional time to compile literature for review.

## 5. THE GULF OF CALIFORNIA, MEXICO SARDINE FISHERY

A brief description of the sardine fishery assessed in this project is provided in the following subsections. The descriptions are general in nature and brief, since a good deal of this information is more fully discussed in Section 10, Assessment Team Performance Evaluations.

### 5.1 Unit of Certification

The fishery under assessment is the Pacific sardine (*Sardinops sagax*) Fishery in the Gulf of California. The vast majority (90%) of vessels fishing in the Gulf of California for sardines are included in the unit of certification (see Appendix I for details on vessel names and permit numbers). All landings are received in the state of Sonora. Some vessels operating in south of the Gulf are not included and do not land stock in Ports of Sonora.

### 5.2 Target Species and Life History

Pacific sardine (*Sardinops sagax*) is the targeted species under assessment. *S. sagax* may be similar to other baitfish species, but since 2009, the [World Registrar of Marine Species](#) identifies only one accepted species in the genus: *S. sagax* (Jenyns 1842). For consistency within this report, *S. sagax* is used throughout, though several reports and publications also refer to *S. caeruleus* or *S. sagax caeruleus*. Other common names include California sardine, California pilchard, sardina monterey and South American pilchard ([Integrated Taxonomic Information System](#)).

Pacific sardines are small schooling forage fishes (up to ~40 cm at the northern distribution areas, ~20 cm at the Gulf of California). While predominantly coastal, they are occasionally found as far as 200 nm offshore.

Pacific sardines are low level consumers that attain large biomasses and are therefore usually restricted to high productivity areas.

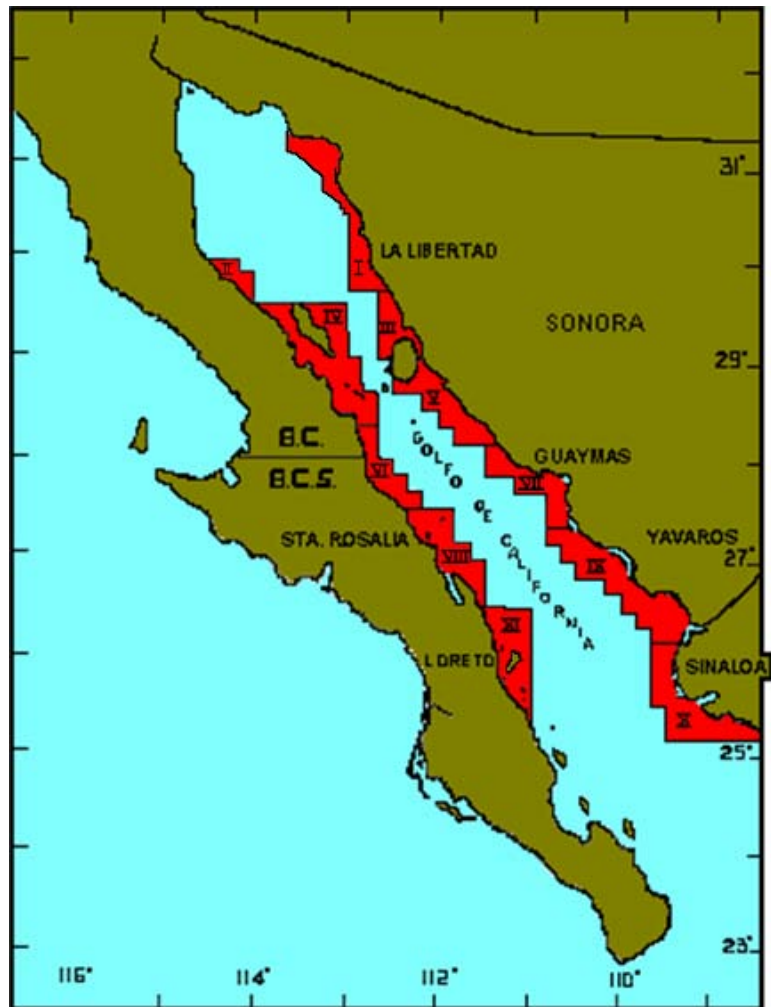


Figure 1. Map of Gulf of California, Mexico, showing the 11 predefined fishing areas for small pelagic fisheries including Pacific sardines (Nevarez Martinez et al. 2010).

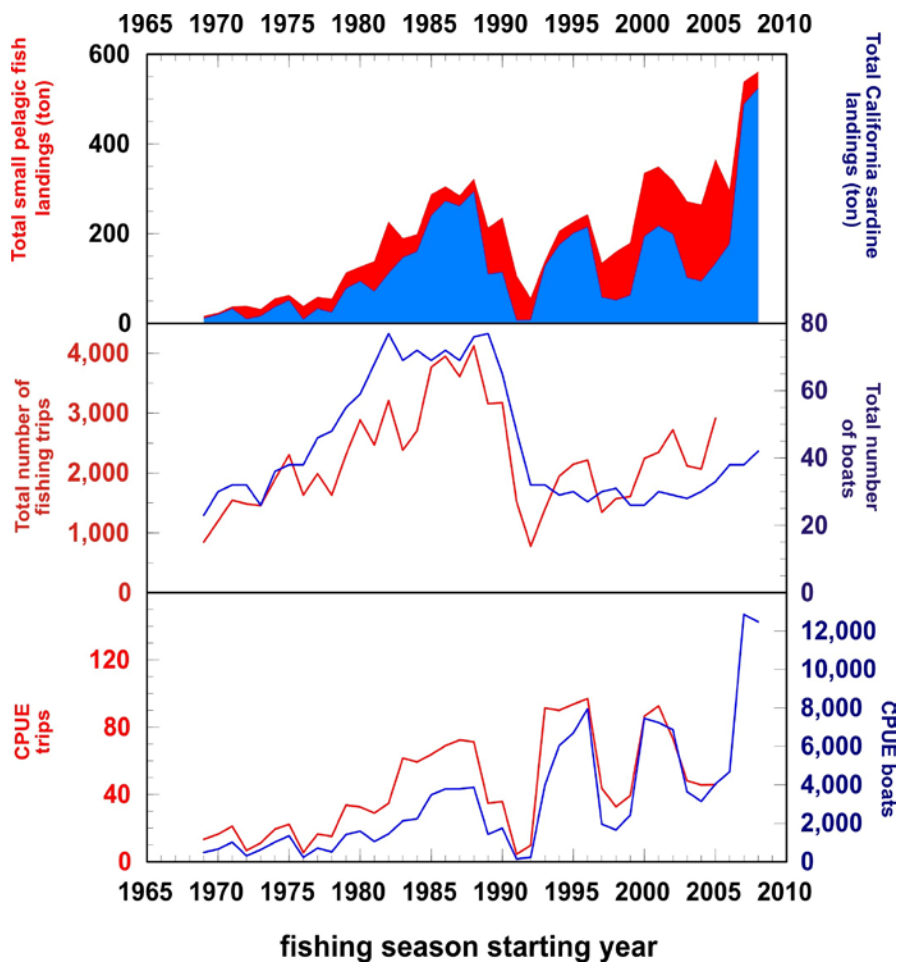


Figure 2 Gulf of California Mexican Sardine Fishery data per year (1969-2010). Catch data from Hill et al. (2010); # of boats and trips from data by Dr. Manuel Nevarez (INAPESCA) and the CANAINPES. For details see technical report [here](#) and summary table of data [here](#).

northward to Alaska during high abundance regimes, but only north to southern California during low abundance periods (Lluch-Belda et al. 1989, 1992). There is paleo-sedimentary evidence of the presence of sardine in the Gulf at least during the last 250 years (Holmgren-Urba et al. 1993). Pacific sardines are also distributed off South America, along the coasts of Chile and Peru.

### 5.4 Geographic Setting of the Sardine Fishery

The Gulf of California is a 1,130 km long and 80 to 209 km wide semi-enclosed sea located between the mainland of Mexico and the Baja California peninsula (Lluch-Cota et al. 2007). The 8° range of latitude includes both subtropical and subarctic influences. Plants and animals of both regions are found near the Gulf. Marine depth ranges from less than 10 m in the north to a maximum of ~3,600 m at the mouth. Located between the shelf-like, northern province and the deep southern province, is an archipelago containing sills, channels, basins, and two large islands, Angel de la Guarda and Tiburón.

The Gulf of California is a semi-enclosed sea, unique in being the only large evaporation basin in the Pacific Ocean (Roden and Groves 1959). It is characterized by great seasonality in temperature, circulation, winds, upwelling, and productivity (Rosas-Cota 1977; Badan-Dangon et al. 1985; Robles and Marinone 1987; Valdez-Holguin and Lara-Lara 1987; Bray 1988; Ripa and Marinone 1989; Alvarez-Borrego and Lara-Lara 1991; Paden et al. 1991; Cervantes-Duarte et al. 1993; Castro et al. 1994; Santamaria-del-Angel et al. 1994a, b; Lavin et al. 1995).

The Pacific sardine, the target species in the fishery, is potentially omnivorous, with juveniles consuming zooplankton and adults primarily preferring phytoplankton (Kawasaki 1983). Sardines have fine gillrakers enabling them to consume a wider range of particle sizes than other forage fish such as anchovy or thread herring (Lopez-Martinez et al. 1999). As many as 13 phytoplankton and 41 zooplankton genera have been identified in the stomachs of sardines from the Gulf of California. Sardines are indeterminate batch spawners (oviparous), producing a large number of eggs in batches spread over many months. Eggs and larvae are pelagic (free floating) and adults may live as long as 25 years (Matarese et al. 1989).

### 5.3 Distribution

The Pacific sardine is distributed in the northeast Pacific from the western coasts of Baja California and the Gulf of California

Optimal physical conditions for larval survival and growth occur where physical forces provide retention, concentration, and enrichment (Parrish et al. 1981; Lasker 1985; Cury and Roy 1989; Bakun et al. 1991; Hunter and Alheit 1995; Bakun 1996). The circulation in the Gulf of California provides an ideal combination of factors for larval survival, by aiding the retention of eggs and larvae in the highly productive central gulf region. Two major gyre systems have been described, one in the upper gulf, and the other in the central/southern region (Bray 1988; Marinone and Ripa 1988; Beier 1997).

### **5.5 Background of the Sardine Fishery**

Fish caught in the Mexican sardine fishery form large schools that are fished by purse seines which are hauled on board and landed mostly by fish pumps. Landings make up about 30% of the total catches in Mexico. About 85% of the total production is used for reduction to fish meal and utilized for animal feeds. Sardines are also packed in cans for sale to domestic and foreign markets. The abundance of small pelagic fishes is largely dependent on environmental conditions, with large fluctuations from year to year (Lluch-Belda et al. 1989, 1992). During years of poor sardine abundance, low sardine catches are supplemented to some degree by increases of other small pelagic fishes such as the tropical thread herring *Opisthonema libertate* (Lluch-Belda et al. 1989) and, starting in the early 1990s, the anchovy *Engraulis mordax* (Cisneros-Mata et al. 1991). For this reason, the reduction industry is not as strongly affected by the low abundance periods as is the canning industry, which historically has had a clear preference for sardines (Lluch-Cota et al. 2007).

Typical fishing boats are 25 m long with a 120 ton capacity, and main engine of about 520 HP. They are often equipped with refrigeration. Mean crew size is 8 fishermen. Nets have a mesh size of 25 mm. Fishing trips are usually short, 1-2 days, and are often guided by aerial surveys. The fishery for small pelagic fish in the Gulf of California began at the end of the 1960's. Landings increased to a peak in 1988-89 to nearly 300,000 MT, whereupon the fishery collapsed abruptly to less than 1/3 of that amount the following year (Cisneros-Mata et al. 1996). This collapse caused the loss of several thousand jobs and the closure of about half of the fleet and processing plants (Lluch-Cota et al. 1999). Landings have been highly variable since that time, increasing along the last five years to more than 500,000 MT. The fleet grew in the early 1970's through the late 1990's to more than 70 boats, but was then restricted to an average of about 30 boats (36 in total but not all active all the time – see Appendix I) followings the early 1990's catch collapse.

## **6. FISHERY AND MANAGEMENT SYSTEM**

The Pacific sardine is the dominant species (50 to 80% of total landings) in a multispecies purse seine fishery that operates from ports in the central and Southern Gulf of California, from November through July (Nevárez-Martínez et al. 1999). Sardines and other small pelagic fishes are also caught in relatively small numbers near the mouth of the gulf for use as bait by vessels targeting tuna (Rodríguez-Sánchez 2001, 2002).

The sardine fishery has been regulated and managed by the federal government of Mexico since 1993 under the Norma Oficial Mexicana (NOM) 003-PESC-1993. The NOM recognizes that the abundance of sardine and other small pelagic species fluctuates with environmental conditions but can also be influenced by fishing. The NOM specifies a minimum length size limit for sardines, regulates fishing gear and fleet capacity, and requires that the fishery be closed in times and areas where the majority of sardines are spawning. The NOM does not include total allowable catch (TAC) quotas. The development of a NOM is a collaborative effort between federal authorities, fishermen organizations and other non-governmental organizations and posted for public comments (Hernandez and Kempton 2003).

The fishery does not yet have a formal fishery management plan, although one is currently being developed as required by the 2007 Ley General de Pesca y Acuicultura Sustentables (Nueva Ley DOF 24-07-2007) and in its final draft at the time of writing this report. Since 1993, the Centro Regional de Investigación Pesquera (CRIP) in Sonora, a branch of the Instituto Nacional de Pesca (INAPESCA), has

conducted pre-season exploratory fishing surveys in the fishing grounds in cooperation with the fishing industry in order to forecast expected catches for the year. If the abundance of fish on the grounds is low, the INAPESCA and the industry can agree to more extensive time and area closures based on their predefined fishing areas.

## 6.1 Evolution of the fishery

The following overview is taken from a paper by Cisneros-Mata (1995 a) that describes the evolution of the sardine fishery in the Gulf of California.

*The sardine fishery in Mexico began during the fall of the sardine fishery in California, USA, during the 1940s. At that time, the fishery operated between Ensenada and Cedros Island, but during the 1950s, fishing extended southward into Magdalena Bay. During the late 1960s Pacific landings of sardine decreased, and fishmeal plants and canneries were installed in Guaymas in the Gulf of California, where the sardine resource was abundant. Since that time, Guaymas has been the major port for the sardine fisheries in Mexico (Lluch-Belda, et al. 1986; Cisneros-Mata et al. 1987). Industrial-scale exploitation of the Pacific sardine in the Gulf of California began in 1969, after exploratory fishing by the Ensenada fleet first detected significant volumes in 1967-68 (Solis-Villa 1981).*

*Annual wetfish landings and Pacific sardine catch per unit of effort (CPUE) show four periods in the Gulf of California: (1) exploration and establishment, 1969/70-1975/76; (2) development and growth, 1976/77-1981/82; (3) expansion and stabilization, 1982/83-1988/89; and (4) decline, 1989/90- present.*

*Several important events occurred during these four periods. First, in 1970, the Pacific sardine fishery in Ensenada was closed and the vessels were moved to Guaymas. These boats were small (40-60 MT) and fished only from October to May (“winter fishing”). During the second period, in 1977, larger boats began to enter the fleet at Guaymas; first twenty-eight 120 MT ships were commissioned from Peru by the Mexican government after the fall of the Peruvian anchovy fishery.*

*In 1979/80 the first landings during the June-September period were reported. During the early 1980s, as the newly installed processing plants increased the demand for sardine, the fishery expanded southward, and Yavaros, Sonora, began developing into an important sardine port (Estrada-Garcia et al. 1986; Cisneros-Mata et al. 1987). During this period, fishing effort was mostly characterized by short, one-day trips.*

*During the third period, in 1982/83, a regime of “summer fishing” was established, and the larger vessels began to operate farther from their home port of Guaymas, especially in the fertile “Canal de Ballenas” (between the large islands and the western coast of the gulf) and in the area north of Tiburón Island. Pacific sardine CPUE increased directly with fishing power and with the increased experience of the fishermen. The fleet began using modern technology to locate schools, combining spotter planes with video sonars installed on the vessels. Trips during this period often lasted three days.*

*In 1985, juvenile northern anchovy were discovered near Guaymas in the Gulf of California, and in 1986 they first appeared in commercial sardine landings (Cisneros-Mata et al. 1987; Hammann and Cisneros-Mata 1989). The Pacific sardine CPUE began to level off in 1984/85, and landings fell drastically after the 1988/89 fishing season.*

*Sardine landings increased steadily over two decades peaked in 1988-89, and then declined rapidly to a minimum of about 7,000 MT in the 1991-92 fishing season. Decreased sardine abundance in the gulf before 1991-92 may have been due to excessive fishing during a period of adverse environmental conditions. A shift in the age structure of the stock and catch to younger ages, and excessive harvest rates during the decline indicated overexploitation of the stock (Cisneros-Mata et al. 1990). The appearance in 1985 of northern anchovy in the commercial catch (Hanimann and Cisneros-Mata*

1989) suggested that anchovy may have been replacing sardine. The species replacement hypothesis can probably now be discarded because recent data indicate that the species have coexisted in the gulf (Holmgren-Urba and Baumgartner 1993), and because both sardine and anchovy presently seem to be increasing in abundance.

The last 14 years have seen the strongest and fastest changes in the fishery. From 1989 to 1990, a dramatic collapse caused severe economic displacement, including the loss of more than 3,000 direct jobs and about half of the fleet and processing plants. Landings in 1991-92 were less than 3% of those in 1988-89. Another strong change, a fast recovery, began in the 1993-94 fishing season, as shown by increasing landing levels (Lluch-Cota et al. 1999).

## 6.2 Management system

The Mexican management system for fisheries in general has been greatly improved in recent decades. The overarching “Ley General de Pesca y Acuicultura Sustentables,” decreed in 2007 incorporates responsible fisheries principles and precautionary approaches. It is also connected to a number of other federal laws, specially the “Ley General del Equilibrio Ecológico y Protección del Ambiente,” as described later in this report.

The fishery is specifically regulated through the provisions of the NOM (*Norma Oficial Mexicana*, Official Mexican Norm). In addition to the NOM, the “Carta Nacional Pesquera” periodically reviews the fishery and establishes conditions and regulations for the fishery. These are published in the “*Diario Oficial de la Federación*”, the Federation Official Gazette. The full management system is described with greater detail in the scoring part of Principle 3.

## 6.3 Stock Assessment, Reference Points and Harvest Strategy

Pacific sardine fishery in the Gulf of California started at the end of 1960s, and has shown large fluctuations in its landings, passing through different stages as described by Lluch-Cota et al. (1999). This fishery has been monitored since the 1972-73 season by port sampling. Total catches have been documented by landing slips per fishing vessel trip during the same period. The development of the fishery has been described by several authors (e.g. Arvizu-Martínez, 1987; Cisneros-Mata et al. 1995 a, b, see Nevárez-Martínez et al. 2006 for a review), and its historical trends and the large fluctuations of the stock size, as a result of the influence of environmental factors, have been analyzed (e.g. Lluch-Belda et al, 1986; Nevárez-Martínez et al. 2001; Bakun et al. 2009). After a rapid growth, the fishery collapsed during 1989 to 1993 (**Figure 2**), due to excessive fishing during a period of adverse environmental conditions. A growing body of evidence suggests that environmental factors play a dominant role in the processes changing the abundance of small pelagics; however, before the collapse a shift in age structure of the stock and catch to younger ages, and excessive harvest rates during the decline, also explains the past overexploitation of this stock. In 1993, the abundance of Pacific sardine began to recover. Landings have shown several fluctuations with landings since 2005 having almost doubled (**Figure 2**).

The population dynamics of the Gulf of California Pacific sardine have been analyzed since 2000, using a stochastic age-structured model with density dependent recruitment, catch and effort data, and estimating the number of individuals at age using Virtual Populations Analysis and a Shepherd’s stock-recruitment model (for methodology consult Nevárez-Martínez et al. 1999). For the latest analysis (covering the 1969-70 to 2007-08 seasons), the estimated recruitment (R) reached a historical maximum of almost 5.0 million recruits (0 age) during the 2007-08 season, with an adult or spawning stock biomass (SSB) of 1.5 million metric tons (MT) (Nevárez-Martínez, 2009a). Landings for the same season (2007-08), reached also a record of 488,639 MT. Recruitment and SSB have shown this increasing tendency after the 1990 to 1992 period, when the landings decreased to a minimum of about 7,000 MT in the 1991-92 season. Exploitation rates showed an increasing tendency between the 1971/72 to 1990/91 seasons with a maximum value of 0.39/year, and falling to 0.023/year in the 1992/93 season. Between the 1993/94 to 2007/08 seasons, exploitation rates have fluctuated

between 0.08 to 0.24/year while fishing mortality (F) has fluctuated between 0.056 to 0.199 per season (Nevárez-Martínez, 2009b).

The main objective of the Nevárez-Martínez et al. (1999) modeling work was to determine the value of fishing mortality (F) which correspond to the long-term optimal yield and cost-benefit ratio. They found that a value of 0.27 would yield the Maximum Sustainable Yield (MSY) that is slightly below the Maximum Economical Yield. However, they decided to use  $0.9F_{MSY} = 0.25$  as Reference Point, because it would not only produce higher economic returns, and be safer biologically, but would also reduce the intrinsic oscillations that they found during modeling. The fishery has been managed in order to accomplish this F value in each season as one of its reference points. Every year, the F value is estimated before the beginning of the following season, and if F is greater than 0.25, harvesting control rules specify that strategies should be implemented in order to control the value of F, based on discussions and agreements between the fisheries scientists and fishery operators, during official meetings (where agreements are written and signed). To control the F value in the following season, strategies such as shortening the fishing season, closeing some fishing areas (**Figure 1**), and reducing fishing effort (number of boats) have been recognized. However, this harvesting control rule, with its strategies, has not yet been applied. In order to complement their fishery dependent analysis, and since 2009, a fishery independent approach has been under development using acoustic techniques for assessing the total biomass by the official assessment team of the fishery. This will create more robust information for better harvest strategies and management as has been suggested by Bakun et al. (2009) and Barange et al. (2009).

We note that the MSC is actively reviewing and revising requirements pertaining to low trophic level species, including reference points used in the management of these fisheries. We have been following these developments closely, actively participated in workshops that were held for that purpose and communicated the findings and recommendations to the fishery client. It is likely that more specific guidelines will be developed and the client has expressed strong commitment to follow these guideline. However, until such guidelines are finalized and implemented the assessment team can not provide any further comments.

A second reference point is a target during the fishing season. The reference point states that the proportion of fish in the catch less than 150 mm standard length, which is the minimum size allowed, cannot be more than 30% of the total catch during the period of observation (around one month). This proportion is based on a Thompson-Bell model (Nevárez-Martínez et al. 2006), that evaluated the effect of a larger proportion of small juveniles in the catch on the yield and biomass. If the 30% level is reached, the fishing area where the sardines were caught is closed for fishing. This measure avoids growth overfishing, allowing juvenile sardines to grow to a mature size, and avoids the fishing mortality of juvenile fishes that are consumed by other components of the ecosystem, including marine birds (Velarde et al. 2004). During the fishing season, monitoring is in place at landing ports, and sometimes onboard during the fishing trips. The obligation of the fisheries operators to participate and allow technical and biological research and monitoring onboard and at port to follow the size structure of the catch is enforced based on the NOM-003-PESC-1993.

The harvest strategy for the fishery has been followed even without a formal management plan. The plan has been developed, but at the time of the publication of this report, is still under review. The strategy is based on the specific measures declared in the management instrument known as Mexican Official Standard (NOM) published in 1993 (NOM-003-PESC-1993). The NOM established a precautionary strategy by declaring a moratorium for new fishing licenses. There has not been an increase in the number of boats participating in the fishery in any Mexican Pacific waters since the 1993 publication of the NOM. Nevertheless, because the fishing licenses allow fishing of small pelagics in Mexican Pacific waters, some boats have switched base ports from the western coast of the Baja California Peninsula to Guaymas and Yavaros, where the sardine fishery under assessment is based. Currently, only 36 boats are participating in this fishery and their information is presented in Appendix 1. In addition, the NOM specifies the size of the purse seiner net by vessel size, and the regulations to follow in order to close the fishery season. The NOM has set a minimum size of capture at 150 mm standard length (SL) for Pacific sardine. In conjunction with these standards, the reference point of no more of 30% of



fish with size less than 150 mm SL was implemented. The general strategy implemented by the NOM aims to protect juveniles and avoid growth overfishing. The season period (generally October to July) was established to protect adults during the spawning season.

As part of the harvest strategy, before the fishing season starts, a research cruise is carried out on board a fishing or research vessel. The goal of the cruise is to assess the reproductive state of the adult sardines and the proportion of juveniles (less than 150 mm SL) in the samples from the fishing areas (**Figure 1**). During the cruises the oceanographic conditions are also characterized, mainly by the sea surface temperature distribution. Based on these results, the date for the fishing season opener is established. The opener is established by agreement between the fisheries researchers and the fishery operators during official meetings afore mentioned where agreements are signed by the participants.

## 7. FISHERY'S IMPACT ON ECOSYSTEM

### 7.1 Bycatch - Retained and discard species

Bycatch consists of the incidental catch of non-target species that may or may not be landed. Seabirds and marine mammals that may form part of the bycatch or may be affected indirectly by the fishery are considered separately in section 6.3.

Pacific Sardines in the Gulf of California are fished with purse seine nets. Fishing vessels (purse seiners) capture large aggregations of sardines that shoal in midwater by surrounding these concentrations with a curtain of netting which is supported by surface floats. Compared to other fishing methods, purse seine gear is relatively selective, as it is done in the open water column and directed to the schools of the target species. Studies in Australia have shown the purse seine bycatch is negligible and even in midwater trawls represents less than 1 % of the total catch (Australian Fisheries Management Authority 2005). In addition, Kelleher (2005) stated that purse seine fisheries for small pelagic fishes generally tend to have very low levels of bycatch. The sardine fleet in the Gulf of California operates between 40 and 100 meters and bycatch constitute less than 1 % of the total catch (Nevárez-Martínez et al. 2006). Studies in other regions have shown that marine mammals can be taken as bycatch in purse seine fisheries (e.g. Hamer et al. 2008). However, there is no evidence that the sardine fishery in the Gulf of California interacts directly with marine mammals. Interactions are known to occur, however, within the gillnet fisheries in the Gulf of California (Northridge, 1984). Interviews with fishermen of the sardine purse seine fishery in during onsite visits indicate that direct interactions are extremely rare. A requirement of certification for this fishery is to establish an at sea monitoring and reporting system for bycatch; all direct interactions will also be recorded (see condition 2.2.3). Results will elucidate if direct interactions with other species occur. Indirect interactions of species with the fishery are explained in detail in section 6.3.

#### 7.1.1. Retained species

Several other species apart from the targeted species are retained in the Mexico sardine fishery. These include thread herring or *Sardina crinuda* (*Opisthonema* spp.), mackerel (*Scomber japonicus*), anchoveta or *Sardina bocona* (*Cetengraulis mysticetus*), round herring or *Sardina japonesa* (*Etrumeus teres*), northern anchovy or *Anchoveta norteña* (*Engraulis mordax*) and leatherjacket or *Sardina piña* (*Oligoplites* spp.) (Martínez-Zavala et al. 2006, Nevárez-Martínez et al. 2010).

**Table 2:** Total landings (MT) of small pelagic species over the last 3 fishing seasons (Nevárez-Martínez et al. 2010)

| Season | Small Pelagics | Pacific Sardines | Thread Herring | Mackerel | Round Herring | Anchoveta spp. | Leather-jacket |
|--------|----------------|------------------|----------------|----------|---------------|----------------|----------------|
| 06/07  | 297,867        | 178,205          | 87,172         | 6,616    | 3,088         | 17,762         | 2,530          |
| 07/08  | 538,669        | 488,639          | 25,726         | 3,988    | 698           | 18,188         | 238            |
| 08/09  | 564,298        | 528,094          | 21,564         | 983      | 422           | 12,157         | 212            |

Table 2 shows the total landings (MT) of all small pelagic species over the last 3 fishing seasons. The targeted Pacific sardine (*Sardinops sagax*) represents the majority of the total catch followed by thread herring or *Sardina crinuda* (*Opisthonema* spp.) and the Anchoveta or *Sardina bocona* (*Cetengraulis mysticetus*) (Table 2).

**Table 3:** Percentage of total catch of small pelagic species by weight over the last 3 fishing seasons (calculated from data in Nevárez-Martínez et al. 2010)

| Season | Pacific Sardines | Thread Herring | Mackerel | Round Herring | Anchoveta spp. | Leatherjacket |
|--------|------------------|----------------|----------|---------------|----------------|---------------|
| 06/07  | 59.83            | 29.27          | 2.22     | 1.04          | 5.96           | 0.85          |
| 07/08  | 90.71            | 4.78           | 0.74     | 0.13          | 3.38           | 0.04          |
| 08/09  | 93.58            | 3.82           | 0.17     | 0.07          | 2.15           | 0.04          |

The catch of Pacific mackerel, round herring and leatherjacket are small, representing less than 1% of the total catch each (Table 3). Only in 06/07 did mackerels reach 2%. Anchoveta spp. represents less than 5% of the total catch during the last 2 season and reached approximately 6% during 06/07. Thread herring were also less than 5% during the last 2 seasons but represented almost 30% of the catch in 06/07. Based on the last seasons (08/09) data and in accordance with the MSC guidance 7.2.2, none of these species are considered being “main retained species” (FAM 2.1, 2010). However, because the catch of thread herring was significant in 06/07 the assessment team does consider this species of thread herring a main retained species for the purpose of this assessment. In addition, the assessment team does acknowledge that the contribution of anchoveta particularly the species *Cetengraulis mysticetus* has been known to be significant in some years (e.g. 200/2001 and 2005/2006), this species will also be considered “main” for the purpose of this assessment. Fishing boats are equipped with purse seine gear and landing sites are set up to handle mainly sardines therefore fishing for other species then small pelagic is avoided (Doode 1992).

The status of the stock of these species are assessed every 3-4 years and well managed as part of the main commercial fishery (Martínez-Zavala et al. 2006). The basic management strategy for the multispecies purse-seine fishery in the Gulf of California is to stay at or below the limit reference point of 0.25F, which is equal to 0.9 F<sub>MSY</sub>. Even if it is not stated explicitly that this reference point takes into account the ecological role of the stock, it is stated to be “safer biologically” (Nevárez-Martínez et al. 1999). A predictive model (Tompson and Bell model) is used to assess the main retained species. In addition, there is a minimum size limit for both thred herring and anchovies. Biomass estimates are collected and maximum sustainable yield is calculated for *Opisthonema libertate*, *O. bulleri* and *O. medirastre*, *Etrumeus teres* and *Cetengraulis mysticetus* (Nevárez-Martínez et al. 2006). However, the assessment focuses on the target species (*Sardinops sagax*). After further deliberation, taking into account the comments received by the stakeholder, the original recommendation under the PI 2.1.1, was elevated to a condition by the assessment team to develop specific assessments for thread herring anchoveta particularly the species *Cetengraulis mysticetus* which are considered main retained species for the purpose of this assessment. As evident from the client action plan in Section 11.1, the client has agreed to develop specific assessments for all main retained species that are caught in this fishery.

### 7.1.2. Discard species

Although there is currently no observer data from the Gulf of California fishery, small amounts of bycatch (<1%) of giant squid (*Dosidicus gigas*), triggerfish and leatherjacket (*Oligoplites* spp.) have been reported (Nevárez-Martínez et al. 2006). Based on that data and in accordance with the MSC guidance 7.3.2, none of these species are considered being “main bycatch species” (FAM 2.1, 2010).

## 7.2 Endangered, threatened and protected (ETP) species

A variety of species in the Gulf of California are listed as endangered, threatened or protected (ETP). ETP species are those that are recognized by “national legislation and/or binding international agreements” (FAM

section 7.4.1). The Mexican national binding agreement for ETP species is the list in the NOM (NOM -059-SEMARNAT-2001). The international list used to evaluate this aspect of the fishery is CITES. The IUCN Red List; this list is non-binding. All species that can potentially interact with the Pacific sardines (directly or indirectly) are listed in Table 4, in Appendix II with their ETP status.

Stakeholders in Mexico have raised concerns about direct interactions with ETP species such as sea lions, birds and sea turtles. Gallo-Reynoso (2003) reported potential interactions of the Gulf of sardine fishery with the common dolphin and concluded that scars on dead dolphins were caused by the sardine purse seine nets. It is very difficult to attribute scares and/ or mortalities to particular type of fishing gear especially post mortem and therefore the team feels that there is no scientific basis to draw any conclusions. There is no scientifically defensible evidence of any direct interactions of ETP species with the fishery. Arguably, this can be a reflection of the lack of observed fishing trips since it is known from other parts of the world that marine mammals can be taken in purse seine fisheries (e.g. Hamer et al. 2008). Results of the required at sea monitoring and reporting system (see condition 2.2.3) will elucidate if and how often interactions with ETP species occur with the sardine fishery in the Gulf of California.

### 7.2.1. Indirect interactions with ETP species

Blue-footed booby (*Sula nebouxii*) and the brown booby (*Sula leucogaster*) are listed by the International Union for Conservation of Nature (IUCN) as a lower risk or “least concern” species and protected under the [NOM-ECOL-059-94](#). Their diet is mainly composed of bocona sardine, *Cetengraulis mysticetus*, (57 %) and to a lesser degree (41 %) of the targeted sardine (*Sardinops sagax*), other species are present in low percentages (e.g. *Anchoa* spp., *A. exigua*, *A. ischana*, *Lile stolifera*) (Suazo-Guillen 2004). This information suggests that brown boobies have sufficient food flexibility and the interference with the sardine fishery is likely to be low.

The California Sea Lion (*Zalophus californianus*) is listed by the IUCN as a lower risk or “least concern” species and protected under the NOM (Appendix II, Table 4). Sea lions are known to prey on and follow large abundance of sardines. Aurioles-Gamboa et al. (2003) showed that the sea lions preyed on a variety of 76 fish species; only *Paralabrax maculatofasciatus* had any commercial value and populations are increasing. However, García-Rodríguez and Aurioles-Gamboa (2004) found differences in diet composition between different rookeries within the Gulf of California. At a rookery at Isla Racitos, sardines were an important prey of the sea lions. It is widely recognized that environmental variables influence the abundance of the sea lion populations and Lluch-Cota et al. (1999) were able to explain the collapse of the Gulf of California sardines in 1992 and subsequent recovery in 1996 by using an index derived from physical and oceanographic processes (mostly wind variations) that influences the reproductive output of sardines. There is no evidence that the sardine fishery in the Gulf of California has a direct or indirect effect on the sea lion populations (Del Monte Luna 2008).

The vaquita (*Phocoena sinus*) is a rare species of porpoise that is endemic to the northern part of the Gulf of California (Sea of Cortez) and listed by the IUCN as a critically endangered species. Vaquita are also protected under the NOM and are CITES listed. They feed on a variety of species and are considered opportunistic consumers that feed on small demersal fish and invertebrates such as squid (Culik 2004). In addition, interactions between fishing vessels and vaquitas are unlikely because the northern boundary of the commercial fleet of sardines is reasonably far away (>100 km) from the documented, southern distribution of the vaquita (**Figure 3**).

Another endemic species to the northern part of the Gulf of California and listed as a critically endangered by the IUCN is the fish species *Totoaba macdonaldi*, which is are protected under the NOM and also CITES listed. Adults consume small pelagics specifically sardines (Román-Rodríguez 1990). The population decline is attributable to the combined effects of loss of habitat, illegal drift-net fishing and environmental factors such as rise in sea water temperature (Lercari and Chavez 2007). Sea bed habitats, occupied by the totoaba throughout their life cycle (Cisneros-Mata et al. 1995a,b), are not effected by purse seine fishing gear (see below) and

hence interaction between the Gulf of California sardine fishery and this species is unlikely. Moreover, Lercari and Chavez (2007) suggest that the variations in catch of the endemic *Totoaba macdonaldi* caused by the fishing effort are less evident than those produced by the environmental factors mentioned. The potential effect of the decline in sardines, their main prey, was also mentioned and cannot be excluded but it is unlikely that it is the only or main cause for the decline of *T. macdonaldi*.

### 7.3 Ecosystem

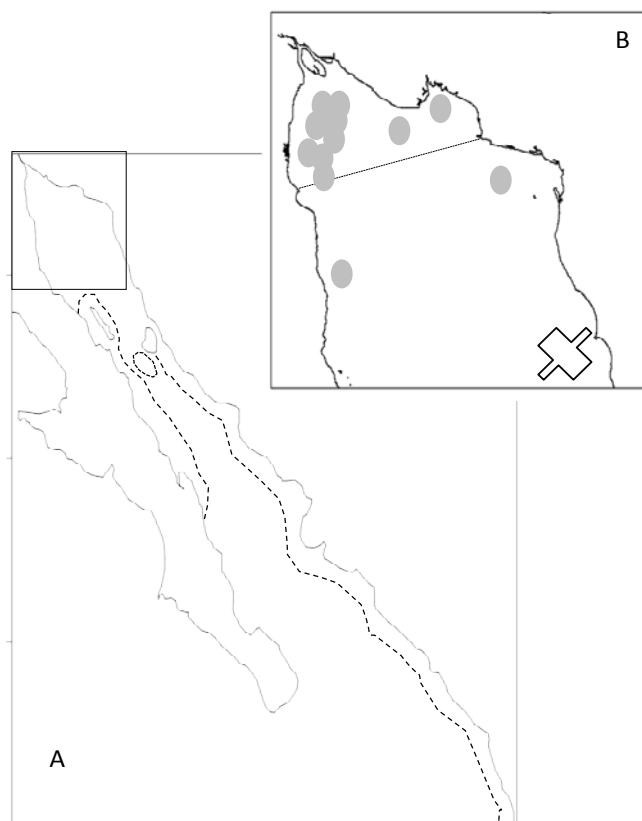
The Gulf of California has unique physical and oceanographic features and is harboring a variety of different marine environments, from deep-water trenches and coastal and island rocky reefs to the sandy and shallow waters of the Colorado River delta. Due to its constant tidal and wind-driven upwelling systems, the Gulf is highly productive and provides 60-70% of Mexico's National fisheries. The sardine fishery operates in the central and southern Gulf, south of the two largest islands; Isla Ángel de la Guarda and Tiburón Island (see also **Figure 3**). Marine protected areas (MPAs) have been created in the Gulf of California since the early 1990s (Cudney-Bueno et al. 2009). There are currently 11 MPAs throughout the Gulf and NGOs together with national and international scientists are working towards the goal of establishing a network of marine reserves in the Gulf.

#### 7.3.1. Habitats

The sardine fleet in the Gulf of California operates in mid-water between 40 and 100 meter depths and generally avoids bottom contact. Contact is intentionally avoided as the small mesh nylon netting is easily damaged. Interviews with fishermen during the site visit indicate that in the rare event when gear is lost, it is retrieved due to its high monetary value. In addition, abandoned purse-seine gear has limited capacity to continue fishing because it fully functions only when used at the surface. Gear drift due to bottom currents may occur, although displacement should be limited because of its weight. Therefore, some localized damage of benthic structure and communities may occur. However, gear loss occurrences are very rare. There is no documented evidence that this fishing activity or any purse seining has had an effect on any marine habitat.

#### 7.3.2. Trophic relationships

As explained by Cury et al. (2000), most large marine ecosystems typically contain (1) a very large number of species at the lower (e.g., planktonic) trophic levels, (2) a large number of species (e.g., predatory fishes, large



**Figure 3.** (A) Commercial distribution of small pelagic fish in the Gulf of California (dotted line). (B) Marine Reserve Alto California and Colorado River Delta (solid line); Gulf biosphere sighting of the vaquita marina (solid circles) and observed northern boundary of the sardine in the Gulf of California (white cross). From Del Luna Monte (2008).

coelenterates, seabirds, marine mammals, etc.) that, as adults at least, feed at the top level, and (3) a few but crucial intermediate small, plankton-feeding pelagic fish species, like sardines. These plankton-feeding pelagic fish species transfer energy from the lower to the higher trophic levels and can create a bottle neck which is often referred to as “wasp waist control” (Bakun et al. 2009, Cury et al. 2000). Del Monte Luna (2008) lists all the studies that examined the trophic relationships of small pelagic fish throughout the Gulf of California (Appendix II, Table 4). This list clearly demonstrates that most species that prey on sardines are opportunists and feed on a variety of other species.

For example, neither the Heermann’s gull (*Larus heermanni*) nor the elegant tern (*Sterna elegans*) are obligatory feeders of sardines. Northern anchovy (*E. mordax*) comprises up to 70 % of their diet, however that species represents less than 1 % of the total commercial fishery in the Centre of the Gulf of California (**Table 2**); the remaining 30 % is made up by the sardines (*S. sagax*). It has been proposed that the diet and the breeding success of these birds are dependent on sardines (Bakun et al. 2009). However, Velarde et al. (1994) found that a change in prey stock abundance may result in a change in diet of these seabirds, indicating that these seabird populations are sustained by the availability of other small pelagic fish species in the Gulf of California, by adjusting their diet to the more abundant species.

Among the fish species, nine large predators that feed on small pelagic fish in the Gulf of California have been identified (Salvadeo 2008). In six of these, sardines represent less than 3 % of their diet. In the remaining three species: striped marlin (*Tetrapturus audax*), Pacific sharpnose shark (*Rhizoprionodon longurio*) and the yellow snapper (*Lutjanus argentiventris*) small pelagic fish, including sardines, make up to 24-25 % of their diet. The striped Marlin has a marked seasonal abundance, which peaks in winter and spring and follows the southward migrating of the sardines (Lluch-Belda et al. 1986, Cisneros Mata et al. 1997, Hammann et al. 1998).

The Bryde’s whales in the Gulf of California feed mainly on Pacific sardines and thread herring (Urbán-Ramirez and Flores 1996). Salvadeo et al. (2007) found a strong relationship between the abundances of these whales and the amount of sardine capture in the Gulf of California that both coincided with El Niño events.

Ecological models have been used to explore these complex trophic relationships in the Gulf of California and several of these include the sardine, *S. sagax* (Arreguín-Sánchez and Calderón-Aguilera 2002, Arreguín-Sánchez and Martínez-Aguilar 2004, Rosas-Ruiz et al. 2008, Lercari and Chávez 2008).

Morales-Zarate et al. (2004) used Ecopath and Ecosim software to construct a trophic structure model for the Northern Gulf of California. With 29 functional groups, which included ETP species like the vaquita, the authors showed that most groups were more impacted by predation and competition than by fishing pressure. In addition they found indications that the use of the ecosystem is balanced. In addition, the Fisheries in Balance Index, which describes how fisheries exploit the trophic levels within an ecosystem, have been stable during the last five decades in the Gulf of California (Lluch-Cota et al. 2007).

## **8. TRACKING AND TRACEABILITY**

Traceability of product from the sea to the consumer is vital to ensure that the MSC standard is maintained. There are several aspects to traceability that the MSC requires to be evaluated: Traceability within the fishery; at-sea processing; at the point of landing; and subsequently the eligibility of product to enter the chain of custody.

### **8.1 Traceability within the fishery**

For the Gulf of California, Mexico Sardine fishery, all landings are recorded and reported. Every fishing boat must report the catch, species and area where caught. All of the catch is weighed on shore and landing data is recorded on a landing slip (avisos de arribo). This information is given directly to the authorities, CONAPESCA and Instituto Nacional de la Pesca. In the sardine purse seine fishery, the boat crews are paid by the weight of the catch and therefore do not exclude any portion of the catch from the landing slip. The receivers/processors are responsible for properly filling out landing slips and are careful in doing so, as there are

fined if the slips are filled out improperly or inaccurately. Dockside sampling is also conducted thereby further monitoring product origin throughout at the processing facility.

## **8.2 At-sea processing**

Processing at sea does not occur in this fishery.

## **8.3 Points of landing**

The sardines are landed in the ports of Guaymas and Yavaros.

## **8.4 Eligibility to enter Chains of Custody**

Sardines landed by any registered vessels (Appendix I) are eligible to enter further Chains of Custody. As described in section 7.4.1 below, continuing suitability, from the 1<sup>st</sup> Annual Surveillance onwards, to label product derived from this fishery with the MSC Ecolabel will be dependent on results of a review of the fishery pursuant to the requirements of TAB D-030. Companies buying directly from this fishery are required to have Chain of Custody certification and shall keep a record of the landing slip to ensure that product originated from the certified fishery.

This report does not cover tracking beyond the point of landing. This report acknowledges that sufficient monitoring takes place to identify the fishery of origin for all landed sardine via landing slips where the amount of catch and the fishing area are recorded for each set of the net during the fishing trip, and the slips (avisos de arribo) are handed over the local Official Fisheries office. This is sufficient to allow a Chain of Custody to be established from the point of landing forward for all products derived from the fishery. MSC Chain of Custody certifications were not undertaken in this project, and therefore, need to be undertaken on a separate and individual basis for those entities that may wish to identify and/or label products derived from the fishery.

### **8.4.1. Inseparable and Practically Inseparable (IPI) stocks**

In the Gulf of California, Mexico Sardine fishery, as with many purse seine fisheries, the problem of ‘practically inseparable’ catch is a real one. The MSC has attempted to address this issue with the release of [TAB D-030](#) which describes requirements for use of the MSC eco-label on product derived from fisheries with IPI catch. While the sardine fishery is not required to follow the provisions in this directive (as they apply to fisheries that began assessment after 6 Sept. 2010) it is the intent of SCS to implement this directive at the 1<sup>st</sup> annual surveillance (see section 7).

The Gulf of California, Mexico Sardine purse seine fishery has a fluctuating level of retained catch of non-target stocks. Catches of non-target IPI stocks consist mostly of thread herring, anchoveta and mackerel (see section 7.1.1 for more detailed information on retained catch). Several factors are known to affect the amount of bycatch. These include mesh size, variability of the stock, environmental factors and spatio-temporal distribution of the stock(s). The most recent year for which data is available is 2008/2009 where sardines made up 93.6% of catch in the fishery; all other IPI species consisted of 6.4% of landed catch.

## **8.5 Target Eligibility Date**

The target eligibility date for the Gulf of California Pacific Sardine fishery, the date from which product from a certified fishery is potentially eligible to bear the label if the fishery is certified, will be the 01 November, 2010, which coincide with the opening of the fishing season.

## **9. OTHER FISHERIES IN THE AREA**

Fishing is considered the most important human activity in the Gulf of California, with a strong cultural component, social relevance and wide spectrum of problems. Different fisheries take place in the region, from highly industrialize pelagic to coastal artisanal, each with particular catch and variability levels, conditions and



number of fishers, economic and social impacts, magnitude of conflicts and management challenges (Lluch-Cota et al. 2007)

### *Small pelagic fishes*

As noted in Section 6 above, there are other species caught at significant rates in the sardine fishery. This is important in an MSC assessment as the assessment requires knowledge of all other species caught and/or landed. In the Mexico sardine fishery, this includes thread herring (*Sardina crinuda*, *Opisthonema* spp.), mackerel (Macarela, *Scomber japonicus*), anchoveta (*Sardina bocona*, *Cetengraulis mysticetus*), round herring (*Sardina japonesa*, *Etrumeus teres*), and leatherjacket (*Sardina piña*, *Oligoplites* spp.) and northern anchovy (Anchoveta norteña, *Engraulis mordax*).

Thread herrings include at least three sympatric species of tropical clupeids: *Opisthonema libertate*, *O. bulleri* and *O. medirastre* (Ruíz and Lyle 1992). Although their distribution is ample, landings are mostly concentrated at Sonora and Sinaloa. The species have been studied since the onset of the fishery (Sokolov and Wong, 1973; Páez, 1976). Species identity has been the subject of a number of studies (López, 1986; Rodríguez, 1987; Hedgecock et al., 1988).

Catches of thread herring or *Sardina crinuda* (*Opisthonema* spp.) have increased from 4,000 to 25,000 metric tons and have been as high as 99,000 metric tons (Lyle et al., 1989, Nevarez-Martinez et al. 2010). There have been a number of population assessments (Cisneros-Mata et al., 1988; Lyle et al., 1989; Acal and Arias, 1990). The availability of thread herring is highly variable between years and opposite to that of sardine, increasing during El Niño events (Lluch-Belda et al., 1986).

The Pacific mackerel, *Scomber japonicus*, is a cosmopolitan species distributed in tropical and subtropical waters of the Atlantic, Indian and Pacific Oceans, as well as in their marginal seas (Collette and Nauen 1983). In the Eastern Pacific, the most important population is distributed in the California Current System, including the Gulf of California, where it is associated with marginal, near-shore upwelling. In the Gulf of California, the fish is distributed in the central and southern provinces in near-shore waters (Roedel 1948; Walker 1953).

Northern anchovy were first detected in the Gulf of California in 1985 by Green-Ruíz and Aguirre-Medina (1992). The discovery of anchovy in the Gulf coincided with declines in the availability of sardine and the decline of the sardine fishery in the Gulf of California (Cisneros-Mata et al. 1991; Nevarez-Martinez et al. 1993a). The identification of anchovy larvae in ichthyoplankton samples and the presence of adults in the fishery catches extended the known geographical range of the anchovy to the Gulf of California (Hamman and Cisneros 1989). Since then, approximately 40,000 metric tons of anchovy have been incidentally taken in the sardine commercial fishery (Cisneros-Mata et al. 1991; Nevarez-Martinez et al. 1993a). Later paleo-ecologic studies by Holmgren-Urba and Baumgartner (1993) demonstrated the presence of the anchovy over 250 years, during alternating periods of high anchovy abundance and high sardine abundance in the Gulf of California. The increased abundance of *Engraulis mordax* (northern anchovy) made the stock an alternative resource for the fishing industry and a matter of scientific concern in the Gulf of California.

In 1986, however, an unexpected catch of more than 2,000 MT of northern anchovy by the gulf sardine fleet (Hamman and Cisneros-Mata 1989) quickly made this an important issue. By the end of 1992 the catch of sardines had plummeted from a 1988/89 peak of greater than 250,000 MT (Cisneros-Mata et al. 1991) to 6,400 MT. Accompanying this dramatic decline in sardine catch, a significant by-catch of northern anchovy nearly equaled the sardine catch, reaching a total of approximately 5,200 MT.

### *Other fisheries*

The following overview is taken from a paper by Lluch-Cota et al. (2007) that describes the ecosystem status of the Gulf of California.

- Shrimp

Shrimp (brown, *Farfantepenaeus californiensis*; white *Litopenaeus vannamei*; and blue *L. stylirostris*) in the Gulf of California is the most important fishery in Mexico in terms of income and employment. It represents nearly 40% of the total national fish production value, with revenues of over US\$132 million per season, and generating over 30,000 direct and indirect jobs. Today, two fleets depend on this resource, one operating small boats in coastal lagoons and shallow waters, and other, fully industrialized, comprised of trawling boats working over the continental shelf. The shrimp fishery began in 1921 and became industrialized by the late 1930s. The Gulf also hosts 90% of the shrimp farming industry, developed mostly during the last 15 years, and currently produces approximately 40% of the national shrimp tonnage. It represents a serious competition and important market component influencing price and demand.

The shrimp fishery is also the most controversial and problematic one in the country; strong debate exists regarding the level of exploitation and the present and potential effect on the ecosystem, mainly because the very high level of effort and overcapitalization of the industry (detected since the early 1970s), and also because the trawling gear that has been operated intensively for the last 60 years is recognized as one of the most ecologically aggressive. On the other hand, this fishery still represents the main sources of income for many coastal communities around the gulf, and has been tightly associated with the Gulf of California regional development for several decades.

- Squid

The Gulf of California giant squid (*Dosidicus gigas*) fishery is also important, although the industry is relatively new. Catches for squid began in the gulf in the early 1970s, mostly supported by small boats on a local scale. By 1980, with the advent of larger boats, annual catch reached more than 22,000 MT. In 1982, the fishery collapsed and the squid virtually disappeared for almost a decade. Giant squid have reappeared since 1989, and by 1993 the fishery resumed operations. Catch rapidly increased to 140,000 MT in 1997. During the last few years, squid became one of the most important fisheries in the country, and probably the most dramatic case of fishery fluctuation in the Gulf of California. Causes of this variability are unknown, and hypothesis range from hydrographic, and biological process to prey availability, reproductive success and recruitment to economy.

- Large pelagic fisheries

Several species of large pelagic fish are taken in the gulf. The commercial fishery mainly targets yellowfin tuna (*Thunnus albacares*) and skipjack (*Katsuwonus pelamis*) using large purse seiners, however, middle size longline fishing boats are common in the region. Billfishes (marlins, sailfish and swordfish) are targeted by the sport fishing in the region, and are sometimes taken as bycatch in the commercial fisheries with dorado (*Coryphaena hippurus*). Approximately 40 species of sharks are also taken by these fisheries.

- Artisanal fisheries

Many human settlements depend on coastal, small-scale, artisanal fisheries, exploiting numerous species of bony fishes, elasmobranchs, mollusks, and crustaceans. Coastal fisheries in this region comprise about 70 species, for an annual catch of nearly 200,000 MT. Artisanal fishermen use gillnets, hooks and lines and traps. There were 56,174 fishers, using 23,304 boats registered in 2001. Together with the associated marketing network, this represents an important regional socioeconomic component, not yet properly analyzed.



## **10. MSC PRINCIPLES AND CRITERIA**

### **10.1 MSC Principle 1 – Stock Status and Harvest Strategy**

A fishery must be conducted in a manner that does not lead to over-fishing or depletion of the exploited populations and, for those populations that are depleted; the fishery must be conducted in a manner that demonstrably leads to their recovery.

#### **Intent:**

The intent of this principle is to ensure that the productive capacities of resources are maintained at high levels and are not sacrificed in favor of short term interests. Thus, exploited populations would be maintained at high levels of abundance designed to retain their productivity, provide margins of safety for error and uncertainty, and restore and retain their capacities for yields over the long term.

#### **MSC Criteria:**

1. The fishery shall be conducted at catch levels that continually maintain the high productivity of the target population(s) and associated ecological community relative to its potential productivity.
2. Where the exploited populations are depleted, the fishery will be executed such that recovery and rebuilding is allowed to occur to a specified level consistent with the precautionary approach and the ability of the populations to produce long-term potential yields within a specified time frame.
3. Fishing is conducted in a manner that does not alter the age or genetic structure or sex composition to a degree that impairs reproductive capacity.

### **10.2 MSC Principle 2 – Ecosystem**

Fishing operations should allow for the maintenance of the structure, productivity, function and diversity of the ecosystem (including habitat and associated dependent and ecologically related species) on which the fishery depends.

#### **Intent:**

The intent of this principle is to encourage the management of fisheries from an ecosystem perspective under a system designed to assess and restrain the impacts of the fishery on the ecosystem.

#### **MSC Criteria:**

1. The fishery is conducted in a way that maintains natural functional relationships among species and should not lead to trophic cascades or ecosystem state changes.
2. The fishery is conducted in a manner that does not threaten biological diversity at the genetic, species or population levels and avoids or minimizes mortality of, or injuries to endangered, threatened or protected species.
3. Where exploited populations are depleted, the fishery will be executed such that recovery and rebuilding is allowed to occur to a specified level within specified time frames, consistent with the precautionary approach and considering the ability of the population to produce long-term potential yields.

### **10.3 MSC Principle 3 – Management**

The fishery is subject to an effective management system that respects local, national and international laws and standards and incorporates institutional and operational frameworks that require use of the resource to be responsible and sustainable.

#### **Intent:**

The intent of this principle is to ensure that there is an institutional and operational framework for implementing Principles 1 and 2, appropriate to the size and scale of the fishery.

## MSC Criteria:

A. Management System: The fishery shall not be conducted under a controversial unilateral exemption to an international agreement.

The management system shall:

1. demonstrate clear long-term objectives consistent with MSC Principles and Criteria and contain a consultative process that is transparent and involves all interested and affected parties so as to consider all relevant information, including local knowledge. The impact of fishery management decisions on all those who depend on the fishery for their livelihoods, including, but not confined to subsistence, artisanal, and fishing-dependent communities shall be addressed as part of this process;
2. be appropriate to the cultural context, scale and intensity of the fishery – reflecting specific objectives, incorporating operational criteria, containing procedures for implementation and a process for monitoring and evaluating performance and acting on findings;
3. observe the legal and customary rights and long term interests of people dependent on fishing for food and livelihood, in a manner consistent with ecological sustainability;
4. incorporates an appropriate mechanism for the resolution of disputes arising within the system;
5. provide economic and social incentives that contribute to sustainable fishing and shall not operate with subsidies that contribute to unsustainable fishing;
6. act in a timely and adaptive fashion on the basis of the best available information using a precautionary approach particularly when dealing with scientific uncertainty;
7. incorporate a research plan – appropriate to the scale and intensity of the fishery – that addresses the information needs of management and provides for the dissemination of research results to all interested parties in a timely fashion;
8. require that assessments of the biological status of the resource and impacts of the fishery have been and are periodically conducted;
9. specify measures and strategies that demonstrably control the degree of exploitation of the resource, including, but not limited to:
10. set catch levels that will maintain the target population and ecological community's high productivity relative to its potential productivity, and account for the non-target species (or size, age, sex) captured and landed in association with, or as a consequence of, fishing for target species;
11. identify appropriate fishing methods that minimize adverse impacts on habitat, especially in critical or sensitive zones such as spawning and nursery areas;
12. provide for the recovery and rebuilding of depleted fish populations to specified levels within specified time frames;
13. have mechanisms in place to limit or close fisheries when designated catch limits are reached;
14. establish no-take zones where appropriate;
15. contain appropriate procedures for effective compliance, monitoring, control, surveillance and enforcement which ensure that established limits to exploitation are not exceeded and specify corrective actions to be taken in the event that they are.

## B. MSC Operational Criteria:

Fishing operations shall:

16. make use of fishing gear and practices designed to avoid the capture of non-target species (and non-target size, age, and/or sex of the target species); minimize mortality of this catch where it cannot be avoided, and reduce discards of what cannot be released alive;
17. implement appropriate fishing methods designed to minimize adverse impacts on habitat, especially in critical or sensitive zones such as spawning and nursery areas;
18. not use destructive fishing practices such as fishing with poisons or explosives;

19. minimize operational waste such as lost fishing gear, oil spills, on-board spoilage of catch, etc.;
20. be conducted in compliance with the fishery management system and all legal and administrative requirements; and
21. assist and co-operate with management authorities in the collection of catch, discard, and other information of importance to effective management of the resources and the fishery.

#### **10.4 Interpretations of MSC Principles for Performance Assessments**

Along with developing a standard for sustainable fisheries management, the MSC also developed a certification methodology that provides the process by which all fisheries are to be evaluated. ASI accredits certification bodies that can show that the expertise and experience necessary to carry out MSC evaluation is present in the organization. In addition, each certification body must demonstrate its fluency with the MSC standards and evaluation methods through the use of these in a fishery evaluation

The methods are provided in great detail through documents that can be downloaded from the MSC website ([www.msc.org](http://www.msc.org)). The Fisheries Assessment Methodology (FAM) Version 1, released 21 July 2008 is being used for the assessment of the Mexican Sardine fishery.

The MSC Principles and Criteria are general statements describing what aspects need to be present in fisheries to indicate that they are moving toward sustainable management. The certification approach or methodology adopted by the MSC requires that any assessment of a fishery or fisheries move beyond a management verification program that simply provides third-party assurances that a company's stated management policies are being implemented. The MSC's 'Certification Methodology' is designed to be an evaluation of a fishery's performance to determine if the fishery is being managed consistent with emerging international standards of sustainable fisheries.

## 11. ASSESSMENT TEAM PERFORMANCE EVALUATIONS

After completing all the reviews and interviews, the assessment team is tasked with utilizing the information it has received to assess the performance of the fishery. The assessment team assigns numerical scores between <60 and 100 to each of the performance indicators. If a fishery scores less than 60 for any performance indicator, it is excluded from certification. The process requires that all team members work together to discuss and evaluate the information they have received for a given performance indicator and come to a consensus decision on the scores. Scores are then combined to get overall scores for each of the three MSC Principles. A fishery must have normalized scores of 80 or above on each of the three MSC Principles to be recommended for certification. Should an individual indicator receive a score of less than 80, a ‘Condition’ is established that when met, would bring the fishery’s performance for that indicator up to the 80 level score representing a well-managed fishery.

Below is a written explanation of the assessment team’s evaluation of the information it received and the team’s interpretation of the information as it pertains to the fishery’s compliance with the MSC Principles and Criteria.

### 11.1 MSC Principle 1

**A fishery must be conducted in a manner that does not lead to over-fishing or depletion of the exploited populations and, for those populations that are depleted, the fishery must be conducted in a manner that demonstrably leads to their recovery.**

| 1.1.1   |   |   |
|---|---|---|
| The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing. |   |   |
| SG 60   | SG 80   | SG 100  |
| It is <u>likely</u> that the stock is above the point where recruitment would be impaired.                      | It is <u>highly likely</u> that the stock is above the point where recruitment would be impaired.<br>The stock is at or fluctuating around its target reference point.<br><br>The stock is at or fluctuating around its target reference point. | There is a <u>high degree of certainty</u> that the stock is above the point where recruitment would be impaired.<br><br>There is a <u>high degree of certainty</u> that the stock has been fluctuating around its target reference point, or has been above its target reference point, <u>over recent years</u> . |

**Score: 90**

#### 1.1.1 Scoring Rationale

The most recent stock assessment (Nevárez-Martínez (2009 a,b), based on the 1969-70 to 2007-08 seasons, shows that the fishery has a high productivity, where the estimated recruitment (R) reached a historical maximum of almost 5.0 million recruits (0 age) during the 2007-08 season, with an adult or spawning stock biomass (SSB) of 1.5 million metric tons (MT). Landings for the same season (2007-08), reached a high record of 488,639 MT. Recruitment and SSB have shown this increasing tendency after the 1990 to 1992 period, when the landings decreased to a minimum of about 7,000 MT in the 1991-92 season. This general tendency strongly suggest that there is a high degree of certainty that the stock is above the point where the recruitment would be impaired.

The fishery has been targeting a value  $0.9F_{MSY} = 0.25$  as reference point (see Section 5.3); which has been considered by INAPESCA to be *safer biologically* and produce higher economic returns. Between the 1993/94 to 2007/08 seasons, fishing mortality (F) has fluctuated between 0.056 to 0.199 per season (year) (Nevárez-Martínez (2009a,b), which are lower than 0.25 value, meaning that values are safer and above the references point during the latest years, and the stock is not exploited as much as could be (at MSY level).

### 1.1.1 Trace References

Martínez-Zavala et al. (2009 a, b)

| 1.1.2  |   |  |
|--|---|--|
| Limit and target reference points are appropriate for the stock.   |   |  |
| SG 60  | SG 80   | SG 100   |
| <p><u>Generic</u> limit and target reference points are based on justifiable and reasonable practice appropriate for the species category.</p> | <p>Reference points are appropriate for the stock and can be estimated.</p> <p>The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity.</p> <p>The target reference point is such that the stock is maintained at a level consistent with BMSY or some measure or surrogate with similar intent or outcome.</p> <p>For low trophic level species, the target reference point takes into account the ecological role of the stock.</p> | <p>Reference points are appropriate for the stock and can be estimated.</p> <p>The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity following consideration of relevant <u>precautionary issues</u>.</p> <p>The target reference point is such that the stock is maintained at a level consistent with BMSY or some measure or surrogate with similar intent or outcome, <u>or a higher level</u>, and takes into account relevant precautionary issues such as the ecological role of the stock with a high degree of certainty.</p> |

**Score: 85**

### 1.1.2 Scoring Rationale

The fishery has been targeting two reference points: The proportion of Pacific sardines in the catch with size below 150 mm standard length, which cannot be more than 30% of the total catch during the period of observation (around one month). This reference point is appropriate for the stock because it avoids *growth overfishing*, by allowing juvenile sardines to grow to a mature size, and avoids fishing mortality on juvenile fishes that are consumed by other components of the ecosystem, like marine birds (Velarde et al. 2004). This reference point is systematically estimated by monitoring at landing ports and sometimes onboard during the fishing trips, during the fishing season. The second reference point is to maintain a value of F less or around  $0.9F_{MSY} = 0.25$  (see section 5.4); which is evaluated post fishing season. This reference point allows fishing only 90% of the Maximum Sustainable Yield, and has been estimated in yearly bases between 1993/94 to 2007/08 seasons, when fishing mortality (F) values have fluctuated between 0.056 to 0.199 per season (Nevárez-Martínez, 2009b). These results indicate that fishing mortality has been always lower than the reference point of 0.25 during the assessed period, suggesting that the stock has been maintained at a level larger than BMSY.

Pacific sardine is a low trophic level species, and has been described as an important component of the Gulf of California Ecosystem (Luch-Cota et al. 2007; Bakum et al. 2009). By targeting the two reference points explained above, and based on the recent stock assessments, it can be affirmed that the stock has continue to accomplish its ecological role because: a) juvenile sardine fishing mortality has been diminished by the rule of not more than 30% underside sardine in the catch, avoiding the impact of the fishery on the predation by other ecosystem components (e.g. marine birds) on this sardine size group (<150 mm); and b) the performance of the fishery since the 1993/1994 season shows that fishing mortality has been maintained under the reference point value of  $0.9F_{MSY} = 0.25$  (fluctuating between 0.056 to 0.199 per season), that has let a larger biomass to be kept in the ecosystem. Never the less, the score reflects the lack of an explicit recognition of the role of the stock in the ecosystem that should be stated in the Management Plan. This plan is under development and this status is part of the rationale of Condition 3.2.1 (see principle 3).

### 1.1.2 Trace References

Bakum et al. 2009; Martínez-Zavala et al. (2009 b); Luch-Cota et al. 2007; Velarde et al. 2004

| 1.1.3  |  |  |
|--|--|--|
| Where the stock is depleted, there is evidence of stock rebuilding.  |  |  |
| SG 60  | SG 80  | SG 100   |
| Where stocks are depleted rebuilding strategies which have a <u>reasonable expectation</u> of success are in place.<br><br>Monitoring is in place to determine whether they are effective in rebuilding the stock within a <u>specified</u> timeframe. | Where stocks are depleted rebuilding strategies are in place.<br><br>There is <u>evidence</u> that they are rebuilding stocks, or it is highly likely based on simulation modeling or previous performance that they will be able to rebuild the stock within a <u>specified</u> timeframe | Where stocks are depleted, strategies are <u>demonstrated</u> to be rebuilding stocks continuously and there is strong evidence that rebuilding will be complete within the <u>shortest practicable</u> timeframe. |

Score: N/A

Performance Indicator 1.1.3 is not scored when there is no stock rebuilding mechanism in operation.

| 1.2.1  |   |   |
|--|---|---|
| There is a robust and precautionary harvest strategy in place.   |   |   |
| SG 60  | SG 80   | SG 100  |
| The harvest strategy is <u>expected</u> to achieve stock management objectives reflected in the target and limit reference points.<br><br>The harvest strategy is <u>likely</u> to work based on prior experience or plausible argument. | The harvest strategy is responsive to the state of the stock and the elements of the harvest strategy <u>work together</u> towards achieving management objectives reflected in the target and limit reference points.<br><br>The harvest strategy may not have been fully tested but monitoring is | The harvest strategy is responsive to the state of the stock and is <u>designed</u> to achieve stock management objectives reflected in the target and limit reference points.<br><br>The performance of the harvest strategy has been <u>fully evaluated</u> and evidence exists to show that it is achieving its objectives including being clearly able to |

|   |   |   |
|---|---|---|
| <p><u>Monitoring</u> is in place that is expected to determine whether the harvest strategy is working.</p> | <p>in place and <u>evidence</u> exists that it is achieving its objectives.</p> | <p>maintain stocks at target levels.</p> <p>The harvest strategy is <u>periodically reviewed and improved</u> as necessary.</p> |
|---|---|---|

**Score: 80**

**1.2.1 Scoring Rationale**

The harvest strategy for the fishery consists in three main elements:

(1) General specifications:

General specifications are included in the Mexican Official Standard (NOM) published in 1993 (NOM-003-PESC-1993). The NOM established a precautionary strategy by declaring a moratorium for fishing licenses, so there has not been an increase in the number of boats participating in the fishery in any Mexican Pacific waters since its publication. The NOM specifies the size of the purse seiner net by vessel size, and the regulations to follow in order to close the fishery season. The NOM has set a minimum size of capture of 150 mm standard length (SL) for Pacific sardine has. The obligation of the fisheries operators to participate and allow technical and biological research and monitoring onboard and at port has been established (See section 5.2 and Principle 3).

(2) Before beginning of the opening of the fishing season:

Before the beginning of the season, the F value of the last season is estimated (see Section 5.3), and its value is contrasted with the Reference Point of  $0.9F_{MSY} = 0.25$ . If the F value is greater than 0.25, control rules like shortening the fishing season or closing some fishing areas (Fig. 1) or reducing fishing effort (number of boats) are discussed and agreed between the fisheries scientists and fishery operators, during official meetings (where agreements are written and signed).

Also, before the fishing season starts, a research cruise is carried out on board a fishing or research vessel. The goal of the cruise is to assess the reproductive state of the adult sardines and the proportion of juveniles (less than 150 mm SL) in the samples from the different fishing areas (**Figure 1**). During the cruises, the oceanographic conditions are also characterized, mainly by the sea surface temperature distribution. Based on these results, the date for the fishing season opener is established. The opener is established with the agreement between the fisheries researchers and the fishery operators during official meetings where agreements are formalized and signed by the participants (“minutas” can be found [here](#)).

(3) During the fishing season:

During the fishing season, monitoring is in place at landing ports, and sometimes onboard during the fishing trips. The goal is to evaluate the size of the fish and assess the proportion of juvenile fish less than 150 mm SL in the catch, and to take samples to determine their age and reproductive state for the population assessment. If the allowed level by the Reference Point of only 30% of undersize fish in the catch is reached (see Section 5.3), the predefined fishing area (Fig. 1), where the undersized fish were caught, is closed for the rest of the season, or until it is shown that larger size Pacific sardines are present in the area once again. After an area with undersize sardine is close, fishing continues in other areas where sardine are larger than 150 mm. If the opening of the closed area is needed, an observer from INAPESCA participates in a fishing trip to the area and the decision is taken based on these observations. The fishing season closes between August and October, depending on the reproductive state of the fishes and their mean size (see above).

Even the strategy has not been formally tested, the combination of the use of both Reference Points has allowed the population biomass to have an increasing tendency and reach the management objectives (see Section 5.3, and rationale of PI 1.1.1 and 1.1.2). Which is the result of assessing the F after each fishing season to maintain a level of fishing mortality lower or close to  $0.9F_{MSY} = 0.25$ , and by avoiding size overfishing through continually observing the percentage of undersize fishes during the fishing season. This strategy has not been formalized in

a management plan, and the score of this PI reflects its absence. Nevertheless, currently there is a Management Plan under development (Nevárez-Martínez et al. In revision) (see also Section 5.2 and 5.3).

### 1.2.1 Trace References

NOM—003-PESC-1993; Nevárez-Martínez et al. (In revision).

| 1.2.2  |   |  |
|--|---|--|
| There are well defined and effective harvest control rules in place.   |   |  |
| SG 60  | SG 80   | SG 100   |
| <p><u>Generally understood</u> harvest control rules are in place that are consistent with the harvest strategy and which act to reduce the exploitation rate as limit reference points are approached.</p> <p>There is <u>some evidence</u> that tools used to implement harvest control rules are appropriate and effective in controlling exploitation.</p> | <p><u>Well defined</u> harvest control rules are in place that are consistent with the harvest strategy and ensure that the exploitation rate is reduced as limit reference points are approached.</p> <p>The <u>selection</u> of the harvest control rules takes into account the <u>main</u> uncertainties.</p> <p><u>Available evidence indicates</u> that the tools in use are appropriate and effective in achieving the exploitation levels required under the harvest control rules.</p> | <p><u>Well defined</u> harvest control rules are in place that are consistent with the harvest strategy and ensure that the exploitation rate is reduced as limit reference points are approached.</p> <p>The <u>design</u> of the harvest control rules take into account a <u>wide</u> range of uncertainties.</p> <p><u>Evidence clearly shows</u> that the tools in use are effective in achieving the exploitation levels required under the harvest control rules.</p> |

**Score: 80**

### 1.2.2 Scoring Rationale

The harvesting strategy includes two main control rules, which are related to the two Reference Points in this fishery. Before the fishing season begins, the F value of the last season is estimated (see Section 5.3), and its value is contrasted with the Reference Point of  $0.9F_{MSY} = 0.25$ . If the F value is greater than 0.25, control rules can be applied. Strategies like shortening the fishing season or close some fishing areas (Fig. 1) or reduce fishing effort (number of boats) are discussed and agreed between the fisheries scientists and fishery operators, during official meetings (where agreements are written and signed). To choose the strategy to be applied, associated uncertainties should be considered in order to ensure the reduction of the F value. Though, because the F value estimated for the 1993/94 to 2007/08 seasons (0.056 to 0.199 per season), this control rule has not been applied yet. Also, during the development of the model to assess the  $F_{MSY}$  level, Nevárez-Martínez et al. (1999) used two approaches, deterministic and stochastic. The later incorporated a stochastic variability generator in their Stock-Recruitment relationship, in order to incorporate the unexplained variability of recruitment, implying that uncertainties have been considered.

During the season, and to avoid the proportion of fishes in the catch with size less than 150 mm SL catch size composition is systematically observed; where the proportion cannot be more than 30% of the total catch per period of evaluation, usually one month. If this proportion is reached, the control rules states that the predefined fishing area, where the catches were taken, is closed for fishing during the rest of the season (to be certain of not fishing juvenile fish will happened) or until it is shown that larger size Pacific sardines are present in the area.

The recent increasing trends of SSB and R, and F values (Nevárez-Martínez (2009 a, b) are an indication of the use of appropriate and effective exploitation levels. Nevertheless, explicit control rules for total catch allowed should be applied. In the Management Plan which is under review, the description of control rules taking into



consideration the size of the stock biomass at the MSY, and other factors are well defined, however, the explicit role of the stock in the ecosystem shall also be stated in a formal way in the harvest control rules, as stated in Condition 3.2.1.

### 1.2.2 Trace References

Nevárez-Martínez et al. (1999)

| 1.2.3   |  |  |
|---|--|--|
| Relevant information is collected to support the harvest strategy.  |  |  |
| SG 60   | SG 80  | SG 100   |
| <p><u>Some</u> relevant information related to stock structure, stock productivity and fleet composition is available to support the harvest strategy.</p> <p>Stock abundance and fishery removals are monitored and at least one indicator is available and monitored with sufficient frequency to support the harvest control rule.</p> | <p><u>Sufficient</u> relevant information related to stock structure, stock productivity, fleet composition and other data is available to support the harvest strategy.</p> <p>Stock abundance and fishery removals are <u>regularly monitored at a level of accuracy and coverage consistent with the harvest control rule</u>, and one or more indicators are available and monitored with sufficient frequency to support the harvest control rule.</p> <p>There is good information on all other fishery removals from the stock.</p> | <p>A <u>comprehensive range</u> of information (on stock structure, stock productivity, fleet composition, stock abundance, fishery removals and other information such as environmental information), including some that may not be directly relevant to the current harvest strategy, is available.</p> <p><u>All information</u> required by the harvest control rule is monitored with high frequency and a high degree of certainty, and there is a good understanding of the inherent <u>uncertainties</u> in the information [data] and the robustness of assessment and management to this uncertainty.</p> |

**Score: 90**

### 1.2.3 Scoring Rationale

The Pacific sardine fishery in the Gulf of California has been monitored since the 1972-73 season by port sampling. Total catches have been documented by landing slips per fishing vessel trip during the same period. The development of the fishery has been described by several authors (e.g. Arvizu-Martínez, 1987; Cisneros-Mata et al. 1995 a, b, see Nevárez-Martínez et al. 2006 for review), and its historical trends and the large fluctuations of the stock size as a result of the influence of environmental factors have been analyzed (e.g. Lluch-Belda et al, 1986; Nevárez-Martínez et al. 2001; Bakun et al. 2009). On the other hand, Smith (2005) after reviewing the genetic, vertebral counts, blood type, and spawning areas, concluded that there is only one stock of Pacific sardine inside the Gulf of California, at least as considered as a management unit. The Gulf of California as an ecosystem has been studied for some time, enabling access to a comprehensive range and amount of information relevant to the current harvest strategy (e.g. Lluch-Cota et al. 2007, Bakun et al. 2009). The relationship of the Pacific sardine stock with other vertebrate species or other fisheries have been discussed (e.g. Velarde et al. 2004; Lluch-Cota et al. 2007). This information has been frequently monitored and several studies on other ecosystem components are on-going, producing information with the potential to be used in an ecosystem analysis approach.

In order to complement their fishery dependent analysis, since 2009, a fishery independent approach is under development using acoustic techniques for assessing the total biomass by the official assessment team of the

fishery. This will create more robust information for better harvest strategies and management as has been suggested by Bakun et al. (2009) and Barange et al. (2009).

**1.2.3 Trace References**

Arvizu- Martínez (1987); Bakun et al. 2009; Cisneros-Mata et al. 1995 a, b; Lluch-Belda et al. (1986); Nevárez-Martínez et al. (2001); Lluch-Cota et al. (2007); Nevárez-Martínez et al. (2006); Smith (2005); Velarde et al. (2004).

| <b>1.2.4</b>   |  |   |
|--|--|---|
| There is an adequate assessment of the stock status.   |  |   |
| <b>SG 60</b>   | <b>SG 80</b>   | <b>SG 100</b>   |
| <p>The assessment estimates stock status relative to reference points.</p> <p>The major sources of uncertainty are identified.</p> | <p>The assessment is appropriate for the stock and for the harvest control rule, and is evaluating stock status relative to reference points.</p> <p>The assessment takes uncertainty into account.</p> <p>The stock assessment is subject to peer review.</p> | <p>The assessment is appropriate for the stock and for the harvest control rule and takes into account the major features relevant to the biology of the species and the nature of the fishery.</p> <p>The assessment takes into account uncertainty and is evaluating stock status relative to reference points in a probabilistic way.</p> <p>The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored.</p> <p>The assessment has been <u>internally and externally</u> peer reviewed.</p> |

**Score: 75**

**1.2.4 Scoring Rationale**

The SSB and R are assessed systematically using a stochastic age-structured model with density-dependent recruitment; which is appropriate for the stock, taking into consideration its biology and the possible SSB-R relationship. The use of a  $0.9F_{MSY}$  as a reference value, allows a safer strategy biologically and economically. The model was published in a peer review journal, and the recent assessment has been peer reviewed inside the INAPESCA. Nevertheless, Bakun et al. (2009) stated about this model:

*The model appeared to be able to match the observed catch trends fairly well, which is perhaps surprising given that they make the classical stationary assumptions. Allowance for the fact that environmental factors impact recruitment is included in the model and takes into consideration the possible uncertainties of the system, but potential trends in life history characteristics and natural mortality rates are not included.*

The authors suggest that that MSY calculated from this model should be treated with caution, and fishery independent surveys of population abundance and recruitment, such as ichthyoplankton sampling and acoustic methods for biomass assessment should be used to base management measures on. Since 2009, a fishery independent approach has been under development using acoustics techniques for assessing the total biomass. This will complement the assessment process, and create more robust information for better harvest strategies and management. However, due to the lack of confidence of the assessment method based on fishery dependent

data used today, there is a need to urge the implementation of the fishery independent biomass estimations in order to create more appropriate estimations.

Other assessment approaches have been explored and suggested, like the use of a constant harvest rate of 0.29 based on the analysis of the catchability coefficient, stock abundance and commercial catches (Martínez-Aguilar et al. 2009). There has also been the suggestion to use a minimum spawning stock sizes of 287 million individuals as reference point; which was estimated by the Shepherd and Ricker stock-recruitment models using a log-likelihood estimator (Morales-Bojórquez and Nevárez-Martínez, 2005). However, these approaches have been only seen as possible alternatives.

**1.2.4 Trace References**

Bakun et al. (2009); Morales-Bojórquez; Nevárez-Martínez (2005); Martínez-Aguilar et al. (2009); Nevárez-Martínez et al. (In revision).

**Condition 1.2.4:** By the 3<sup>rd</sup> annual surveillance audit the client shall provide evidence that the stock assessment has been modified to be more appropriate for the sardine stock. In doing so, the client shall consider the use of fishery independent data to assess the population biomass. The assessment shall continue to use adequate reference points and control rules, taking uncertainties into account and should be peer reviewed.

**11.2 MSC Principle 2**

**Fishing operations should allow for the maintenance of the structure, productivity, function and diversity of the ecosystem (including habitat and associated dependent and ecologically related species) on which the fishery depends.**

|  |   |  |
|--|---|--|
| <b>2.1.1</b>   |   |  |
| The fishery does not pose a risk of serious or irreversible harm to the retained species and does not hinder recovery of depleted retained species.  |   |  |
| <b>SG 60</b>   | <b>SG 80</b>  | <b>SG 100</b>  |
| Main retained species are <u>likely</u> to be within biologically based limits or if outside the limits there are <u>measures</u> in place that are <u>expected</u> to ensure that the fishery does not hinder recovery and rebuilding of the depleted species.<br><br>If the status is poorly known there are measures or practices in place that are expected to result in the fishery not causing the retained species to be outside biologically based limits or hindering recovery. | Main retained species are <u>highly likely</u> to be within biologically based limits, or if outside the limits there is a <u>partial strategy</u> of <u>demonstrably effective</u> management measures in place such that the fishery does not hinder recovery and rebuilding. | There is a <u>high degree of certainty</u> that retained species are within biologically based limits.<br><br>Target reference points are defined and retained species are at or fluctuating around their target reference points. |

**Score: 75**

**2.1.1 Scoring Rationale:** Thread herring (*Sardina crinuda*, *Opisthonema* spp.), mackerel (*Scomber japonicus*), anchoveta (*Sardina bocona*, *Cetengraulis mysticetus*), round herring (*Sardina japonesa*, *Etrumeus teres*), northern anchovy (Anchoveta norteña, *Engraulis mordax*) and leatherjacket (*Sardina piña*, *Oligoplites* spp.) are retained as part of the multispecies purse-seine fishery in the Gulf of (Martínez-Zavala et al. 2006). Based on the last seasons (08/09) data (Nevarez-Martinez et al. 2010) and in accordance with the MSC guidance 7.2.2, none of these species are considered being “main retained species” (FAM 2.1, 2010). However, because the catch of thread herring was significant in 06/07 the assessment team does consider this species of thread herring

(*Opisthonema* spp.) a main retained species for the purpose of this assessment. In addition, the assessment team does acknowledge that the contribution of anchoveta particularly the species *C. mysticetus* has been significant in some years (e.g. 200/2001 and 2005/2006), this species will also be considered “main” for the purpose of this assessment.

The status of the stock of all the retained species is assessed every 3-4 years and is well managed as part of the main commercial fishery (Martínez-Zavala et al. 2006). A predictive model (Tompson and Bell model) is used to assess the main retained species. In addition, there is a minimum size limit for thread herring and anchovies. Biomass estimates are collected and maximum sustainable yield is calculated for *Opisthonema libertate*, *O. bulleri* and *O. medirastre*, *Etrumeus teres* and *Cetengraulis mysticetus* (Nevárez-Martínez et al. 2006). There is a high degree of certainty that the main retained species of thread herring (*Opisthonema* spp.) anchoveta (*Cetengraulis mysticetus*) is within biologically based limits, but specific target reference points have not been defined. The assessment focuses on the target species (*Sardinops sagax*) and therefore the fishery does not achieve the 80 score of this performance indicator. The team recommends developing specific assessments for the main retained species (*Opisthonema* spp. and *Cetengraulis mysticetus*) as part of the condition set for continued certification.

### 2.1.1 Trace References

Martínez-Zavala et al. (2006), Nevárez-Martínez et al. (2006), Nevarez-Martinez et al. (2010)

#### Condition 2.1.1:

By the 3<sup>rd</sup> annual surveillance audit provide evidence to the CB that the main retained species (*Opisthonema* spp. and *Cetengraulis mysticetus*) are highly likely to be within biologically based limits, or if outside the limits there is a partial strategy of demonstrably effective management measures in place such that the fishery does not hinder recovery and rebuilding.

| 2.1.2   |  |   |
|---|--|---|
| There is a strategy in place for managing retained species that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to retained species.   |  |   |
| SG 60   | SG 80  | SG 100  |
| <p>There are <u>measures</u> in place, if necessary, that are expected to maintain the main retained species at levels which are highly likely to be within biologically based limits, or to ensure the fishery does not hinder their recovery and rebuilding.</p> <p>The measures are considered <u>likely</u> to work, based on plausible argument (eg, general experience, theory or comparison with similar fisheries/species).</p> | <p>There is a <u>partial strategy</u> in place, if necessary that is expected to maintain the main retained species at levels which are highly likely to be within biologically based limits, or to ensure the fishery does not hinder their recovery and rebuilding.</p> <p>There is some <u>objective basis for confidence</u> that the partial strategy will work, based on some information directly about the fishery and/or species involved.</p> <p>There is <u>some evidence</u> that the partial strategy is being <u>implemented successfully</u>.</p> | <p>There is a <u>strategy</u> in place for managing retained species.</p> <p>The strategy is mainly based on information directly about the fishery and/or species involved, and <u>testing</u> supports <u>high confidence</u> that the strategy will work.</p> <p>There is <u>clear evidence</u> that the strategy is being <u>implemented successfully</u>, and intended changes are occurring.</p> <p>There is some evidence that the strategy is <u>achieving its overall objective</u>.</p> |

**Score: 70**

**2.1.2 Scoring Rationale:** There is a strategy in place for managing retained species. The basic management strategy for the multispecies purse-seine fishery in the Gulf of California is to stay at or below the limit reference point of 0.25, which is equal to 0.9  $F_{MSY}$  (Nevares-Martinez et al. 1999, 2006). There is some evidence that the strategy is implemented (Martínez-Zavala et al. 2006). Certainly, the reference point of 0.9F at MSY was modeled and developed for Pacific sardine, and then been applied to the others species. However, as indicated above, the harvest rate is set for the whole catch and not for individual species and therefore the fishery does not achieve the 80 score. A strategy reflecting the specifics of a multispecies fishery, dealing with inseperable catch, has not been formalized in a management plan, and the score of this PI reflects its absence. Nevertheless, currently there is a Management Plan under development (Nevárez-Martínez et al. In revision) In order to provide confidence to the CB that the partial strategy will work for all retained species, the client shall consider to develop assessments (see above) and harvest rates for individual species.

**2.1.2 Trace References**

Martínez-Zavala et al. (2006); Nevárez-Martínez et al. (1999, 2006); Nevárez-Martínez et al. (In revision)

**Condition 2.1.2:**

By the 3<sup>rd</sup> annual surveillance audit provide basis for confidence to the CB that the partial strategy will work. In order to do so the client shall consider setting harvest rates and assessments for individual species and incorporate these into the management plan.

**2.1.3**

Information on the nature and extent of retained species is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage retained species.

| SG 60  | SG 80  | SG 100  |
|--|--|---|
| <p><u>Qualitative information</u> is available on the amount of main retained species taken by the fishery.</p> <p>Information is <u>adequate to qualitatively</u> assess outcome status with respect to biologically based limits.</p> <p>Information is adequate to support <u>measures to manage main</u> retained species.</p> | <p><u>Qualitative information</u> and some quantitative information are available on the amount of main retained species taken by the fishery.</p> <p>Information is <u>sufficient</u> to estimate outcome status with respect to biologically based limits.</p> <p>Information is adequate to support a <u>partial strategy to manage main</u> retained species.</p> <p>Sufficient data continue to be collected to detect any increase in risk level (e.g. due to changes in the outcome indicator scores or the operation of the fishery or the effectiveness of the strategy).</p> | <p>Accurate and verifiable information is available on the catch of all retained species and the consequences for the status of affected populations.</p> <p>Information is <u>sufficient to quantitatively</u> estimate outcome status with a <u>high degree of certainty</u>.</p> <p>Information is adequate to support a <u>comprehensive strategy to manage</u> retained species, and evaluate with a <u>high degree of certainty</u> whether the strategy is achieving its objective.</p> <p>Monitoring of retained species is conducted in sufficient detail to assess ongoing mortalities to all retained species.</p> |

**Score: 90**

**2.1.3 Scoring Rationale:** Qualitative and quantitative information is available on the amount of the main retained species take by the fishery (Martínez-Zavala et al. 2006, Nevárez-Martínez et al. 2010). Several other species apart from the targeted species are retained in the Mexican sardine fishery. These include thread herring (*Sardina crinuda*, *Opisthonema* spp.), mackerel (*Scomber japonicus*), anchoveta (*Sardina bocona*, *Cetengraulis mysticetus*), round herring (*Sardina japonesa*, *Etrumeus teres*), northern anchovy (*Anchoveta norsteña*, *Engraulis mordax*) and leatherjacket (*Sardina piña*, *Oligoplites* spp.). Pacific anchoveta (*Cetengraulis mysticetus*) and three thread herring (*Opisthonema* spp.) are the largest contributors and are therefore considered “main” retained species for the purpose of this assessment (Nevárez-Martínez et al. 2010). The information has been collected and analyzed regularly since 1989 (Cisneros-Mata et al. 1989, 1990, 1997, Martínez-Zavala et al. 2000, 2006). There is sufficient information to support the management strategy for the main retained species and the data continues to be collected.

**2.1.3 Trace References**

Cisneros-Mata et al. 1989, 1990, 1997; Martínez-Zavala et al. 2000, 2006; Nevárez-Martínez et al. 2006, 2010

|  |   |   |
|--|---|---|
| <b>2.2.1</b>   |   |   |
| 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.  |   |   |
| <b>SG 60</b>   | <b>SG 80</b>  | <b>SG 100</b>   |
| Main bycatch species are <u>likely</u> to be within biologically based limits, or if outside such limits there are mitigation <u>measures</u> in place that are <u>expected</u> to ensure that the fishery does not hinder recovery and rebuilding.<br><br>If the status is poorly known there are measures or practices in place that are expected result in the fishery not causing the bycatch species to be biologically based limits or hindering recovery. | Main bycatch species are <u>highly likely</u> to be within biologically based limits or if outside such limits there is a <u>partial strategy of demonstrably effective</u> mitigation measures in place such that the fishery does not hinder recovery and rebuilding. | There is a <u>high degree of certainty</u> that bycatch species are within biologically based limits. |

**Score: 80**

**2.2.1 Scoring Rationale:** Sardines in the Gulf of California are fished with purse seine nets. Fishing vessels capture large aggregations of sardines that shoal in mid-water by surrounding these concentrations with a curtain of netting which is supported by surface floats. Compared to other fishing methods purse seine gear is relatively selective, since it is done in the open water column and directed at schools of targeted species. The main bycatch species are known and are considered to be below 1% of the total catch, and include small amounts of bycatch of giant squid (*Dosidicus gigas*) and triggerfish (Nevárez-Martínez et al 2006). Based on that data and in accordance with the MSC guidance 7.3.2, none of these species are considered being “main bycatch species” (FAM 2.1, 2010). However, a stock assessment exists for giant squid (Martinez-Aguilar et al. 2006) and even there are no bycatch species that can be considered “main” it is highly likely that the known bycatch species will be within biologically based limits. Therefore the fishery meets the 80 score. It was broad to the attention of the assessment team that slipping or discard at sea can occur and such small pelagic species are likely to have high mortalities. However as a result of technical improvements that allow for a more precise recognition of catch in recent years and the known highly selective nature of the purse seine gear are effective in not hindering recovery and rebuilding.

**2.2.1 Trace References**

Nevárez-Martínez et al. 2006, Martínez-Aguilar et al. (2006).

| <b>2.2.2</b>  |   |   |
|---|---|---|
| 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.   |   |   |
| <b>SG 60</b>  | <b>SG 80</b>  | <b>SG 100</b>   |
| <p>There are <u>measures</u> in place, if necessary, which are 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.</p> <p>The measures are considered <u>likely</u> to work, based on plausible argument (e.g. general experience, theory or comparison with similar fisheries/species).</p> | <p>There is a <u>partial strategy</u> in place, if necessary, for managing bycatch 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.</p> <p>There is <u>some objective basis for confidence</u> that the partial strategy will work, based on some information directly about the fishery and/or the species involved.</p> <p>There is <u>some evidence</u> that the partial strategy is being implemented successfully.</p> | <p>There is a <u>strategy</u> in place for managing and minimising bycatch.</p> <p>The strategy is mainly based on information directly about the fishery and/or species involved, and testing supports <u>high confidence</u> that the strategy will work.</p> <p>There is <u>clear evidence</u> that the strategy is being implemented successfully, and intended changes are occurring. There is some evidence that the strategy is achieving its objective.</p> |

**Score: 70**

**2.2.2 Scoring Rationale:** As stated above the fishing method used in the Gulf of California Sardine fishery is fairly selective and does not allow for large amounts of bycatch. However there is no observer program to verify this information and no formal strategy has been implemented therefore the fishery does not meet the 80 guildpost.

**Condition 2.2.2:**

By the 3<sup>rd</sup> annual surveillance audit, provide some evidence, if necessary, that the main bycatch species are highly likely to be within biologically based limits, or if outside such limits develop a partial strategy of demonstrably effective mitigation measures and provide some evidence to the CB that the strategy has been implemented successfully.

| <b>2.2.3</b>  |              |               |
|---|--------------|---------------|
| Information on the nature and amount of bycatch is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage bycatch. |              |               |
| <b>SG 60</b>  | <b>SG 80</b> | <b>SG 100</b> |
|   |              |               |

|  |  |   |
|--|--|---|
| <p><u>Qualitative information</u> is available on the amount of main bycatch species affected by the fishery.</p> <p>Information is <u>adequate to broadly understand</u> outcome status with respect to biologically based limits.</p> <p>Information is adequate to support <u>measures</u> to manage bycatch.</p> | <p><u>Qualitative information and some quantitative information</u> are available on the amount of main bycatch species affected by the fishery.</p> <p>Information is sufficient to estimate outcome status with respect to biologically based limits.</p> <p>Information is adequate to support a <u>partial strategy</u> to manage main bycatch species.</p> <p>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).</p> | <p><u>Accurate and verifiable information</u> is available on the amount of all bycatch and the consequences for the status of affected populations.</p> <p>Information is <u>sufficient</u> to quantitatively estimate outcome status with respect to biologically based limits with a <u>high degree of certainty</u>.</p> <p>Information is adequate to support a <u>comprehensive strategy</u> to manage bycatch, and evaluate with a high degree of certainty whether a strategy is achieving its objective.</p> <p>Monitoring of bycatch data is conducted in sufficient detail to assess ongoing mortalities to all bycatch species.</p> |
|--|--|---|

**Score: 70**

**2.2.3 Scoring Rationale:** Kelleher (2005) stated that purse seine fisheries for small pelagic fishes generally tend to have very low levels of bycatch. In addition, studies in Australia have shown that purse seine bycatch is negligible and even in mid-water trawls represents less than 1% of the total catch (Australian Fisheries Management Authority 2005) similarly to other areas of the world (South Africa, west coast of the USA and Canada). The sardine fleet in the Gulf of California operates between 40 and 100 meters depths and bycatch such as giant squid (*Dosidicus gigas*) and leatherjacket (*Oligoplites* spp.) constitute less than 1% of the total catch (Nevárez-Martínez et al. 2006). Although there is no observer data from the Gulf of California fishery, small amounts of bycatch of giant squid (*Dosidicus gigas*) and triggerfish have been reported. Information is adequate to broadly understand and manage the bycatch species. However, there is not sufficient ongoing data collection for the bycatch species of the Gulf of California Sardine fishery.

**2.2.3 Trace References**

Australian Fisheries Management Authority (2005), Kelleher (2005), Nevárez-Martínez et al. (2006).

**Condition 2.2.3:**

By the 2<sup>nd</sup> annual surveillance audit provide quantitative and qualitative information on all main bycatch species of the Gulf of California Sardine fishery. The information shall be sufficient to support a partial strategy for the main bycatch species and shall continue to be collected to detect any increase in risk to the main bycatch species. In order to do so the client should consider developing a scientifically defensible and comprehensive monitoring and reporting system for bycatch species.

**2.3.1**

The fishery meets national and international requirements for protection of ETP species.

The fishery does not pose a risk of serious or irreversible harm to ETP species and does not hinder recovery



| of ETP species.   |   |  |
|---|---|--|
| SG 60   | SG 80   | SG 100   |
| <p>Known effects of the fishery are <u>likely</u> to be within limits of national and international requirements for protection of ETP species.</p> <p>Known direct effects are <u>unlikely</u> to create <u>unacceptable impacts</u> to ETP species.</p> | <p>The effects of the fishery are known and are <u>highly likely</u> to be within limits of national and international requirements for protection of ETP species.</p> <p>Direct effects are <u>highly unlikely</u> to create <u>unacceptable impacts</u> to ETP species.</p> <p>Indirect effects have been considered and are thought to be unlikely to create unacceptable impacts.</p> | <p>There is a <u>high degree of certainty</u> that the effects of the fishery are within limits of national and international requirements for protection of ETP species.</p> <p>There is a <u>high degree of confidence</u> that there are <u>no significant detrimental effects (direct and indirect)</u> of the fishery on ETP species.</p> |

**Score: 80**

**2.3.1 Scoring Rationale:** ETP species are those that are recognized by “national legislation and/or binding international agreements” (FAM section 7.4.1). The Mexican national binding agreement for ETP species is the list in the NOM (NOM -059-SEMARNAT-2001). The international list used to evaluate this aspect of the fishery is CITES. The IUCN Red List; this list is non-binding. All species that can potentially interact with the Pacific sardines (directly or indirectly) are listed in Table 4, Appendix II with their ETP status.

Several birds (*Sula nebouxii* and *S. leucogaste*) and mammals (*Zalophus californianus*, *Phocoena sinus*) as well as a fish species (*Totoaba macdonaldi*) are regarded endangered or threatened in the Gulf of California (Table 4, Appendix II). Interactions between fishing vessels and vaquitas (*Phocoena sinus*), a rare species of porpoise endemic to the northern part of the Gulf of California (Sea of Cortez) and CITES listed, are unlikely. This is because the northern boundary of the commercial fleet of sardines is reasonably far away (>100 km) from the documented southern distribution of the vaquita.

Stakeholders raised concern about potential interaction of this fishery with ETP species and a report by Gallo-Reynoso (2003) attributed some death of the common dolphin to interaction with purse seine fishing gear (see also section 6.2). However, it is extremely difficult to link scares to specific gear types and hence there is no scientifically defensible evidence of any directly interactions of ETP species with the fishery. In any case if interactions occur there are likely to be rare due to the high selectivity of the fishing gear and are unlikely to create unacceptable impacts.

Hence the effects of the Sardine fishery on these species are known and are considered indirect as these species prey on sardines (see section 6.2 for indirect effects). The sardine fishery in the Gulf of California is thought to be unlikely to create unacceptable impacts and they are highly likely to be within limits of national and international requirements. Therefore all elements of the 80 score are met.

**2.3.1 Trace References**

NOM-059-SEMARNAT-2001, Gallo Reynoso (2003)

**2.3.2**

The fishery has in place precautionary management strategies designed to:

| <ul style="list-style-type: none"> <li>- meet national and international requirements;</li> <li>- ensure the fishery does not pose a risk of serious or irreversible harm to ETP species;</li> <li>- ensure the fishery does not hinder recovery of ETP species; and</li> <li>- minimize mortality of ETP species.</li> </ul>   |  |   |
|---|--|---|
| SG 60   | SG 80  | SG 100  |
| <p>There are <u>measures</u> in place that minimize mortality, and are expected to be highly likely to achieve national and international requirements for the protection of ETP species.</p> <p>The measures are <u>considered likely</u> to work, based on <u>plausible argument</u> (eg. general experience, theory or comparison with similar fisheries/species).</p> | <p>There is a <u>strategy</u> in place for managing the fishery’s impact on ETP species, including measures to minimize mortality that is designed to be highly likely to achieve national and international requirements for the protection of ETP species.</p> <p>There is an <u>objective basis for confidence</u> that the strategy will work, based on <u>some information</u> directly about the fishery and/or the species involved.</p> <p>There is <u>evidence</u> that the strategy is being implemented successfully.</p> | <p>There is a <u>comprehensive strategy</u> in place for managing the fishery’s impact on ETP species, including measures to minimize mortality that is designed to achieve <u>above</u> national and international requirements for the protection of ETP species.</p> <p>The strategy is mainly based on information directly about the fishery and/or species involved, and a <u>quantitative analysis</u> supports <u>high confidence</u> that the strategy will work.</p> <p>There is <u>clear evidence</u> that the strategy is being implemented successfully, and intended changes are occurring. There is evidence that the strategy is achieving its objective.</p> |

**Score: 80**

**2.3.2 Scoring Rationale:** As explained above, interactions are only indirect. There is a strategy in place for managing the indirect fishery’s impact on ETP species, which is to stay at or below the limit reference point of 0.25 for the multispecies fishery in the Gulf of California. This strategy has been implemented successfully (Nevárez-Martínez et al. 1999). Most of the ETP species in the Gulf of California rely only partially on sardines. Ecopath models have been used to study the complex trophic structure of the Gulf and ETP species are included in these (Morales-Zárate et al. 2004). Therefore there is an objective basis for confidence that the strategy will work.

**2.3. 2 Trace References**

Morales-Zárate et al. (2004), Nevárez-Martínez et al. (1999)

| <b>2.3.3</b>   |       |        |
|--|-------|--------|
| <p>Relevant information is collected to support the management of fishery impacts on ETP species, including:</p> <ul style="list-style-type: none"> <li>- information for the development of the management strategy;</li> <li>- information to assess the effectiveness of the management strategy; and</li> <li>- information to determine the outcome status of ETP species.</li> </ul> |       |        |
| SG 60  | SG 80 | SG 100 |

|   |  |  |
|---|--|--|
| <p>Information is <u>adequate</u> to <u>broadly understand</u> the impact of the fishery on ETP species. Information is adequate to support <u>measures</u> to manage the impacts on ETP species</p> <p><u>Information</u> is sufficient to <u>qualitatively</u> estimate the fishery related mortality of ETP species.</p> | <p>Information is <u>sufficient</u> to determine whether the fishery may be a threat to protection and recovery of the ETP species, and if so, to measure trends and support a <u>full strategy</u> to manage impacts.</p> <p><u>Sufficient data</u> are available to allow fishery related mortality and the impact of fishing to be <u>quantitatively</u> estimated for ETP species.</p> | <p>Information is <u>sufficient</u> to <u>quantitatively</u> estimate outcome status with a high degree of certainty.</p> <p>Information is adequate to support a <u>comprehensive strategy</u> to manage impacts, minimize mortality and injury of ETP species, and evaluate with a high degree of certainty whether a strategy is achieving its objectives.</p> <p><u>Accurate and verifiable information</u> is available on the magnitude of all impacts, mortalities and injuries and the consequences for the status of ETP species.</p> |
|---|--|--|

**Score: 85**

**2.3.3 Scoring Rationale:** There are numerous studies on ETP species of the Gulf of California (Auriolles-Gamboa 2003, Cisneros-Mata et al. 1995 a,b, Lluch-Cota et al. 1999, Culik 2004, Lercari and Chavez 2007, Sauzo-Guillen 2004). The information is sufficient to determine whether the fishery may be a threat to protection and recovery of the ETP species. Ecopath with EcoSim models, that included ETP species, have been used to study the complex trophic structure of the Gulf and to quantify the impact of fishing (Morales-Zárate et al. 2004).

**2.3. 3 Trace References**

Auriolles-Gamboa (2003), Cisneros-Mata et al. (1995 a,b), Lluch-Cota et al. (1999), Culik (2004), Lercari and Chavez (2007), Morales-Zárate et al. (2004), Sauzo-Guillen (2004)

|  |  |   |
|--|--|---|
| <b>2.4.1</b>   |  |   |
| The fishery does not cause serious or irreversible harm to habitat structure, considered on a regional or bioregional basis, and function. |  |   |
| <b>SG 60</b>   | <b>SG 80</b>   | <b>SG 100</b>   |
| The fishery is <u>unlikely</u> to reduce habitat structure and function to a point where there would be serious or irreversible harm.      | The fishery is <u>highly unlikely</u> to reduce habitat structure and function to a point where there would be serious or irreversible harm. | There is <u>evidence</u> that the fishery is highly unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm. |

**Score: 95**

**2.4.1 Scoring Rationale:** Sardines in the Gulf of California are fished with purse seine nets. The sardine fleet in the Gulf of California operates in mid-water between 40 and 100 meter depths and generally avoids bottom contact as noted above. There is some implied evidence that the fishery is highly unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm.

**2.4.2**

There is a strategy in place that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to habitat types.

| SG 60  | SG 80  | SG 100  |
|--|--|---|
| <p>There are <u>measures</u> in place, if necessary, that are expected to achieve the Habitat Outcome 80 level of performance.</p> <p>The measures are considered <u>likely</u> to work, based on plausible argument (e.g general experience, theory or comparison with similar fisheries/habitats).</p> | <p>There is a <u>partial strategy</u> in place, if necessary, that is expected to achieve the Habitat Outcome 80 level of performance or above.</p> <p>There is some <u>objective basis for confidence</u> that the partial strategy will work, based on some information directly about the fishery and/or habitats involved.</p> <p>There is <u>some evidence</u> that the partial strategy is being implemented successfully.</p> | <p>There is a <u>strategy</u> in place for managing the impact of the fishery on habitat types.</p> <p>The strategy is mainly based on information directly about the fishery and/or habitats involved, and testing supports high confidence that the strategy will work.</p> <p>There is <u>clear evidence</u> that the strategy is being implemented successfully, and intended changes are occurring. There is some evidence that the strategy is achieving its objective.</p> |

**Score: 95**

**2.4.2 Scoring Rationale:** There is a strategy in place for managing the impact of the fishery on habitat types. According to the fishermen, the fishing vessels avoid bottom contact because the small mesh nylon of the purse seine nets is easily damaged and costs of repair are very high. Fishermen with knowledge of the area would avoid shallow coastal areas and therefore the risk is of potential negative impact is decreased. The strategy for managing the impact of the fishery on habitat types is to maintain avoiding these areas and as such is based on the real character of the fishery. Given the lack of impact, the evidence suggests that the strategy is achieving the objective of minimizing the impact. Chuenpagdee et al. (2003) assessed the collateral impact (bycatch and impact on habitat) of a variety of fishing gear by integrating the knowledge of a wide range of fisheries stakeholder. They concluded that purse seine showed relatively low impact compared to other gear types like bottom trawl and bottom gillnet.

**2.4.2 Trace References**

Chuenpagdee et al. (2003)

**2.4.3**

Information is adequate to determine the risk posed to habitat types by the fishery and the effectiveness of the strategy to manage impacts on habitat types.

| SG 60   | SG 80  | SG 100   |
|---|--|--|
| <p>There is a basic understanding of the types and distribution of main habitats in the area of the fishery.</p> <p>Information is adequate to broadly understand</p> | <p>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.</p> <p>Sufficient data are available to allow the nature of the impacts of the fishery on habitat types to be identified and there is reliable information on the spatial extent, timing and location of use of the fishing gear.</p> | <p>The distribution of habitat types is known over their range, with particular attention to the occurrence of vulnerable habitat types.</p> <p>Changes in habitat</p> |

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| the main impacts of gear use on the main habitats, including spatial extent of interaction. | 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). | distributions over time are measured.<br>The physical impacts of the gear on the habitat types have been quantified fully. |
|---|--|--|

**Score: 95**

**2.4.3 Scoring Rationale:** As explained above, purse seine have limited to no impact on habitat, it could be argued that there is adequate information to determine that the risk posed to the fishing habitat by the fishing method are known at a level of detail that is relevant to the fishing gear, scale and intensity of the fishery. There is reliable information on the spatial extent, timing and location of use of the fishing gear.

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| <b>2.5.1</b>   |   |  |
| The fishery does not cause serious or irreversible harm to the key elements of ecosystem structure and function.   |   |  |
| <b>SG 60</b>   | <b>SG 80</b>  | <b>SG 100</b>  |
| The fishery is <u>unlikely</u> to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm. | The fishery is <u>highly unlikely</u> to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm. | There is <u>evidence</u> that the fishery is highly unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm. |

**Score: 80**

**2.5.1 Scoring Rationale:** The fishery is highly unlikely to disrupt the key elements underlying ecosystem structure and function. In addition, the Fisheries in Balance Index, which describes how fisheries exploit the trophic levels within an ecosystem, have been stable during the last five decades in the Gulf of California (Lluch-Cota et al. 2007). Morales-Zárate et al. (2004) used Ecopath and Ecosim software and found indications that the use of the ecosystem is balanced.

**2.5.1 Trace References**

Lluch-Cota et al. (2007), Morales-Zárate et al. (2004)

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| <b>2.5.2</b>  |  |  |
| There are measures in place to ensure the fishery does not pose a risk of serious or irreversible harm to ecosystem structure and function. |  |  |
| <b>SG 60</b>  | <b>SG 80</b>   | <b>SG 100</b>  |
| There are <u>measures</u> in place, if necessary, that take into account potential impacts of the fishery on key elements of the            | There is a <u>partial strategy</u> in place, if necessary, that takes into account available information and is expected to restrain impacts of the fishery on the ecosystem so as to achieve the Ecosystem Outcome 80 level | There is a <u>strategy</u> that consists of a <u>plan</u> , containing measures to address all main impacts of the fishery on the ecosystem, and at least some of these measures are in place. The plan and measures are based on well-understood functional relationships between the fishery and the Components and elements of the ecosystem. |

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| <p>ecosystem.</p> <p>The measures are considered likely to work, based on <u>plausible argument</u> (eg, general experience, theory or comparison with similar fisheries/ ecosystems).</p> | <p>of performance.</p> <p>The partial strategy is considered likely to work, based on <u>plausible argument</u> (eg, general experience, theory or comparison with similar fisheries/ ecosystems).</p> <p>There is <u>some evidence</u> that the measures comprising the partial strategy are being implemented successfully</p> | <p>This plan provides for development of a full strategy that restrains impacts on the ecosystem to ensure the fishery does not cause serious or irreversible harm.</p> <p>The measures are considered likely to work based on <u>prior experience</u>, plausible argument or <u>information</u> directly from the fishery/ecosystems involved.</p> <p>There is <u>evidence</u> that the measures are being implemented successfully.</p> |
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**Score: 75**

**2.5.2 Scoring Rationale:** There are measures in place, if necessary, that take into account potential impacts of the fishery on key elements of the ecosystem, e.g. the size composition of the catch is monitored and if necessary fishing areas are closed if set certain limits are reached. Certain areas in the north of the Gulf are closed to fishing. In addition due to the ecosystem modeling, there is evidence that the measures are considered likely to work and are being implemented successfully (Lluch-Cota et al. 2007, Morales-Zárate et al. 2004). However, the fishery does not achieve the 80 score for this indicator because no strategy is in place to restrain impacts of the fishery on the ecosystem.

**2.5.2 Trace References**

Lluch-Cota et al. (2007), Morales-Zárate et al. (2004)

**Condition 2.5.2:**

By the 3<sup>rd</sup> annual surveillance audit, develop a strategy to restrain impacts of the Sardine fishery on the Gulf of California ecosystem and provide evidence to the CB that the strategy has been implemented successfully.

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| <p><b>2.5.3</b></p>  |   |  |
| <p>There is adequate knowledge of the impacts of the fishery on the ecosystem.</p>   |   |  |
| <p><b>SG 60</b></p> <p>Information is adequate to <u>identify</u> the key elements of the ecosystem (e.g. trophic structure and function, community composition, productivity pattern and biodiversity).</p> <p>Main impacts of the fishery on these key</p> | <p><b>SG 80</b></p> <p>Information is adequate to <u>broadly understand the functions</u> of the key elements of the ecosystem.</p> <p>Main impacts of the fishery on these key ecosystem elements can be inferred from existing information, but <u>may not have been investigated in detail</u>.</p> <p>The main functions of the Components (i.e. target, Bycatch, Retained and ETP species and Habitats) in the ecosystem are <u>known</u>.</p> | <p><b>SG 100</b></p> <p>Information is adequate to <u>broadly understand the key elements</u> of the ecosystem.</p> <p>Main <u>interactions</u> between the fishery and these ecosystem elements can be inferred from existing information, and <u>have been investigated</u>.</p> <p>The impacts of the fishery on target, Bycatch, Retained and ETP species and Habitats are identified and the main</p> |

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|---|--|---|
| <p>ecosystem elements can be inferred from existing information, but <u>have not been investigated in detail</u>.</p> | <p>Sufficient information is available on the impacts of the fishery on these Components to allow some of the main consequences for the ecosystem to be inferred.</p> <p>Sufficient data continue to be collected to detect any increase in risk level (e.g. due to changes in the outcome indicator scores or the operation of the fishery or the effectiveness of the measures).</p> | <p>functions of these Components in the ecosystem are <u>understood</u>.</p> <p>Sufficient information is available on the impacts of the fishery on the Components <u>and elements</u> to allow the main consequences for the ecosystem to be inferred.</p> <p>Information is sufficient to support the development of strategies to manage ecosystem impacts.</p> |
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**Score: 85**

**2.5.3 Scoring Rationale:** There is adequate information to broadly understand the key elements of the ecosystem and the main functions of the Target, Bycatch, Retained and ETP species in the ecosystem are known.

Numerous studies have been conducted in relation to the trophic relationships of small pelagic fish throughout the Gulf of California. Del Monte Luna (2008) lists all the studies that involved sardines in the Gulf of California. This list clearly demonstrates that most species that prey on sardines are opportunists and feed on a variety of other species. Data continue to be collected to detect any increase in risk level. Morales-Zárate et al. (2004) used Ecopath and Ecosim software to construct a trophic structure model for the Northern Gulf of California. With 29 functional groups, which included ETP species like the vaquita, the authors showed that most groups were more impacted by predation and competition than by fishing pressure.

**2.5.3 Trace References**

Del Monte Luna (2008), Morales-Zárate et al. (2004)

**11.3 MSC Principle 3**

**The fishery is subject to an effective management system that respects local, national and international laws and standards and incorporates institutional and operational frameworks that require use of the resource to be responsible and sustainable.**

|  |  |  |
|--|--|--|
| <p><b>3.1.1</b></p>  |  |  |
| <p>The management system exists within an appropriate and effective legal and/or customary framework which ensures that it:</p> <ul style="list-style-type: none"> <li>- Is capable of delivering sustainable fisheries in accordance with MSC Principles 1 and 2;</li> <li>- Observes the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood; and</li> <li>- Incorporates an appropriate dispute resolution framework.</li> </ul> |  |  |
| <p><b>SG 60</b></p>  | <p><b>SG 80</b></p>  | <p><b>SG 100</b></p>   |
| <p>The management system is generally consistent with local, national or international laws or</p>   | <p>The management system is generally consistent with local, national or international laws or</p> | <p>The management system is generally consistent with local, national or international laws or</p> |

|   |  |   |
|---|--|---|
| <p>standards that are aimed at achieving sustainable fisheries in accordance with MSC Principles 1 and 2.</p> <p>The management system incorporates or is subject by law to a <u>mechanism</u> for the resolution of legal disputes arising within the system.</p> <p>Although the management authority or fishery may be subject to continuing court challenges, it is not indicating a disrespect or defiance of the law by repeatedly violating the same law or regulation necessary for the sustainability for the fishery.</p> <p>The management system has a mechanism to <u>generally respect</u> the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.</p> | <p>standards that are aimed at achieving sustainable fisheries in accordance with MSC Principles 1 and 2.</p> <p>The management system incorporates or is subject by law to a <u>transparent mechanism</u> for the resolution of legal disputes which is <u>considered to be effective</u> in dealing with most issues and that is appropriate to the context of the fishery.</p> <p>The management system or fishery is attempting to comply in a timely fashion with binding judicial decisions arising from any legal challenges.</p> <p>The management system has a mechanism to <u>observe</u> the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.</p> | <p>standards that are aimed at achieving sustainable fisheries in accordance with MSC Principles 1 and 2.</p> <p>The management system incorporates or is subject by law to a <u>transparent mechanism</u> for the resolution of legal disputes that is appropriate to the context of the fishery and has been <u>tested and proven to be effective</u>.</p> <p>The management system or fishery acts proactively to avoid legal disputes or rapidly implements binding judicial decisions arising from legal challenges.</p> <p>The management system has a mechanism to <u>formally commit</u> to the legal rights created explicitly or established by custom on people dependent on fishing for food and livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.</p> |
|---|--|---|

**Score: 95**

**3.1.1 Scoring Rationale:** Fisheries are a federal matter and the new “Ley general de Pesca y Acuicultura Sustentables” (LGPAS 2007) is the highest legal framework. It contains specific and explicit provisions to deal with the requirements of Principle 3.

The purpose of the law is defined in its Article 1 as:

*... regulating, promoting and managing the use of fishery and aquaculture resources ... establishing the basis for the exercise of those attributions of the federation, states and municipalities, under the overarching principles of concurrence and with the participation of fishers ... with the purpose of promoting the integral and sustainable development of fisheries and aquaculture.*

Regarding being capable of delivering sustainable fisheries in accordance with MSC Principles 1 and 2; the objectives of the law (as declared in its Article 2) include:

*III. Establishing the basis for the ordination, conservation, protection, repopulation and sustainable utilization of fisheries and aquaculture resources, as well as the protection and rehabilitation of those ecosystems in which these resources are.*

Under the general law, that is a matter of the legislature, there is a “Reglamento de la ley” (Regulations of the law), decreed by the President of the Republic.



Another general law relevant for fisheries is the “Ley General del Equilibrio Ecológico y la Protección del Ambiente/General law for the ecological equilibrium and the protection to environment” (LGEEPA 1988).

In its Chapter 1, it states the objectives of the law as:

- III. *The preservation, restoration and improvement of the environment;*
- IV. *The preservation and protection of biodiversity, as well as the establishment and management of natural protected areas*
- V. *The sustainable use, preservation and, in due course, restoration of soil, water and the other natural resources, in such a way that they are compatible with the generation of economic benefits and societal activities and the protection of ecosystems*

The law is particularly apt in the ecological ordering (as stated in its 5<sup>th</sup> Article):

- IX. *The formulation, application and evaluation of the ecological ordering programs ... and those of marine ecological ordering...*
- XI. *The regulation of the sustainable use, protection and preservation of national waters, its biodiversity, fauna and other natural resources...*

The “Ley Federal Sobre Metrología y Normalización” (LFMN, Federal Law on Metrology and Standardization) establishes the procedures for the integration of the “Normas Oficiales Mexicanas” (NOMs, Official Mexican Norms), which are specific legal guidelines defined as:

*The technical regulation of compulsory enforcement issued by the competent agencies ... that establish rules, specifications, attributes, directives, characteristics or prescriptions to be followed for a product, installation, system, activity or method of manufacturing or operation, as well as those relative to terminology, symbols, marks and labels...*

In its Article 40, the law states that the NOMs will define

*The characteristics and/or specifications to be met by the products and procedures when they may bear any risk for the safety of people or damage human, animal, vegetal, labor or general environment, or for the preservation of natural resources.*

Regarding the observation of the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood; paragraph V in article 2 of the LGPAS states:

*V. To seek the preferential right to access, utilization and benefits of fishery resources to indigenous communities and people ... in those places that they occupy and inhabit.*

As to providing an appropriate dispute resolution framework, there is a full scale judicial system. Sanctions by authorities to particulars for failures to comply with the law and its subsidiaries have to meet the premises in the “Ley Federal de Procedimiento Administrativo” (Federal Law of Administrative Procedure)

### **3.1.1 Trace References**

[LGPAS 2007](#), [LGEEPA 1988](#), [LFMN](#), [Federal Law of Administrative Procedures](#),

### **3.1.2**

The management system has effective consultation processes that are open to interested and affected parties. The roles and responsibilities of organizations and individuals who are involved in the management process are clear and understood by all relevant parties.

| SG 60   | SG 80   | SG 100   |
|---|---|--|
| <p>Organizations and individuals involved in the management process have been identified. Functions, roles and responsibilities are <u>generally understood</u>.</p> <p>The management system includes consultation processes that <u>obtain relevant information</u> from the main affected parties, including local knowledge, to inform the management system.</p> | <p>Organizations and individuals involved in the management process have been identified. Functions, roles and responsibilities are <u>explicitly defined and well understood</u> for <u>key areas</u> of responsibility and interaction.</p> <p>The management system includes consultation processes that <u>regularly seek and accept</u> relevant information, including local knowledge. The management system demonstrates consideration of the information obtained.</p> <p>The consultation process <u>provides opportunity</u> for all interested and affected parties to be involved.</p> | <p>Organizations and individuals involved in the management process have been identified. Functions, roles and responsibilities are <u>explicitly defined and well understood</u> for <u>all areas</u> of responsibility and interaction.</p> <p>The management system includes consultation processes that <u>regularly seek and accept</u> relevant information, including local knowledge. The management system demonstrates consideration of the information and <u>explains how it is used or not used</u>.</p> <p>The consultation process <u>provides opportunity and encouragement</u> for all interested and affected parties to be involved, and <u>facilitates</u> their effective engagement.</p> |

**Score: 85**

**3.1.2 Scoring Rationale:** Functions, rules and responsibilities are clearly and explicitly defined and well understood; consultation processes regularly accept and seek for relevant information. There is an explanation about the consideration of comments in the process of integration of NOMs and in other steps.

There is comprehensive set of instances at several levels in which matters related to fisheries and aquaculture are dealt with.

As of the writing of this report, the operating Regulations of the LGPAS corresponds to the former law as revised on 28 January 2004; since the new law was published, there was an announcement soliciting comments on the new law sent to all appropriate stakeholders and publically posted that read in part:

*Following the agreement of the Consejo Nacional de Pesca y Acuicultura [described in the following paragraphs] as of July 1<sup>st</sup>, 2009... the last version of the draft Regulation of the General Law of Sustainable Fisheries and Aquaculture is made available to the fisheries and aquaculture sector, as well as to the general public for the purpose of obtaining comments before July 10<sup>th</sup>, 2009...*

Other lower level instances of consultation are the following:

- a. The “Consejo Nacional de Pesca y Acuicultura” (CNPA, National Council for Fisheries and Aquaculture), described in Chapter II of the LGPAS, integrated the representatives of the various related branches of the federal government with social organizations, fishery and aquaculture producers as well as representatives from the appropriate branches in the state governments.

- b. For the first time, the law favors decentralization, by creating the “Consejos Estatales de Pesca y Acuicultura” (CEPA, State Councils for Fisheries and Aquaculture), that may be requested by the CNPA to offer opinions and technical issues prior to any resolution (Article 23).
- c. Scientific research is now given a relevant role; a full Título (major division of the law) is devoted to define it. Further, it considers the participation of the academia. Article 28 defines its main objectives being:
  - I. *To guide the decisions of relevant authorities, as related to conservation, protection, restoration and sustainable utilization of fisheries and aquacultural resources*
  - II. *Increase the capacity to identify, quantify, utilize, manage, transform, conserve and increment fishery and aquaculture species*
  - III. *Promote de design of new selective and environmentally safe fishing gear*
  - IV. *Establishing new evaluation procedures to determine the state of the fisheries*
  - V. *Provide knowledge to determine the conditions in which fishing and aquacultural practices should be undertaken to maintain environmental equilibrium*
  - VI. *Develop research on sanitation in fisheries and aquaculture*
  - VII. *Provide knowledge to the establishment of measures to protect overexploited species*
- d. The “Instituto Nacional de Pesca” (INAPESCA, National Fisheries Research Institute) is declared as the administrative organization of the federal government responsible for coordination and guidance of scientific and technological research for matters of fisheries and aquaculture (Article 29); some of its relevant responsibilities being:
  - I. *To undertake scientific and technological research in fisheries and aquaculture*
  - II. *Provide with technical and scientific advice for the purposes of management and conservation of fisheries and aquaculture species...*
  - V. *Integrate and update the Carta Nacional Pesquera (National Fisheries Chart) and the Carta Nacional Acuicola (National Aquacultural Chart)...*
  - XV. *Integrate the Management Plans for fisheries and aquaculture*

Particularly regarding the collaboration with other scientific and technological research institutions:

- III. *Coordinate the integration of the “Programa Nacional de Investigación Científica Tecnológica en Pesca y Acuicultura” (National Program for Scientific and Technological Research in Fisheries and Aquaculture), based on the proposals of higher education and research institutions, as well as fishery producers organizations.*
- IV. *Coordinate the integration and functioning of the Red Nacional de Información e Investigación en Pesca y Acuicultura (National Network of Information and Research in Fisheries and Aquaculture) to aid in the collaborative work and optimizing human, financial and infrastructural resources. [The Red Nacional de Información e Investigación*

en Pesca y Acuicultura (National Network of Information and Research in Fisheries and Aquaculture) was implemented on 11/24/2009].

Inter institutional cooperation in scientific and technical research is stressed further:

*Article 30. The INAPESCA will have a Scientific and Technical Assessing Committee ... with representatives from the National Network of Information and Research in Fisheries and Aquaculture.*

e. The procedures for the establishment of NOMs are explicitly defined in the law itself:

In Article 44:

*The federal government agencies are responsible for the elaboration of the first drafts of NOMs and to submit them to the Comités Consultivos Nacionales de Normalización (CCNN, National Consulting Normalization Committees). Other national normalization organisms may also submit first order drafts to the CCNNs. These will, in turn, integrate the second order drafts. They will also search for the existence of similar NOMs, in which case coordination between agencies will be mandatory. Further, they will take in account other national and international norms. The CCNNs will comment the draft within a period not longer than 75 days.*

*The originating agencies will then answer to comments and do the necessary modifications within the following 30 days. The result will then be the Project of NOM, which will be published in the Diario Oficial de la Federación (DOF, Official Federal Government Gazette). This will remain posted for public scrutiny for 60 days during which any interested party may revise the documentation that will be available with the corresponding CCNN and submit any comments or suggestions.*

*The CCNN will analyze the comments and suggestions and, in due course, will modify the project within the following 45 days. Then answers to comments and suggestions will be published in the DOF at least 15 days in advance of the final publication of the NOM.*

The CCNN for the fisheries sector is known as the Comité Consultivo Nacional de Normalización de Pesca Responsable (National Consultive Committee for the Normalization of Responsible Fisheries) and is constituted by government officials from the CONAPESCA, the Director General of Norms (Secretariat of Economy), the President of the National Chamber of the Fisheries and Aquaculture Industries, the President of the National Organization of Fisheries Cooperatives, the Chief of Staff of the Navy, the Director General and other officials of Merchant Shipping (Secretariat of Communications and Transportation), representatives from the Secretariat of Public Health and Secretariat of Tourism; the Director of the Institute of Marine Sciences of the National Autonomous University of Mexico, a representative from the National Waters Commission, the Undersecretary of the Secretariat of the Environment and Natural Resources, the regional Directors of INAPESCA, the Director General of the *Procuraduría de la Defensa del Ambiente* (Attorney for the Defense of Environment), representatives from the net manufacturing industry, marine equipment and cables industry, as well as the Director of INAPESCA and the Colegio de Profesionales de la Pesca (Association of Fisheries Professionals).

### **3.1.2 Trace References**

[Reglamento de la Ley Pesca 2004](#), [Draft Regulation of the General Law on Fisheries and Aquaculture Sustainable](#), [Red Nacional de Información e Investigación en Pesca y Acuicultura](#)

### **3.1.3**

The management policy has clear long-term objectives to guide decision-making that are consistent with MSC Principles and Criteria, and incorporates the precautionary approach.

| SG 60  | SG 80   | SG 100  |
|--|---|---|
| Long-term objectives to guide decision-making, consistent with MSC Principles and Criteria and the precautionary approach, are <u>implicit</u> within management policy. | <u>Clear</u> long-term objectives that guide decision-making, consistent with MSC Principles and Criteria and the precautionary approach, are <u>explicit</u> within management policy. | <u>Clear</u> long-term objectives that guide decision-making, consistent with MSC Principles and Criteria and the precautionary approach, are <u>explicit</u> within <u>and required by</u> management policy |

**Score: 100**

**3.1.3 Scoring Rationale:** The major law, LGPAS, defines as one of its prime objectives:

*III. Establishing the basis for the ordination, conservation, protection, repopulation y sustainable utilization of fisheries and aquaculture resources, as well as the protection and rehabilitation of those ecosystems in which these resources are.*

Further, Mexico is a signatory of the FAO Code of Conduct for Responsible Fisheries and compliance with its principles is embedded in the Plan Sectorial (SAGARPA 2003). The draft management plan for the fishery incorporates these principles:

*“The Fisheries Management Plan follows the precepts of Article 27 of the Political Constitution of the United Mexican States, the General Law for Sustainable Fisheries and Aquaculture and other subsidiary laws and regulations. It is further a management plan with precautionary approach, agreeing with the Code of Responsible Fisheries, of which Mexico is signatory, and is coherent with the objectives of the Sector Plan for 2001-2006.”*

**3.1.3 Trace References**

[LGPAS 2007](#), [FAO Code of Conduct for Responsible Fisheries](#), [SAGARPA 2003](#),

**3.1.4**

The management system provides economic and social incentives for sustainable fishing and does not operate with subsidies that contribute to unsustainable fishing.

| SG 60  | SG 80   | SG 100  |
|--|---|---|
| The management system provides for incentives that are consistent with achieving the outcomes expressed by MSC Principles 1 and 2. | The management system provides for incentives that are consistent with achieving the outcomes expressed by MSC Principles 1 and 2, and seeks to ensure that negative incentives do not arise. | The management system provides for incentives that are consistent with achieving the outcomes expressed by MSC Principles 1 and 2, and <u>explicitly considers</u> incentives in a <u>regular review</u> of management policy or procedures to ensure that they do not contribute to unsustainable fishing practices. |

**Score: 85**

**3.1.4 Scoring Rationale:** There is hard evidence of formal provisions for either economic or social incentives in some instances, such as the case of the fishery for gulf croaker in the northern Gulf of California. None applies specifically to the sardine fishery. There are no subsidies except for the widespread subsidy to fuel for primary level producers, i.e. agriculture and fisheries.

There is a “*Programa de Uso Sustentable de Recursos Naturales para la Producción Primaria*” (Program for the sustainable utilization of natural resources for primary production) that includes,

*Strategic projects by fishery resource...and fisheries ordination for the sustainable utilization of fisheries, fishing resources...may be regional, state wide or municipal...*

One example of such programs is the “*Substitution of fishing gear as a strategy to implement NOM-063-PESC-2005, Responsible fishing of gulf croaker (Cynoscion othonopterus) at the northern gulf of California and the Colorado River delta*”, in which CONAPESCA financed a specific study on gill net selectivity to an outside consultant, developed a training program for fishers and financed the purchasing of nets for them.

**3.1.4 Trace References**

[NOM-063-PESC-2005](http://www.sagarpa.gob.mx/programas/Documents/RO_2011.pdf), Program for the sustainable utilization of natural resources for primary production (2009): [http://www.sagarpa.gob.mx/programas/Documents/RO\\_2011.pdf](http://www.sagarpa.gob.mx/programas/Documents/RO_2011.pdf)

|   |   |  |
|---|---|--|
| <b>3.2.1</b>  |   |  |
| The fishery has clear, specific objectives designed to achieve the outcomes expressed by MSC’s Principles 1 and 2.  |   |  |
| <b>SG 60</b>  | <b>SG 80</b>  | <b>SG 100</b>  |
| <u>Objectives</u> , which are broadly consistent with achieving the outcomes expressed by MSC’s Principles 1 and 2, are <u>implicit</u> within the fishery management system. | <u>Short and long term objectives</u> , which are consistent with achieving the outcomes expressed by MSC’s Principles 1 and 2, are <u>explicit</u> within the fishery management system. | <u>Well defined and measurable short and long term objectives</u> , which are demonstrably consistent with achieving the outcomes expressed by MSC’s Principles 1 and 2, are <u>explicit</u> within the fishery management system. |

**Score: 75**

**3.2.1 Scoring Rationale:** Although the formal documents related to the specific management of the sardine fishery do recognize the precautionary principles and consider objectives that are in line with MSC’s Principle 1, they do not include sufficient consideration of control regarding MSC’s Principle 2. Consideration of Principle 2 is given explicitly in the draft Sardine Fishery Management Plan, which is at the integration stage.

The NOM-003-PESC-1993 states the main objectives of the fishery management system:

*0.1 The behavior of fisheries based on the utilization of sardine, anchovy and mackerel species in the Mexican Pacific reveal the need for establishing regulations to order such activities with the objectives of warranting the conservation, preservation and rational utilization of these resources.*

Although there are no specific objectives declared particularly on sardine fisheries in it, the Carta Pesquera (2004) states:

*Management of aquatic flora and fauna is being forced from the purely sector approach to a fisheries policy with an integral one, based on the principles of responsible fisheries ... the management of aquatic resources demands the joint participation of officials and fishers, ecological ordering, conservation and environmental legislation...*

The specific Management Plan for the sardine fishery (Nevárez-Martínez et al (in revision), is at the final draft stage, considers the following objectives:

*To conserve the stocks at sustainable level, by controlling fishing effort ... including the number and kind of fishing boats, as well as the characteristics of the nets...*

Particularly, among other aspects it considers:

- *Limiting the total fishing capacity, restricting the number of permits for fishing,*
- *Defining the permissible amount of equipment,*
- *Monitoring the fishery with detail enough to decide on appropriate alternatives, making the necessary adjustments to management strategies. This includes the identification and utilization of biological limits and reference points for the main species*
- *Protecting spawning and early growth areas*

The precautionary approach is further dealt with in the reference points chapter of the PMPS, which states:

- *Optimal yield (RO) is defined as the amount of fishes that provides the maximum benefit for the country, particularly with regard to production of food and generation of employment, taking in account the protection of the marine ecosystem, and is determined on the basis of the maximum sustainable yield (RMS).*
- *In the case of small pelagic fishes, RO will be a catch level equal or lower that the biologically acceptable catch (CBA) ... which is a precautionary catch level (25% of the estimated biomass) ... in particular, RO should be less than CBA ... the main focus being the biomass rather than catch, since these resources are very important for the pelagic ecosystem.*

**Condition 3.2.1:**

By the 2<sup>nd</sup> annual surveillance audit evidence should be provided, that the short and long term objectives are explicit within the fishery`s management system and consistent with achieving the outcomes expressed by MSC`s Principles 1 and 2. Therefore the specific Management Plan for the fishery shall be completed and shall include proper and formal consideration of the role of the resource on the maintenance of the ecosystem and these considerations shall be incorporated into the harvest control rules.

**3.2.1 Trace References**

Carta Pesquera (2004), Nevárez-Martínez et al. (in revision), NOM-003-PESC-1993

**3.2.2**

The fishery-specific management system includes effective decision-making processes that result in measures and strategies to achieve the objectives.

**SG 60**

**SG 80**

**SG 100**

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| <p>There are <u>informal</u> decision-making processes that result in measures and strategies to achieve the fishery-specific objectives.</p> <p>Decision-making processes respond to <u>serious issues</u> identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take <u>some</u> account of the wider implications of decisions.</p> | <p>There are <u>established</u> decision-making processes that result in measures and strategies to achieve the fishery-specific objectives.</p> <p>Decision-making processes respond to <u>serious and other important issues</u> identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take account of the wider implications of decisions.</p> <p>Decision-making processes use the precautionary approach and are based on best available information. <u>Explanations</u> are provided for any actions or lack of action associated with findings and relevant recommendations emerging from research, monitoring, evaluation and review activity.</p> | <p>There are <u>established</u> decision-making processes that result in measures and strategies to achieve the fishery-specific objectives.</p> <p>Decision-making processes respond to <u>all issues</u> identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take account of the wider implications of decisions.</p> <p>Decision-making processes use the precautionary approach and are based on best available information.</p> <p><u>Formal reporting</u> to all interested stakeholders describes how the management system responded to findings and relevant recommendations emerging from research, monitoring, evaluation and review activity.</p> |
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**Score: 85**

**3.2.2 Scoring Rationale:** The decision-making process incorporates interchange of scientific information and collaboration in research. Since 1993, there has been an annual meeting of the Comité Técnico de Pelágicos Menores (Technical committee on small pelagics), that brings together management officials, INAPESCA researchers, members of the academia in the northwest (research centers, universities, etc.) and representatives of the industry. A book of abstracts is published annually and widely distributed. Since 1990 sampling cruises have been made at several times during each year, mostly financed by the industry but also by the state of Sonora government; a report is written and circulated to the industry and government officials. Further meetings take place to jointly agree on particular measures (Cisneros-Mata, et al. 1999)

**3.2.2 Trace References**

Cisneros-Mata, et al. (1999)

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| <p><b>3.2.3</b></p>  |  |  |
| <p>Monitoring, control and surveillance mechanisms ensure the fishery’s management measures are enforced and complied with.</p>  |  |  |
| <p><b>SG 60</b></p>  | <p><b>SG 80</b></p>  | <p><b>SG 100</b></p>   |
| <p>Monitoring, control and surveillance <u>mechanisms</u> exist, are implemented in the fishery under assessment and there is a reasonable expectation that they are</p> | <p>A monitoring, control and surveillance <u>system</u> has been implemented in the fishery under assessment and has demonstrated an ability to enforce relevant management measures, strategies</p> | <p>A <u>comprehensive</u> monitoring, control and surveillance system has been implemented in the fishery under assessment and has demonstrated a consistent ability to enforce relevant management measures, strategies</p> |



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| <p>effective.</p> <p>Sanctions to deal with non-compliance exist and there is some evidence that they are applied.</p> <p>Fishers are <u>generally thought</u> to comply with the management system for the fishery under assessment, including, when required, providing information of importance to the effective management of the fishery.</p> | <p>and/or rules.</p> <p>Sanctions to deal with non-compliance exist, <u>are consistently applied</u> and thought to provide effective deterrence.</p> <p><u>Some evidence exists</u> to demonstrate fishers comply with the management system under assessment, including, when required, providing information of importance to the effective management of the fishery.</p> <p>There is no evidence of systematic non-compliance.</p> | <p>and/or rules.</p> <p>Sanctions to deal with non-compliance exist, are consistently applied and <u>demonstrably provide</u> effective deterrence.</p> <p>There is a <u>high degree of confidence</u> that fishers comply with the management system under assessment, including, providing information of importance to the effective management of the fishery.</p> <p>There is no evidence of systematic non-compliance.</p> |
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**Score: 80**

**3.2.3 Scoring Rationale:** There is effective monitoring of each fishing boat’s position at all times through a compulsory satellite detection system (<http://200.94.129.210/Default.aspx>), and subject to sanctions.

Each and every landing operation is sampled by technical personnel from the Centro Regional de Investigación Pesquera (CRIP, Regional Center for Fisheries Research, a branch of INAPESCA).

Personnel from CONAPESCA, formally identified, perform regular and frequent inspection visits to fish processing plants and boats to assert that all norms and precepts of the regulation are fully complied with.

There is no evidence of systematic non-compliance.

**3.2.3 Trace References**

<http://200.94.129.210/Default.aspx>

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| <b>3.2.4</b>  |   |   |
| The fishery has a research plan that addresses the information needs of management.   |   |   |
| <b>SG 60</b>  | <b>SG 80</b>  | <b>SG 100</b>   |
| <p><u>Research is</u> undertaken, as required, to achieve the objectives consistent with MSC’s Principles 1 and 2. Research results are <u>available</u> to interested parties.</p> | <p>A <u>research plan</u> provides the management system with a strategic approach to research and <u>reliable and timely information</u> sufficient to achieve the objectives consistent with MSC’s Principles 1 and 2. Research results are <u>disseminated</u> to all interested parties in a <u>timely</u> fashion.</p> | <p>A <u>comprehensive research plan</u> provides the management system with a coherent and strategic approach to research across P1, P2 and P3, and <u>reliable and timely information</u> sufficient to achieve the objectives consistent with MSC’s Principles 1 and 2. Research <u>plan</u> and results are <u>disseminated</u> to all interested parties in a <u>timely</u> fashion and are <u>widely and publicly available</u>.</p> |

**Score: 70**

**3.2.4 Scoring Rationale:** There is a long term specific research plan by INAPESCA, yearly programs are submitted by the Guaymas CRIP. This programs focus on the sardine populations and fishery. There is no specific plan as yet to look at the impacts of the fishery on the ecosystem.

However, research on the ecosystem is regularly undertaken by many of the research centers and universities in the area. **Table** in Appendix III lists the research expenditures of CRIP from 2005-2009.

**Condition 3.2.4:**

By the 1<sup>st</sup> annual surveillance audit, evidence shall be provided to the CB that information from the fishery (including data, analysis and minutes from the technical bodies) have been disseminated in a timely fashion to all interested parties. In addition, a research plan shall be made available to the public that includes a strategic approach to research and reliable information that is sufficient to achieve the objectives consistent with MSC’s Principles 1 and 2.

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| <b>3.2.5</b>   |  |   |
| There is a system for monitoring and evaluating the performance of the fishery-specific management system against its objectives.<br>There is effective and timely review of the fishery-specific management system. |  |   |
| <b>SG 60</b>   | <b>SG 80</b>   | <b>SG 100</b>   |
| The fishery has in place mechanisms to evaluate <u>some</u> parts of the management system and is subject to <u>occasional internal</u> review.  | The fishery has in place mechanisms to evaluate <u>key</u> parts of the management system and is subject to <u>regular internal</u> and <u>occasional external</u> review. | The fishery has in place mechanisms to evaluate <u>all</u> parts of the management system and is subject to <u>regular internal</u> and <u>external</u> review. |

**Score: 85**

**3.2.5 Scoring Rationale:** There is internal review of the management system at various levels, including the INAPESCA and CONAPESCA internal reviews. Further, the INAPESCA itself was reviewed by FAO in 2005 (Csirke et al, 2005)

**3.2.5 Trace References**

Csirke et al. (2005)

## 12. ACTION PLAN FOR MEETING CONDITIONS

The Client for this fishery assessment and certification has submitted an Action Plan for meeting all conditions and requirements under the MSC program.

### ACTION PLAN FOR MEETING THE CONDITIONS FOR CONTINUED CERTIFICATION Guaymas Sonora February 2011

| <b>Action Plan 1.2.4</b>   |  |  |  |
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| Conditional Requirement  | How to Meet  | By Whom  | When Completed   |
| By the second surveillance the client should provide evidence that fishery – independent data has been collected. In addition, the client should provide some proof by the fourth surveillance audit, that this data has been incorporated into the stock assessment of the sardine fishery in addition to fishery-dependent data. | Fishery-independent data of stock size, using hydro-acoustic measurements, has already been collected during the last three research cruises. The plan is to continue collecting fishery-independent data twice annually. These data will be used for fisheries management because it will be used for tuning the stock assessment analysis, which today use fishery-dependent data. Preliminary results for the biomass of sardine, obtained by hydroacoustic methods for the last three years were very similar to estimates obtained from virtual population analysis. In addition, the evaluation model will also include environmental indices. At the second surveillance audit this data will be presented to the CB. | Sardine fishery scientist (Manuel Nevárez, INAPESCA) | At the second surveillance audit in 2012, this data will be presented to the CB.<br>By the fourth surveillance audit in 2014, proof will be provided that this data has been incorporated into the stock assessment. This data will be used to establish harvesting rules. |

| <b>Action Plan 2.1.1</b>  |  |  |   |
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| Conditional Requirement   | How to Meet  | By Whom                                      | When Completed  |
| By the third annual surveillance provide evidence to the CB that the main retained species ( <i>Opisthonema</i> spp. and <i>Cetengraulis mysticetus</i> ) are highly likely to be within biologically based limits, or if outside the limits there is a partial strategy of demonstrably effective management | Annual Projects at INAPESCA have the objective, amongst others, to determine the effect of the fisheries on small pelagic populations, for which systematic biological sampling is conducted, and gathering of catch and fishing effort data. This information will make the stock assessment individually for the main small pelagic species. This will provide the fishing mortality estimates specific to each size | Instituto Nacional de Pesca, Manuel Nevárez. | By the third surveillance audit, we will provide evidence to the CB (in an annual research report) that the main retained species are highly likely to be within biologically based limits, or if are |

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| <p>measures in place such that the fishery does not hinder recovery and rebuilding.</p> | <p>(Fsize), average fishing mortality (Fa) and abundance of size (Nsize). In addition, changes in future fish yields (Y) and average biomass of populations for the main small pelagic species that are retained as part of this fishery, will be explored individually with a predictive model, which will allow us to estimate the maximum sustainable yield (MSY), and mortality associated with that fishery yield (F<sub>MSY</sub>). These results will be presented in an annual research report.</p> <p>The Fisheries Management Plan (FMP) for small pelagic fish, which is currently being developed, defined control rules for all species included in the FMP, including <i>Opisthonema</i> spp. and <i>Cetengraulis mysticetus</i>. It also includes emerging management actions, which are the management actions we can take, if one or more reference points are reached or exceeded. Any management option that we consider will aim to maintain (or return) the fishery resource and non-critical (sustainable).</p> |  | <p>outside the limits there are a partial strategy of demonstrably effective management measures in place, such that the fishery does not hinder recovery and rebuilding.</p> |
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| <b>Action Plan 2.2.2</b>  |  |                 |  |
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| Conditional Requirement   | How to Meet  | By Whom         | When Completed   |
| <p>By the third surveillance audit, provide some evidence that main bycatch species are highly likely to be within biologically based limits, or if outside such limits develop a partial strategy of demonstrably effective mitigation measures and provide some evidence to the CB that the strategy has been implemented successfully.</p> | <p>The study mentioned 2.2.3 will provide baseline data on bycatch species of the Gulf of California Sardine Fishery. Once the composition and biomass of bycatch species are known (by the second surveillance audit) we will have a very good idea as to the steps taken as to determine if they are within biological limit or if not to take the necessary mitigation measures.</p> <p>In others words, there should be sufficient information as to take the necessary steps to mitigate the effect of the fishery on other species, or if necessary to do more research to satisfy the CB and achieve the required score for this indicator.</p> | <p>INAPESCA</p> | <p>By the third surveillance audit, will be provided some evidence, to the CB, that main bycatch species are highly likely to be within biologically based limits, or if outside such limits develop a partial strategy of demonstrably effective mitigation measures will be presented to the CB.</p> |

**Action Plan 2.2.3**

| Conditional Requirement   | How to Meet   | By Whom  | When Completed   |
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| <p>By the second surveillance audit, establish a scientifically defensible and comprehensive monitoring and reporting system for bycatch of the Gulf of California Sardine fishery. For example, this could be accomplished by implementing an observer program to cover a proportion of the fisheries vessels, or by development of electronic monitoring such as video capture to record and identify bycatch, if that can be shown to be suitably effective.</p> | <p>We have planned two programs:</p> <p>1) the first one a study that will be conducted by the post graduate student Sergio Macias, at CIBNOR La Paz Mexico, and will provide a base line and estimates on composition and biomass of bycatch species caught in the sardine fishery. According to the work plan raised the fishing trips will be performed three times during the fishing season (July, November/December, February/March), and the trips will last from one to one and a half weeks. The bycatch species will be collected, photographed and identified.</p> <p>2) The second is an observer program that will be implemented from October of 2010, for one year, and will be done by three technical staff working full time. These technicians will be working onboard of the sardine fishery vessels, and at fishing landing sites. During these activities data of bycatch species will be obtained and interactions between the fishery and endangered, threatened and protected (ETP) species will be monitored and recorded. The work will continue if more information is required.</p> <p>This program will be important part of INAPESCA effort to gather sufficient information about the bycatch species and of the interaction with the ETP species, to further understand, identify and develop management measures oriented to mitigate potential issues of the bycatch and about the ecosystem issues. The results will be presented to the CB on the second surveillance.</p> | <p>Industry, Cámara Nacional de la Industria Pesquera</p> <p>Instituto Nacional de Pesca.<br/>Supervised by Manuel Nevarez, INAPESCA</p> | <p>At the second surveillance audit, this data will be presented to the CB.</p> <p>There will be sufficient information to take the necessary steps to treat in an informed way the bycatch situation.</p> |

| <b>Action Plan 2.5.2</b>  |   |   |   |
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| Conditional Requirement   | How Meet  | By Whom   | When Completed  |
| By the 3 <sup>rd</sup> annual surveillance audit, develop a strategy to restrain impacts of the Sardine fishery on the Gulf of California ecosystem and provide evidence to the CB that the strategy has been implemented successfully. | <p>Because the fishery is highly unlikely to disrupt the key elements underlying ecosystem structure and function, no strategy has been in place to restrain impacts of the fishery on the ecosystem. However, in the Fishery Management Plan (FMP), that is currently being developed, proper and formal consideration of the role of the resource on the maintenance of the ecosystem, particularly as food for other species shall be included. It also includes research requirements for determining ecosystem interactions with the aim of reducing fishery impacts. So from the FMP be developed and implemented the strategy for reducing the impacts of fishing on the ecosystem.</p> <p>We know that the INAPESCA in conjunction with other academic institutions have plans to develop ecosystem models for fisheries management, but we have no information about their status.</p> | Instituto Nacional de Pesca,<br>Manuel Nevárez. | By the third surveillance audit, we will provide some evidence, to the CB, that the strategy has been implemented successfully. |

| <b>Action Plan 3.2.1</b>  |   |   |   |
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| Conditional Requirement   | How Meet  | By Whom   | When Completed                                |
| By the 2 <sup>nd</sup> annual surveillance audit evidence should be provided, that the short and long term objectives are explicit within the fishery's management system and consistent with achieving the outcomes expressed by MSC's Principles 1 and 2. Therefore the specific Management Plan for the fishery shall be completed and shall include proper and formal consideration of the role of the resource on the maintenance of | <p>A comprehensive Fishery Management Plan (FMP) is in its final draft stages as of June 2010 and shall be adopted by the second annual surveillance. The FMP is designed to cover most of the requirements stated in the condition.</p> <p>There are two additional regulatory instruments used to control guidelines and management decisions about fisheries in Mexico. These are 1) the Carta Nacional Pesquera which by law is to be updated every two years, and 2) NOM-003-PESC-1993, currently under revision. These instruments will collectively determine fishing methods, gear types, open/closed fishing areas, TAC's, size, ecosystem provisions etc.</p> <p>The comision Federal de Mejora Regulatoria (COFEMER) is a government body engaged in advisory oversight and advocacy functions</p> | <p>Instituto Nacional de Pesca.</p> <p>Comisión Nacional de Acuacultura y Pesca (CONAPESCA)</p> <p>They are responsible for its publication</p> | We expect this to be published by 2012 -2013. |



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| <p>the ecosystem and these considerations shall be incorporated into the harvest control rules.</p> | <p>on regulatory reform matters with the objective to promote transparency in the design and implementation of regulations. The FMP will be put on COFEMER website for ample consultation by any interested party.<br/>The Instituto Nacional de Pesca (INAPESCA) whose decisions on fishery management are final holds yearly workshops for coordination of research by the various institutions involved in fishery research.</p> |  |  |
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| <b>Action plan 3.2.4.</b>  |  |   |   |
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| Conditional Requirement  | How Meet   | By Whom   | When Completed  |
| <p>By the first surveillance audit, evidence should be provided to the CB that information from the fishery, including, data, analisis and minutes from the technical bodies, have been disseminated in a timely fashion to all interested parties. In addition, a research plan should be made available to the public that includes a strategic approach to research and reliable information that is sufficient to achive the objectives consistent with MSC's Principle 1 and 2.</p> | <p>By the first surveillance audit evidence will be provided that the specific INAPESCA webpage was set up to facilitate access to all of the information regarding de Gulf of California Pelagic Fishery and its management, and that it will be updated on a regular basis. This will include a draft of the master research plan for the pelagic fishery that will be made available for consultation by interested parties, this will happen when the INAPESCA has the final draft. Also, the minutes of the quarterly meetings between fisheries and the industry, will be made available when updated information on effort is submitted by researchers from the INAPESCA. These meetings are used to make decisions on the maintainance and status of the fishery.<br/>In May of this year INAPESCA created a new organization, the RED NACIONAL DE INFORMACION E INVESTIGACION EN PESCA Y ACUACULTURA (RNIIPA) that will be responsible for centralizing information on research in Fisheries and Acuaculture in Mexico in order to have more readily information to all interested parties. RNIIPA will also facilitate procurement of research funding and establish research priorities with the objective of sustainability of marine resources.</p> | <p>Instituto Nacional de Pesca,<br/>Manuel Nevárez<br/><br/>Cámara Nacional de la Pesca y acuacultura, Delegación Sonora,<br/>Leon Tissot</p> | <p>At the first surveillance audit, evidence will be presented to the CB that information from the fishery, including, data, analisis and minutes from the technical bodies, have been disseminated in a timely fashion to all interested parties. When completed all the information will be available at the INAPESCA web site. But at this site only the information about the sardine in the Gulf of California will be posted, other information must be consulted at the RNIIPA web site.</p> |

**Action plan 3.2.4.**

| Conditional Requirement   | How Meet   | By Whom   | When Completed  |
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| <p>By the 1<sup>st</sup> annual surveillance audit, evidence shall be provided to the CB that information from the fishery (including data, analysis and minutes from the technical bodies) have been disseminated in a timely fashion to all interested parties. In addition, a research plan shall be made available to the public that includes a strategic approach to research and reliable information that is sufficient to achieve the objectives consistent with MSC's Principles 1 and 2.</p> | <p>By the first surveillance audit evidence will be provided that the specific INAPESCA webpage was set up to facilitate access to all of the information regarding de Gulf of California Pelagic Fishery and its management, and that it will be updated on a regular basis. This will include a draft of the master research plan for the pelagic fishery that will be made available for consultation by interested parties, this will happen when the INAPESCA has the final draft. Also, the minutes of the quarterly meetings between fisheries and the industry, will be made available when updated information on catch and effort is submitted by researchers from the INAPESCA. These meetings are used to make decisions on the maintainance and status of the fishery. In May of this year INAPESCA created a new organization, the RED NACIONAL DE INFORMACION E INVESTIGACION EN PESCA Y ACUACULTURA (RNIIPA) that will be responsible for centralizing information on research in Fisheries and Acuaculture in Mexico in order to have more readily information to all interested parties. RNIIPA will also facilitate procurement of research funding and establish research priorities with the objective of sustainability of marine resources.</p> | <p>Instituto Nacional de Pesca,<br/>Manuel Nevárez</p> <p>Cámara Nacional de la Pesca y acuacultura,<br/>Delegación Sonora,<br/>Leon Tissot</p> | <p>At the first surveillance audit in 2011, evidence will be presented to the CB that information from the fishery, including, data, analysis and minutes from the technical bodies, have been disseminated in a timely fashion to all interested parties. When completed all the information will be available at the INAPESCA web site. But at this site only the information about the sardine in the Gulf of California will be posted, other information must be consulted at the RNIIPA web site.</p> |



### **13. PEER REVIEW, PUBLIC COMMENT AND OBJECTIONS**

A peer review has been conducted by two peer reviewers. Their comments and the response to the comments by the team can be found in Appendix IV. As required, scientists nominated as peer reviewers for this report were posted on the MSC web site for stakeholder comment. Also, a public comment period was held, as well as a posting period for objections as required by the MSC.

### **14. MSC LOGO LICENSING RESPONSIBILITIES**

As the “applicant” for certification of the fishery, Camara Nacional de la Industria Pesquera, Delegacion Sonora is the only entity that has the right to apply for a license to use the MSC logo. It is also the case that Camara Nacional de la Industria Pesquera, Delegacion Sonora has the right to approve the use of the logo for other quota holders in the fishery at its discretion and by a means that is considered fair and equitable (based on MSC requirements). The MSC as the logo license owner has the sole right and responsibility to review and enforce its requirements with regard to the fair and equitable sharing of access to the fishery certificate. SCS as the certification body does not have any obligations to review, approve, or enforce the MSC requirements in this regard.

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Note: Some of these references that support the scores and are not in the public domain can be found at:  
<http://www.inapesca.gob.mx/portal/component/content/article/21-foros-y-eventos/71-pesqueria-pelagicos>

**APPENDIX I – LIST OF VESSEL NAMES AND PERMIT NUMBERS INCLUDED IN THE UNIT OF CERTIFICATION**



**Cámara Nacional de la Industria Pesquera**

**Canainpesca**

**DELEGACION SONORA**

LIST OF VESSELS THAT ARE COVERED UNDER THE UNIT OF CERTIFICATION

| OWNER  | BOAT NAME           | PERMIT No.  | CONCESION 20 YEAR |
|--|---------------------|-------------|-------------------|
| *PESQUERA SANTA MONICA S.A. DE C.V.                  | B.M SARDINA VI      | 12604779334 |                   |
|  | B.M PROPEMEX PM 2-S | 12604779351 |                   |
| *HERNANDEZ Y PTANIK SA DE CV                         | BM DON ISAAC        | 10203079307 |                   |
| *PESQUERA PROESA S.A. DE C.V.                        | BM PROESA I         | 10203079308 |                   |
| PESQUERA SIGLO S.A. DE C.V.                          | COZAR III           | 12604779355 |                   |
|  | CHUYITO XXX         | 12604779357 |                   |
|  | COZAR XI            | 12604779356 |                   |
|  | KORE                | 12604779002 |                   |
|  | JUAN PABLO I        | 12604779377 |                   |
|  | MANOLO              | 12604779325 |                   |
| PESQUERA COSTA ROCA S.A. DE C.V.                     | PESCADOR II         | 12604779358 |                   |
|  | NENE CONDE          | 12604779363 |                   |
|  | LAZARO CARDENAS III | 12604779322 |                   |
|  | SANDOKAN            | 12609679314 |                   |
|  | SALGARI             | 10203079320 |                   |
|  | DELTA YAQUI         | 12604779337 |                   |
|  | PROPEMEX DP-1S      | 10203004520 |                   |
|  | BAKATETE            | 12604779360 |                   |
| *JULIO R. LUEBBERT DUARTE                            | SELECTA             | 12604779361 |                   |
|  | SELECTA I           |             | CP-409/2000       |
|  | SELECTA II          | 12604779332 |                   |
|  | SELECTA III         | 12604779328 |                   |
| *SELECTA DE GUAYMAS S.A. DE C.V.                     | PP-1-S              |             | CP-296/2000       |
|  | SELECTA V           | 12604779001 |                   |
|  | PP-2-S              |             | CP-292/2000       |
| NAVIERA Y PESQUERA DEL PACIFICO S.A. DE C.V.         | SARDINA IX          |             | CP-293/2000       |
|  | PESCADOR IV         | 12609679311 |                   |
|  | PESCADOR V          | 12647793012 |                   |
| INDUSTRIAS BARDA S.A. DE C.V.                        | DON ELIAS           | 10305379301 |                   |
|  | BARDA I             | 12604779366 |                   |
|  | BARDA III           | 12604779319 |                   |
|  | ISLA DE CEDROS      | 12604779320 |                   |
| *PESCA E INDUSTRIALIZACION DEL PACIFICO S.A. DE C.V. | ZENIT II            | 12609679315 |                   |
|  | ADMIRALTY           | 12604779329 |                   |
|  | PROPEMEX T3S        | 12604779364 |                   |
| *PESQUERA CABRALES S.A. DE C.V.                      | AZTECA              | 10203079316 |                   |

## APPENDIX II - ETP AND UNLISTED SPECIES THAT CONSUME SMALL PELAGIC FISH IN THE GULF OF CALIFORNIA

**Table 4:** List of species that consume small pelagic fish within certain areas of the Gulf of California: southern (S), northern (N), central (C), eastern (E), western (w). ETP listings: CITES - Convention on International Trade in Endangered Species of Wild Fauna and Flora (the searchable database can be found [here](#)); NOM (NOM -059-SEMARNAT-2001); IUCN (International Union for Conservation of Nature) [Red List](#). IRR -Index of relative importance.

| Species   | ETP listing |                              | Periode of investigation | Prey species   | %                 | Observation  | Study   |          |
|---|-------------|------------------------------|--------------------------|--|-------------------|--|---|----------|
| <b>Cephalopods</b>                                |             |                              |                          |  |                   |  |   |          |
| Giant Squid ( <i>Dosidicus gigas</i> )            | CS          | -                            | 1995-2000                |  |                   | Anchovetas and sardines are not important in their diet, no changes are observable during El Niño            | Markaida et al., 2003<br>Markaida, U., 2006                         |          |
| <b>Elasmobranchia (Sharks)</b>                    |             |                              |                          |  |                   |  |   |          |
| <i>Sphyrna lewini</i>                             | SE          | IUCN (endangered)            | 2000-2004                | <i>S. caeruleus</i>  | 0.31              | IRR  | Torres-Rojas, 2006<br>Torres-Rojas <i>et al.</i> , 2006             |          |
| Juvenile <i>Sphyrna lewini</i>                    |             |                              | 2001-2002                | <i>S. caeruleus</i>  | 2.52              | IRR  | Aguilar castro, 2003  |          |
| Juvenil <i>Sphyrna lewini</i>                     | S           |                              | El Niño 1997-98          | <i>O. libertate</i>  | 5.9               | % in peso  | Torres-Huerta, 2004   |          |
| <i>Sphyrna zigaena</i>                            | SW          |                              | 2000-2004                | <i>S. caeruleus</i>  | 2.96              | IRR  | Ochoa- Díaz, 2006   |          |
| <i>Rhizoprionodon longurio</i>                    | S           |                              | 2003-2004                | <i>Opisthopterus. dovii</i>  | 24.1              | IRR  | Conde-Moreno *  |          |
| <i>Squatina californica</i>                       | S           |                              | 2000-2003                | <i>S. caeruleus</i><br><i>Etrumeus teres</i>                         | 0.03<br>4.23      | IRR  | Escobar S. 2004<br>S. <i>et al.</i> , 2006                          | Escobar  |
| Cazones ( <i>Mustelus sp.</i> )                   | N           |                              | 2002                     | <i>Cetengraulis mysticetus</i>                                       | 1.7               | IRR  | Mendez-Loesa, 2004  |          |
| <b>Fish</b>                                       |             |                              |                          |  |                   |  |   |          |
| Yellow snapper ( <i>Lutjanus argentiventris</i> ) | SW          | -                            | 2003                     | <i>Harengula thrissina</i>   | 23.7              | IRR  | Vázquez-Sánchez, 2005   |          |
| Sailfish ( <i>Istiophorus platypterus</i> )       | SE          | -                            | 2002-2003                | <i>S. caeruleus</i><br><i>Ophistonema sp.</i><br><i>O. libertate</i> | 0.01<br>3<br>0.41 | IRR  | Arizmendi R. 2004, Arizmendi R. <i>et al.</i> , 2006                |          |
| Mahi-mahi ( <i>Corhyphaena hippurus</i> )         | S           | -                            | 1990-1991                | <i>S. caeruleus</i>  | 0.2               | IRR  | Aguilar-Palomino, 1993<br>Aguilar-P. <i>et al.</i> , 1998           | Aguilar- |
| Mahi-mahi ( <i>Corhyphaena hippurus</i> )         | S           | -                            | 2000-2003                | <i>S. caeruleus</i><br><i>Ophistonema spp.</i>                       | 0.04<br>0.03      | IRR  | Tripp-Valdez, 2005  |          |
| Striped marlin ( <i>Tetrapturus audax</i> )       | SW          | -                            | 1988-1989                | <i>S. sagax, O. libertate</i>  | 23.17<br>0.24     | IRR  | Abitia-Cárdenas, 1992   |          |
| Blue marlin azul ( <i>Makaira mazara</i> )        | SW          | -                            | 1988-1989                | <i>S. sagax</i>  | 0.14              | IRR  | Abitia-Cárdenas, 1992   |          |
| <b>Marine mammals</b>                             |             |                              |                          |  |                   |  |   |          |
| Sea lion ( <i>Zalophus californianus</i> )        | SW          | NOM, IUCN (least concerned)  | 1980-1994                |  |                   |  | Aurioles <i>et al.</i> , 2003                                       |          |
| <i>Z. californianus</i>                           | N           |                              | 1995-1996                | <i>S. caeruleus</i>  |                   |  | García R. 1999<br>García & Aurioles 2004<br>Aurioles & Garcia, 1999 |          |
| <i>Z. californianus</i>                           |             |                              |                          |  |                   | Fluctuation sea lions and sardines<br>Out of 13 colonies 2 (at Gdes Islands) are important<br>Feeds on krill | Porras-Peter, 2004<br>Busquets-Vass, 2008                           |          |
| <i>Zalophus californianus</i>                     |             |                              | 2002                     | <i>S. sagax</i>  |                   |  |   |          |
| Blue whale ( <i>Balaenoptera musculus</i> )       |             | NOM, CITES, IUCN(endangered) |                          |  |                   |  |   |          |
| Bryde's whale ( <i>B. edeni</i> )                 | SW          | NOM, CITES (lower risk)      | 1988-1995                |  |                   | They feed on sardines  | Urbán & Flores, 1996  |          |
| Bryde's whale ( <i>B. edeni</i> )                 | SW          |                              | 1988-2006                |  |                   | Significant relationship presence of the species and sardines  | Salvadeo <i>et al.</i> , 2007                                       |          |
| Fin whale ( <i>B. physalus</i> )                  |             | NOM, CITES, IUCN(endangered) | 1988                     |  |                   | Seen feeding on small pelagic on the surface   | Gendron, 1993   |          |
| Fin whale ( <i>B. physalus</i> )                  | SW          |                              | 1993-1995                |  |                   | No observable sardines in faecal samples   | Del Angel R., 1997  |          |
| Fin whale ( <i>B. physalus</i> )                  | SW          |                              | 2001-2002                | <i>S. sagax</i>  |                   | Isotopic study showed consumption during warm season   | Jaume, 2004   |          |

Table 4 continues:

| Species  | Area | ETP listing                                     | Period of investigation | Prey species   | % IRI    | Observation   | Study   |
|--|------|---|-------------------------|--|----------|---|---|
| Humpback whale<br>( <i>Megaptera novaeangliae</i> )  |      | IUCN (least concerned)                          |                         |  | -        | Mexico area of upbringing and reproduction, areas of power in the North Pacific | Guerrero-Ruiz, 2005   |
| Grey whale<br>( <i>Eschrichtius robustus</i> )   |      | IUCN (least concerned)                          |                         |  | -        | They feed on benthic crustaceans  | Guerrero-Ruiz, 2005   |
| Sperm whale<br>( <i>Physeter macrocephalus</i> )   |      | IUCN (vulnerable)                               |                         |  | -        | squid   | Jaquet & Gendron, 2002  |
| Pilot whale<br>( <i>Globicephala macrorhynchus</i> )   |      | -   |                         |  | -        | squid   | Guerrero-Ruiz, 2005; Salvadeo, 2008a                                      |
| Bryde's whale and<br>Common dolphin<br>( <i>Balaenoptera edeni</i> ;<br><i>Delphinus delphis</i> ) | C    | NOM<br>NOM                                      | 1983-1985               |  | -        | Whales refuge during El Niño events channel                                     | Tershy et al., 1991   |
| Common dolphin<br>( <i>Delphinus</i> sp.)  | SW   | NOM   | 2003-2006               |  | -        | Relationship with sardines seasonal movements                                   | Salvadeo et al., 2008a  |
| Bottlenose Dolphin<br>( <i>Tursiops truncatus</i> )  |      | NOM, CITES<br>(lower risk)                      |                         |  | -        | Ocean ecotype eats squid, coastal ecotype preys on fish                         | Días-Gamboa, 2003; Salinas, 2005; Salvadeo, 2008a, Jaquet & Gendron, 2002 |
| Vaquita ( <i>Phocoena sinus</i> )  |      | NOM, CITES,<br>IUCN<br>(critically endangered), |                         |  | -        | Feeds mainly on <i>Orthopristis reddingi</i> and <i>Bairdiella icistia</i>      | Barlow, 1986 Fitch & Brownell, 1968                                       |
| <b>Birds</b>   |      |   |                         |  |          |   |   |
| Hermann's gull<br>( <i>Larus heermanni</i> )   | C    | NOM, IUCN<br>(near threatened)                  | 1983-1992               | <i>S. sagax</i> , <i>E. mordax</i>   | -        | per cent of total - diet-playing catch predictor                                | Velarde et al 1994; Velarde et al 2004                                    |
| Elegant tern<br>( <i>Sterna elegans</i> )  | C    | NOM, IUCN<br>(near threatened)                  | 1983-1992               | <i>S. sagax</i> , <i>E. mordax</i>   |          |   |   |
| Red-billed Tropicbird<br>( <i>Phaethon aethereus</i> )   | SE   | NOM, IUCN<br>(least concerned)                  | 2004 2007               | <i>O. libertate</i>  |          | % of total organisms  | Guevara-Medina, 2008*   |
| Royal tern ( <i>Thalasseus maximus</i> )   | SE   | IUCN<br>(least concerned)                       | 2007                    | <i>Anchoa sp.</i><br><i>Cetengraulis mysticetus</i>  |          | % of total organisms  | Angulo-Gastélum, 2008*  |
| Brown bobby ( <i>Sula leucogaster</i> )  | C    | IUCN<br>(least concerned)                       | 1998-2000               | <i>O. libertate</i><br><i>Lile stolifera</i> ,<br><i>Anchoa spp.</i> ;<br><i>C. Mysticetus</i> |          | % of total organisms (Island San Jorge)   | Mellink et al., 2001  |
| Brown bobby ( <i>S. leucogaster</i> )  | C    | IUCN<br>(least concerned)                       | 1998-2000               | <i>Sardine clupeidae</i><br><i>Anchoa spp.</i> ,<br><i>C. Mysticetus</i>                       |          | % of total organisms (Island San Idelfonso and San Pedro Martir                 | Mellink et al., 2001  |
| Blue-footed bobby ( <i>S. neboxii</i> )  | C    | IUCN<br>(least concerned)                       | 1998-2000               | <i>O. libertate</i><br><i>Anchoa exigua</i><br><i>C mysticetus</i>                             |          | % of total organisms (Island El Rancho  | Castillo-Guerrero, 2003   |
| Brown bobby ( <i>S. leucogaster</i> )  | C    | IUCN<br>(least concerned)                       | 2003-2004               | <i>S. caeruleus</i> ;<br><i>C mysticetus</i>   | 29<br>70 | % of total organisms  | Suazo-Guillen, 2004   |
| Brown and blue-footed bobby<br>( <i>Sula neboxii</i> ; <i>S. leucogaster</i> )                     | C    | IUCN<br>(least concerned)                       | 1983-1985               |  |          | Whales refuge during El Niño events   | Tershy et al., 1991   |
| Pelican ( <i>Pelecanus occidentalis</i> )  | SW   | IUCN<br>(least concerned)                       | 1984-1986               | <i>H. thrissina</i> ,<br><i>O. libértate</i> ,<br><i>Anchoa ischana</i>                        | 23<br>70 | % frequency regurgitated  | Jiménez-Castro, 1988  |
| <b>Reptiles</b>  |      |   |                         |  |          |   |   |
| <i>Caretta caretta</i>   |      | NOM, IUCN<br>(endangered)                       |                         |  |          |   |   |
| <i>Chelonia agassizii</i>  |      | NOM, IUCN<br>(endangered)                       |                         |  |          |   |   |

Revised after Del Monte Luna (2008)

## APPENDIX III –CRIP RESEARCH EXPENDITURES CONTRIBUTED BY THE INDUSTRY (2005-2009)

Table 5. CRIP Research Expenditures (2005-2009)



### Canainpes Delegación Sonora

RELACION DE APORTACIONES ENTREGADAS AL CENTRO REGIONAL DE INVESTIGACION PESQUERA (CRIP)

PARA FOMENTAR LA INVESTIGACION DE LA PESQUERIA DE PELAGICOS MENORES EN EL GOLFO DE CALIFORNIA.

PERIODO: DEL 2005 A SEPTIEMBRE DEL 2009.

| CONCEPTO   | FECHA                      | IMPORTE   | TOTAL APORTADO    |
|--|----------------------------|-----------|-------------------|
| <b>***2005***</b>  |                            |           |                   |
| APORTACIÓN PARA CRUCERO DE PELAGICOS MENORES A REALIZARSE POR EL CRIP GUAYMAS DURANTE MAYO-JUNIO DEL 2005. | 29 DE ABRIL<br>CH. 733     | 31,000.00 |                   |
|  | 04 DE MAYO<br>CH. 736      | 11,000.00 |                   |
|  | 20 DE MAYO<br>CH. 746      | 7,000.00  |                   |
|  | 01 DE JUNIO<br>CH. 753     | 7,000.00  | 56,000.00         |
| PAGO POR LA INSTALACIÓN DEL SITIO FTP PARA VER LAS IMÁGENES DE SATELITE DEL GOLFO DE CALIFORNIA            | 15 DE DICIEMBRE<br>CH. 837 | 1,000.00  | 1,000.00          |
| <b>TOTAL APORTADO DURANTE 2005</b>   |                            |           | <b>57,000.00</b>  |
| <b>***2006***</b>  |                            |           |                   |
| APORTACIÓN PARA CRUCERO DE PELAGICOS MENORES A REALIZARSE POR EL CRIP GUAYMAS DURANTE MAYO-JUNIO DEL 2006. | 30 DE MAYO                 | 21,600.00 |                   |
|  | 08 DE JUNIO<br>CH. 905     | 32,400.00 | 54,000.00         |
| APORTACIÓN PARA CRUCERO DE PELAGICOS MENORES A REALIZARSE POR EL CRIP GUAYMAS DURANTE NOVIEMBRE DEL 2006.  | 21 DE NOVIEMBRE<br>CH. 952 | 43,700.00 |                   |
|  | 29 DE NOVIEMBRE<br>CH. 954 | 26,700.00 |                   |
|  | 16 DE DICIEMBRE<br>CH. 964 | 20,600.00 | 91,000.00         |
| <b>TOTAL APORTADO DURANTE 2006</b>   |                            |           | <b>145,000.00</b> |

\*\*\*2007\*\*\*

|  |   |                              |                   |
|--|---|------------------------------|-------------------|
| APORTACIÓN PARA CRUCERO DE PELAGICOS MENORES A REALIZARSE POR EL CRIP GUAYMAS DURANTE MAYO-JUNIO DEL 2007.   | 14 DE MAYO<br>CH.1015   | 30,500.00                    |                   |
|  | 14 DE MAYO<br>CH. 1016  | 13,800.00                    |                   |
|  | 29 DE MAYO<br>CH. 1024  | 11,650.00                    |                   |
|  | 19 DE JUNIO<br>CH. 1036   | 7,600.00                     |                   |
|  | 29 DE JUNIO<br>CH. 1041   | 9,300.00                     | 72,850.00         |
| PAGO A 2 TECNICOS CONTRATADOS POR EL CRIP PARA SUPERVISAR LAS DESCARGAS DE SARDINA EN LOS MUELLES PARA REVISAR EL TAMAÑO DE LA MISMA.<br>(POR 3 MESES Y MEDIO) | 17 DE MAYO<br>CH. 1017  | 2,500.00                     |                   |
|  | CH. 1018  | 2,500.00                     |                   |
|  | 29 DE MAYO<br>CH. 1022  | 2,500.00                     |                   |
|  | CH. 1023  | 2,500.00                     |                   |
|  | 14 DE JUNIO<br>CH, 1032   | 2,500.00                     |                   |
|  | CH. 1033  | 2,500.00                     |                   |
|  | 29 DE JUNIO<br>CH. 1038   | 2,500.00                     |                   |
|  | CH. 1039  | 2,500.00                     |                   |
|  | 13 DE JULIO<br>CH. 1046   | 2,500.00                     |                   |
|  | CH. 1047  | 2,500.00                     |                   |
|  | 27 DE JULIO<br>CH. 1050   | 2,500.00                     |                   |
|  | CH. 1052  | 2,500.00                     |                   |
|  | 16 DE AGOSTO<br>CH. 1064  | 2,500.00                     |                   |
|  | CH. 1065  | 2,500.00                     | 35,000.00         |
|  | APOYO PARA FESTEJO DE ANIVERSARIO DEL CENTRO NAC. DE INVESTIGACION PESQUERA | 21 DE SEPTIEMBRE<br>CH. 1075 | 16,000.00         |
| 31 DE OCTUBRE<br>CH. 1093  |   | 1,800.00                     | 17,800.00         |
| APORTACIÓN PARA CRUCERO DE PELAGICOS MENORES A REALIZARSE POR EL CRIP GUAYMAS DURANTE NOVIEMBRE DEL 2007.  |   | 28 DE NOVIEMBRE<br>CH. 1105  | 19,200.00         |
|  | 6 DE DICIEMBRE<br>CH. 1111  | 39,800.00                    | 59,000.00         |
|  | <b>TOTAL APORTADO DURANTE 2007</b>  |                              | <b>184,650.00</b> |

\*\*\*2008\*\*\*

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|--|-------------------------|-----------|--|
| APORTACIÓN PARA CRUCERO DE PELAGICOS MENORES A REALIZARSE POR EL CRIP GUAYMAS DURANTE MAYO-JUNIO DEL 2008. | 28 DE ABRIL<br>CH. 1155 | 40,100.00 |  |
|  | 7 DE MAYO               | 8,300.00  |  |

|  |                                    |           |                   |
|--|------------------------------------|-----------|-------------------|
|  | CH. 1159                           |           |                   |
|  | 14 DE MAYO                         | 10,600.00 |                   |
|  | CH. 1164                           |           |                   |
|  | 27 DE MAYO                         | 13,325.00 |                   |
|  | CH. 1165                           |           |                   |
|  | 3 DE JUNIO                         | 11,305.00 |                   |
|  | CH. 1173                           |           | 83,630.00         |
|  |                                    | <hr/>     |                   |
| <b>PAGO A 2 INVESTIGADORES CONTRATADOS POR EL CRIP GUAYMAS PARA ANALIZAR EL PLANCTON PARA EVALUAR LA ALIMENTACIÓN DE LA SARDINA DEL GOLFO DE CALIFORNIA. (POR 5 MESES)</b> | 20 DE AGOSTO                       |           |                   |
|  | CH. 1202                           | 3,000.00  |                   |
|  | CH. 1203                           | 3,000.00  |                   |
|  | 29 DE AGOSTO                       |           |                   |
|  | CH. 1204                           | 3,000.00  |                   |
|  | CH. 1205                           | 3,000.00  |                   |
|  | 13 DE SEPTIEMBRE                   |           |                   |
|  | CH. 1215                           | 3,000.00  |                   |
|  | CH. 1216                           | 3,000.00  |                   |
|  | 29 DE SEPTIEMBRE                   |           |                   |
|  | CH. 1219                           | 3,000.00  |                   |
|  | CH. 1221                           | 3,000.00  |                   |
|  | 14 DE OCTUBRE                      |           |                   |
|  | CH. 1228                           | 3,000.00  |                   |
|  | CH. 1229                           | 3,000.00  |                   |
|  | 29 DE OCTUBRE                      |           |                   |
|  | CH. 1232                           | 3,000.00  |                   |
|  | CH. 1233                           | 3,000.00  |                   |
|  | 13 DE NOVIEMBRE                    |           |                   |
|  | CH. 1245                           | 3,000.00  |                   |
|  | CH. 1246                           | 3,000.00  |                   |
|  | 28 DE NOVIEMBRE                    |           |                   |
|  | CH. 1253                           | 3,000.00  |                   |
|  | CH. 1255                           | 3,000.00  | 48,000.00         |
|  |                                    | <hr/>     |                   |
|  | <b>TOTAL APORTADO DURANTE 2008</b> |           | <b>131,630.00</b> |
| <b>***2009***</b>  |                                    |           |                   |
| <b>PAGO A 2 INVESTIGADORES CONTRATADOS POR EL CRIP GUAYMAS PARA ANALIZAR EL PLANCTON PARA EVALUAR LA ALIMENTACIÓN DE LA SARDINA DEL GOLFO DE CALIFORNIA.</b>               | 14 DE ENERO                        |           |                   |
|  | CH. 1268                           | 3,000.00  |                   |
|  | CH. 1270                           | 3,000.00  |                   |
|  | 29 DE ENERO                        |           |                   |
|  | CH. 1277                           | 3,000.00  |                   |
|  | CH. 1278                           | 3,000.00  | 12,000.00         |
|  |                                    | <hr/>     |                   |
| <b>APORTACION PARA CRUCERO EXTRAORDINARIO PARA EL MES DE FEBRERO (DEBIDO A QUE NO SE HIZO CRUCERO EN NOVIEMBRE DEL 2008)</b>   | 13 DE FEBRERO                      |           |                   |
|  | CH. 1286                           | 25,365.00 |                   |
|  | 26 DE FEBRERO                      |           |                   |
|  | CH. 1288                           | 52,760.00 | 78,125.00         |
|  |                                    | <hr/>     |                   |

|  |                                    |                  |                          |
|--|------------------------------------|------------------|--------------------------|
| <b>APORTACIÓN PARA CRUCERO DE PELAGICOS MENORES A REALIZARSE POR EL CRIP GUAYMAS DURANTE MAYO-JUNIO DEL 2009.</b>                        | 18 DE MAYO<br>CH. 1318             | 37,760.00        |                          |
|  | 27 DE MAYO<br>CH. 1319             | 17,399.00        |                          |
|  | 4 DE JUNIO<br>CH. 1323             | <u>22,330.00</u> | 77,489.00                |
| <b>APORTACION PARA REALIZAR EL XVII TALLER DEL COMITÉ TECNICO DE PELAGICOS MENORES, DEL 10 AL 12 DE JUNIO DEL 2009, EN GUAYMAS, SON.</b> | 4 DE JUNIO<br>CH. 1325             | 12,000.00        |                          |
|  | 17 DE JUNIO<br>CH. 1331            | <u>12,169.01</u> | 24,169.01                |
|  | <b>TOTAL APORTADO DURANTE 2009</b> |                  | <b><u>191,783.01</u></b> |

**TOTAL DE LOS APOYOS ENTREGADOS AL CRIP PARA FOMENTAR LA INVESTIGACION DE LA PESQUERÍA DE PELAGICOS MENORES: 710,063.01**

**NOTA: EL 2009 AUN NO TERMINA Y NOS COMPROMETIMOS PARA APOYAR AL CRIP CON UNA APORTACIÓN DE 84,000.00 PESOS PARA EL VIAJE A FRANCIA DEL DR. HECTOR VILLALOBOS PARA ASISTIR A CAPACITACIÓN SOBRE "ASPECTOS METODOLOGICOS Y PROCESAMIENTO DE DATOS HIDROACUSTICOS PARA LA ESTIMACIÓN DE LA BIOMASA DE PELAGICOS MENORES.**

**SIN OLVIDAR QUE CADA AÑO APOYAMOS PARA LA REALIZACIÓN DEL CRUCERO DE INVESTIGACION DE NOVIEMBRE.**



## **APPENDIX IV – PEER REVIEW AND TEAM RESPONSES TO COMMENTS**

### **Peer Reviewer 1 General Comments**

The general information provided in this report about the sardine fishery in the Gulf of California is appropriate.

From my point of view, the procedures followed by the organization of the scientific certification system (SCS) for the evaluation of the fishery properly followed the requirements established by the Marine Stewardship Council (MSC). The evaluation team took the time to properly establish the allocation and performance indicators for each of the principles. The pre-assessment work and interviews with key players of the fishery was appropriate to determine if the fishery should be subject to a final assessment.

The information requested by the evaluation team and provided by the different elements of the fishery was necessary for evaluation and convenient to clearly establish scores for performance indicators. The performance indicators were well adjusted to the sardine fishery of the Gulf of California. Information provided was sufficient and appropriate.

### **Comments on team conclusions and recommendations**

Certification for this fishery shall be subject to constraints. The certification body or evaluation team clearly states that the applicant will sign a contract of an action plan to identify in time, the progress made to meet specific commitments of the plan; hence, in the contract, the fishery will be subject to audits. This is appropriate and the fishery will be subject to periodical revisions until it meets stated conditions.

### **Conditions**

Three conditions are related to Principle 2 (Ecosystem) of the MSC and two are related to Principle 3 (Management). The first two of the Principle 2 conditions have to do with the bycatch and the third with the impacts on the ecosystem. I feel that these conditions are appropriate and should be fully implemented. Recommendations to establish an observer or monitoring system for the fishery could help to determine the limits of bycatch species. The third condition refers to mitigate impacts on the Gulf of California ecosystem. The recommendation is to develop and implement a plan to reduce or stop impacts on the ecosystem. The current conditions of the fishery is not life-threatening or harmful to the ecosystem structure, however, it requires that fishery managers develop a strategic plan to ensure that this situation will not be allowed. I am in support of this condition.

About the two conditions of Principle 3, these are related to establishing research and management plans and their implementation to meet with objectives of Principles 1 and 2. These conditions are necessary and must be accomplished by the fishery. Fisheries managers must commit to this integration in a short time to demonstrate that these plans already exist by the first and second audits, respectively.

## Peer Reviewer 2 General Comments

The [report] is generally well done, but needs some work before it is finalised.

Importantly, it seems clear based on the information provided in the assessment that the sardine “stock” in the Gulf of California is above a level where recruitment would be impeded. Management arrangements are also in place to limit the potential growth over-fishing. Hence, the stock is not currently overfished. However, it does appear that fishing has contributed to previous stock collapses (Bakun *et al.* 2010) and the assessment should provide more information about this history.

I agree with the assessors that there is a need to implement a fishery monitoring program, which should initially include independent observers, and also agree that the Management Plan needs to be completed. With the exception of information relating to retained species in section 10.2, I also generally agree with the assessments provided in sections 10.2 and 10.3. My main concerns relate to section 10.1, where I think the assessors have scored the fishery too highly in several instances.

My primary concerns about the fishery are that: 1) the stock assessment is based mainly (solely?) on fishery-dependent data and there are published concerns about the reliability of outputs (Bakun *et al.* 2010); 2) target reference points are not sufficiently precautionary given the documented limitations in the stock assessment and the ecological importance of sardine; and 3) the management responses to declines in stock status are not adequately defined.

Given these weaknesses, I think that the assessors should apply additional conditions relating to the need to:

1. collect fishery-independent data and incorporate these into future stock assessments;
2. establish a harvest strategy that accounts for uncertainty in the stock assessment by being explicitly precautionary and which also explicitly acknowledges the ecological importance of sardine; and
3. establish harvest control rules that clearly identify what the management responses will be to declines in fish abundance.

**Team Response:** The team included an additional condition (Condition 1.2.4) asking for the incorporation of a fishery independent assessment of the biomass to complement the regular assessment of the fishery. The implementation of a harvest strategy and harvest control rules, that explicitly acknowledge the ecological importance of sardine and responses from the management are expected to be incorporated in the management plan based on Conditions 3.2.1.

## Specific Comments

### 1. Introduction

Adequately describes overall MSC process. Suggest in future SCS should provide reviewers with copies of FAM and Guidance for Certification Bodies.

### 2. Summary

2.1 Assessment process - Adequate. Assume this section will be updated to include response to reviewer comments.

2.2 Meeting Conditions for Continued Certification – Adequate.

2.2.1 General Conditions for Continued Certification - Adequate. Could reduce repetition of information provided in 2.2.

2.2.2 Specific conditions

There should be conditions regarding need to improve stock assessment, develop a harvest strategy which is precautionary and reflects the ecological importance of sardine and establish agreed management responses to declines in fish abundance.

**Team Response:** see response above

### **3. Background to the report**

3.1. Assessment Team/authors - Adequate

3.2 Peer Reviewers - Adequate

3.3 Summary of Meetings - Adequate

3.4 Submission of Data on the Fishery - Adequate

### **4. The Gulf of California Sardine Fishery**

4.1 Life history - Not adequate. General information on small pelagic fishes is not necessary. Section should provide more information on the target species. Need to give full taxonomic information. Need to justify why common name of Monterey sardine and scientific name of *Sardinops caeruleus* are used in assessment (reference to taxonomic literature is required). Alternatively, why are names Pacific sardine and *Sardinops sagax* not used? Assessors must provide more life history information on target species.

**Team Response:** more information is provided

4.2 Geographic setting of the Sardine Fishery - Adequate. Suggestion of sub-arctic influence is surprising – should this be temperate or subtropical?

4.3 Background of the Sardine Fishery - Not adequate. The assessors should write a concise description of the evolution of the fishery that includes the years since the 1990s. Need to provide objective information about role of fishery in previous stock collapses (see Bakun *et al.* 2010). Section on the evolution of the fishery could become first part of next section (5.1).

**Team Response:** more information is provided

### **5. Fishery and Management System**

Not adequate. First sentence refers to Pacific sardine – need internal consistency in nomenclature. Too much overlap between Sections 4.3 and 5. Need to re-structure these sections. For example

5.1 Evolution of fishery (revised section 4.3) Provide historical context

5.2 Species composition and catches

5.3 Management system should not repeat historical context and catch information (delete first two paragraphs of this section as they are discussed elsewhere). This section should focus more on the management system. Currently, relevant information begins with third paragraph. Given that Management Plan is in draft form, I agree that completion in an appropriate time frame should be a condition for certification (Condition 3.2.1). Only the last sentence of this section refers to management responses to declines in abundance. The assessment should specify that the inclusion in the management plan of agreed management responses to changes fish abundance is a condition for certification.

**Team Response: this section has been updated**

## **6. Fisheries Impact on the Ecosystem**

Not adequate. This section is poorly structured, with repeated discussion of similar topics in different sections (e.g. trophic impacts). This section needs to be rewritten.

**Team Response: the whole section has been updated**

6.1. Retained species - Not adequate. Repeats information in section 5 (species composition of catch). Doesn't provide sufficient information on, or reference to, potential impacts of taking these species on the ecosystem. How are these potential impacts being addressed? EG Does limit reference of  $F = 0.25$  only apply to sardine? Does  $F = 0.25$  include an "ecosystem allocation"? Are there assessment models for the other species?

**Team Response: more information is provided**

6.2 By-catch species, first two sentences again repeat information that has been provided previously and should be deleted. Currently, this section only talks about fish by-catch. Need to note that other studies have shown that other taxa (e.g. cetaceans) can be taken as bycatch in purse seine fisheries (e.g. Hamer *et al.* 2008). Is the vaquita the only cetacean in the Gulf of California? Lack of evidence regarding interactions with marine mammals may be directly related to lack of observer data. Hamer, D.J, Ward, T.M. and McGarvey, R. (2008). Measurement, management and mitigation of operational interactions between the South Australian Sardine Fishery and short-beaked common dolphins (*Delphinus delphis*) *Biological Conservation* **141**: 2865-2878

**Team Response: more information is provided**

6.3 Endangered, Threatened and Protected Species – Adequate. Some minor revision needed. Suggest moving comments regarding direct interactions of ETPS with fishery to the by-catch section. Alternatively, you could have a separate subsection regarding direct interactions with ETPS. Currently, information about direct interactions is hidden amongst information on trophic interactions.

6.4 Habitats – Adequate.

6.5 Ecosystem - Not adequate. Too repetitive, should be combined with 6.6. Dietary information on sardine should go in section 4.1.

**Team Response: this has been updated**

6.6. Ecological Models - Not adequate. Too repetitive, should be combined with 6.5. Suggest reorganisation of this entire section:

6.1. Habitats (now 6.4)

6.2. By-product and by-catch (including direct interactions with non-target species including ETPs)

6.3. Trophic relationships, including subsection on TEPs (now 6.3, 6.5 and 6.6).

**Team Response: the whole section has been reorganized**

## **7. Tracking and tracing of fish and fish products**

Not Adequate. Need more detail about how landings are recorded. Are there logbooks? What are landing slips – how are these validated? Are catch and processor data reconciled?

**Team Response: more information has been added**

## **8. Other fisheries in area and summary of previous certification evaluations**

Not adequate. This section seems to list other species caught in the fishery, again! These aren't other fisheries in the region. Shouldn't much of this section as currently written actually go in the bycatch or other species parts of sections 5.2 (species composition) and 6.2 (bycatch)? Need to add information on other fisheries in Gulf of California.

**Team Response: Information was added for other fisheries.**

## **9. MSC Principles and criteria**

9.1 Adequate

9.2 Adequate

9.3 Adequate

9.4 Adequate

## **10. Assessment team performance evaluations**

10.1 MSC Principle 1 General comments Assessment should include more information about data used in model. Is the modelling based entirely on fishery data? It is unclear whether the management system is sufficiently robust to ensure that fishing will not cause stock to decline below agreed thresholds. There is a need to more clearly define the responses to declines in stock abundance.

**Team Response: For each of the PIs the rationale has been improved and more information has been added as suggested.**

### Peer Reviewers Comments Related to Scores and Rationales

|  |  |
|--|--|
| 1.1.1 Stock at level which maintains productivity and has low probability of recruitment overfishing |  |
| Peer Reviewer 1  | I suggest a more conservative rating of 85–90 for this indicator because the fishery has shown considerable variation in recent history. An increase in 1988-1989, a decline in 1990–1992, an increase in 1994–1996, a decrease in 1997–1998, an increase in 2001-2002, a decrease 2004-2005, and an increase in 2007-2008. No conclusive explanation of this variation has been demonstrated. However, certainty comes from the latest estimates of fishing mortality F has remained below the levels suggested by the results of the application of stochastic age-structured, density-dependent recruitment and dynamic simulation models and the corresponding catches. Same trace references as states in the evaluation.   |
| Peer Reviewer 2  | <p>I agree that it is more than highly likely that the stock is above a point where recruitment is impaired. However, due to reliance of assessment model solely on fishery dependent data, there is not a high degree of certainty the stock is above that point. I would have scored this fishery as being midway between SG 80 and SG 100 and given it a score of 90.</p> <p>Need to comment on uncertainty in estimates R and SSB, including potential limitations of data (e.g. biases) as well as statistical uncertainty. Hyper-stability of CPUE for small pelagic fishes is an important issue that should be mentioned.</p> <p>I suggest that the assessors should indicate that that the collection of fishery-independent abundance data and incorporation into future stock assessments within an agreed timeframe is a condition of certification.</p> |
| Team Response  | Certainly the landings have shown large fluctuations but in recent years an increasing tendency of the biomass has been shown by the assessment, strongly suggesting that there is a high degree of certainty that the stock is above the point where the recruitment would be impaired. More information and additional comments on fishery-independent assessment and conditions for PI 1.2.4 were added.  |

|  |   |
|--|---|
| 1.1.2 Limit and target reference points are appropriate for the stock. |   |
| Peer Reviewer 1  | Score is adequate; however, for the second limit that is set after the season, it is not clear to me whether there is a formal mechanism to ensure that the appropriate measures will be taken in case the limits of fishing mortality $F=0.25$ are exceeded.   |
| Peer Reviewer 2  | <p>Limit and target reference points are appropriate. Need more information about catch sampling program. There is potential that sampling at landing ports could encourage dumping of small fish at sea. Given fishery's heavy reliance on this reference point for size composition, I agree that some independent at sea monitoring is warranted.</p> <p>Limit Reference point of 0.9 MSY (<math>F = 0.25</math>) is not particularly precautionary; it is very close to MEY. Hence, I do not agree with the suggestion that this reference point takes into account the ecological importance of the stock. It is notable that Nevarez-Martinez <i>et al.</i> (2009) do not make this claim.</p> <p>I would score this at 80 and agree that it should be a condition of certification that the fishery implements at sea monitoring program that provides information on the size composition of the catch. It should also be a condition of certification that a biomass</p> |

|               |  |
|---------------|--|
|               | reference point is established that explicitly reflects uncertainty in stock assessment and acknowledges ecological importance of the stock.   |
| Team Response | We improved the explanations to support the score, and addressed the comments and suggestions of Reviewer 2 with the condition 1.2.4 (related to fishery-independent assessment) and condition 3.2.1 (completing the Management plan). |

|   |  |
|---|--|
| 1.1.3 Where the stock is depleted, there is evidence of stock rebuilding. |  |
| Peer Reviewer 1   | Not applicable                               |
| Peer Reviewer 2   | Adequate – stock does not require rebuilding |

|  |  |
|--|--|
| 1.2.1 There is a robust and precautionary harvest strategy in place. |  |
| Peer Reviewer 1  | Score and explanation are well described for this indicator; however, when referring to the Mexican Official Standard published in 1993 (NOM-003-PESC-1993), which was proposed by the fisheries authorities, signed by fishermen organization, and amended by the Mexican Congress, the NOM established a precautionary strategy by declaring a moratorium for fishing licenses, so there has not been an increase in the number of boats participating in the fishery since its publication. According to Figure 2, there is an increase of the number of boats and fishing trips in recent years. It is difficult to see this from the figure; however, I suggest including a table showing the number of boats participating in this fishery.  |
| Peer Reviewer 2  | The limitations that have been placed on the number and size of vessels are appropriate. Similarly, having a limit reference point for size composition to protect juveniles and avoid growth overfishing is a positive step, although as identified above, this would be improved by implementation of an at sea monitoring program.<br><br>The harvest strategy of having a limit reference point of 0.9 MSY is not particularly precautionary, especially because the stock assessment is based solely on fishery dependent data.<br><br>I agree that score should be 80.<br><br>As indicated above, it should be a condition of certification that the fishery establishes a biomass reference point that is explicitly precautionary and reflects ecological importance of the stock. |
| Team Response  | The scoring rationale was edited and improved in order to be more explicit. The status of the stock in recent years suggest that harvesting strategies have function, however clarity will be achieved when conditions 1.2.4 and 3.2.1 will be accomplished.   |

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|--|---|
| 1.2.2 There are well defined and effective harvest control rules in place. |   |
| Peer Reviewer 1  | Score and explanation are well described for this indicator; however, when referring to the Management Plan under review, I suggest take this document with caution since it is in progress and should be considered so until it is officially established. I suggest including a description of the actual mechanism of the management system that has to respond in case of the second limit is exceeded. |
| Peer Reviewer 2  | The text for this section currently focuses too much on the limit reference points and not enough on the agreed responses to breaches (harvest control rules). This needs to  |

|                      |   |
|----------------------|---|
|                      | <p>be amended.</p> <p>The assessors should make it clear that are not well defined rules about how catches will be controlled if reference points are breached. For example, there is no indication of how big an area will be closed if the size limit is breached. Similarly, as the assessors note, there are not explicit control rules for total catch, although the previous section (1.2.1) appears to hint that the start of the season may be adjusted under some circumstances.</p> <p>It is worth noting that the assessors indicate that in the draft Management Plan the control rules are well defined. This is positive and suggests that the fishery is moving to establish well defined and effective harvest control rules.</p> <p>As there are not well defined harvest control rules in place, I do not agree score should be 80. Given that there is a general understanding about what will be done if limits are breached, I suggest that the score should be 65 (recognising that it is agreed that if the size composition limit is breached, some areas will be closed).</p> <p>I suggest that it should be a condition of certification that the Management Plan which is implemented for the fishery includes well defined harvest control rules.</p> |
| <b>Team Response</b> | <p>The score rationale was extended to be more explicit, but the score was not changed because we think that there are well defined harvest controls. Nevertheless, more clarity in the harvest control rules and strategy will be achieved when condition 1.2.4.and 3.2.1 will be accomplished.</p>  |

|   |  |
|---|--|
| <b>1.2.3 Relevant information is collected to support the harvest strategy.</b> |  |
| <b>Peer Reviewer 1</b>  | <p>I have no comments or suggestions for this score. The text description is adequate and documented.</p>  |
| <b>Peer Reviewer 2</b>  | <p>The assessors note that catches are monitored, the fishery has been described and supporting research has been conducted. However, assessors fail to identify the lack of an ongoing fishery-independent assessment program. It is widely recognised that it is difficult to assess fisheries for schooling pelagic fishes using fishery-dependent data only (e.g. Barange et al. 2009).</p> <p>There is a need to establish a fishery-independent research program which provides information to enhance stock assessment. In the following section (1.2.4), it is mentioned that the use of acoustic techniques is under investigation, which is a positive step and highly relevant to this section of the report.</p> <p>I do not agree that sufficient information are available to support the harvest strategy, the score should not be more than 80.</p> <p>It should be a condition of certification that fishery-independent information is incorporated into the stock assessment within an agreed time frame.</p> <p>Barange M, et al. (2009) Current trends in the assessment and management of small pelagic fish stocks, Chapter 9. In: Checkley DM Jr, Alheit J, Oozeki Y, Roy C (eds) Climate change and small pelagic fish. Cambridge University Press, Cambridge, pp 191-255</p> |
| <b>Team Response</b>  | <p>The text of the score rationale was modified for clarity and in accordance with the suggestions of the reviewer 2.</p>  |



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| 1.2.4 There is an adequate assessment of the stock status. |  |
| Peer Reviewer 1  | The stock assessments developed for this fishery uses stochastic age-structured, density-dependent recruitment and dynamic simulation models have been considered adequate as part of the management system; however, I agree in the sense that the management plan must consider the application of several approaches based on estimates of total biomass from periodic sampling or use models and techniques like Rickers stock-recruitment models or total harvest based on the use of the catchability level suggested by Martínez-Aguilar et al. (2009). These may help establish different management strategies.   |
| Peer Reviewer 2  | <p>Bakun <i>et al.</i> (2010) note that a previous stock collapse was caused by a combination of several years of poor recruitment and severe overfishing and that estimates of management benchmarks (e.g. MSY) calculated from the current stock assessment models for this fishery should be treated with caution.</p> <p>It is clear that current approach to stock assessment is not adequate given relative lack of precaution in the harvest strategy. Options are to have more precautionary limit reference point (i.e. lower than 0.9 MSY) to account for the high level uncertainty or to develop a fishery-independent research program that will provide additional information about population size and reduce uncertainty in outputs from stock assessment model, <u>or both</u>. Note that Bakun <i>et al.</i> (2010) identified the need for direct fishery independent surveys of population abundance and recruitment, such as the use of ichthyoplankton sampling and acoustic methods</p> <p>I do not agree with the score of 80. The assessment method (based solely on fishery-dependant data) is not appropriate for a small pelagic fish. I think the score should be more like 60.</p> <p>It should be a condition of certification that fishery-independent information is incorporated into the stock assessment within an agreed time frame.</p> |
| Team Response  | Considering the reviewer's comments the score was adjusted and a condition was set for the implementation of a fishery-independent assessment for the biomass to improve the stock assessment process.   |

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| 2.1.1 The fishery does not pose a risk of serious or irreversible harm to the retained species and does not hinder recovery of depleted retained species. |   |
| Peer Reviewer 1   | I suggest a score 85 or 80 because this indicator is referred to retained species and the assessment focuses on the primary species of the sardine fishery. It should be recommended to develop the specific assessment of the retained species.  |
| Peer Reviewer 2   | <p>Retained species (see above) It is highly likely that the sardine stock is above a point where recruitment is impaired. However, limitations in the assessment method and hence estimates of management benchmarks for sardine (e.g. MSY) mean that there is a significant risk of overfishing in the future for this retained species. Minimal information is provided about assessments for other retained species, but it is highly likely that these are less rigorous than that for sardine. Assessors should provide more information about assessments for other retained species.</p> <p>Given the deficiencies in the assessment method, the score of 90 seems too high. I think it should be 80.</p> |
| Team Response   | More information is provided on the assessment model of the main retained species. A predictive model (Tompson and Bell model) is used to assess the main retained  |

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|  | species. Biomass estimates are collected and maximum sustainable yield is calculated for <i>Opisthonema libertate</i> , <i>O. bulleri</i> and <i>O. medirastre</i> , <i>Etrumeus teres</i> and <i>Cetengraulis mysticetus</i> (Nevarez-Martinez et al. 2006). The assessments are conducted every 3-4 years (Nevarez-Martinez et al. 2006). In addition there is a minimum size limit for thred hering and anchovies. Fishery-independent data will be collected for the target species (see condition 1.2.4). Taken the reviewers comments into account the score was lowered to 85. In addition, a recommendation is made by the team to develop specific assessments for the main retained species. |
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| 2.1.2 There is a strategy in place for managing retained species that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to retained species. |   |
| Peer Reviewer 1   | As the rational of the score of this indicator, I suggest citing the red book (INP 2006) since it has the description of all target species and retained species considered in the fishery. It includes some statements related to incidental catches. I agree with the score.  |
| Peer Reviewer 2   | As identified above, the strategy for managing retained species is not sufficiently precautionary given weaknesses in the assessment.<br>The score should not be more than 80.  |
| Team Response   | This indicator relates to the management strategy for the retained species and not the assessment. The guidepost of the default assessment tree asks for a partial strategy to justify a score of 80 the assessment team considered that there is more information than that and therefore the score was not changed. Clarification is given that harvest rules are set for the whole catch and not for individual species (harvest rate 0.25) which resulted in the lowering of the score in the previous indicator. However the team feels that it is not justified to lower the score again. |

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| 2.1.3 Information on the nature and extent of retained species is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage retained species. |  |
| Peer Reviewer 1   | Text description of the rationale corresponds properly to the score.   |
| Peer Reviewer 2   | Information on retained species is adequate (see above). Fishery-independent information is needed to assess small pelagic fishes adequately.<br>The score should not be more than 80.   |
| Team Response   | This indicator relates to the information about the main retained species. The information has been collected and analyzed regularly since 1989 (Cisneros-Mata et al. 1989, 1990, 1997, Martinez-Zavala et al. 2000, 2006). More references has been added, the score was not changed. The score was lowered for indicator 2.1.1 taking into consideration the reviewers comments. |

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| 2.2.1 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. |  |
| Peer Reviewer 1   | I think the score of this indicator is adequate. There are mechanisms established within the management system to limit the contribution of the bycatch species to the total catch of the fishery and this is in place. However, there is no ways of knowing if the incidental catches affect the bycatch resource unless its stock status is known. See a |

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|                 | recommendation in the next indicator.   |
| Peer Reviewer 2 | Some information is available for by-product species, but no quantitative data on non-retained by-catch. Lack independent observer program means that composition of bycatch is poorly understood.<br>The score should not be more than 80.   |
| Team Response   | Taking into consideration the reviewers comments scores have been lowered to 80. The bycatch reporting and monitoring program (see condition 2.2.2) will provide information on bycatch species. Stock assessment exists for one of the bycatch species (giant squid) Martinez-Aguilar et al. 2006. |

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| 2.2.2 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. |   |
| Peer Reviewer 1   | I think the score is appropriate for this indicator. There is no program of observers to ensure enough information of the bycatch species. Conditions are clearly explained. For future research and management plans, I suggest including investigations of the status of the stocks of bycatch species. |
| Peer Reviewer 2   | Agree with assessors.   |
| Team Response   | See above comments for stock assessment. The bycatch reporting and monitoring program will provide information on species composition and more directed stock assessments may be recommended depending on the species and their vulnerability.  |

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| 2.2.3 Information on the nature and amount of bycatch is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage bycatch. |   |
| Peer Reviewer 1   | See comments of the previous statement. Conditions are clearly set. Recommendations made by the evaluation team seem appropriate. |
| Peer Reviewer 2   | Agree with assessors.   |
| Team Response   | No comment needed   |

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| 2.3.1 The fishery meets national and international requirements for protection of ETP species. The fishery does not pose a risk of serious or irreversible harm to ETP species and does not hinder recovery of ETP species. |   |
| Peer Reviewer 1   | Score and text of the rationale seem appropriate; however, there are no references. I suggest including trace references to support this score.               |
| Peer Reviewer 2   | If these species are only ETPs in the Gulf, I agree with assessors. However, an observer program is needed to confirm interactions are only indirect (2.3.2). |
| Team Response   | No response needed as indicated by reviewer 2, the bycatch reporting and monitoring program will determine if interactions with ETP species occur.            |

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| 2.3.2 The fishery has in place precautionary management strategies designed to:   |  |
| <ul style="list-style-type: none"> <li>- meet national and international requirements;</li> <li>- ensure the fishery does not pose a risk of serious or irreversible harm to ETP species;</li> <li>- ensure the fishery does not hinder recovery of ETP species; and</li> </ul> |  |

|                                      |  |
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| - minimise mortality of ETP species. |  |
| Peer Reviewer 1                      | Score and text for the rationale seem appropriate. Beside the specific studies of the ETP (Endangered, Threatened, and Protected species) in the Gulf of California, results of the application of the Ecopath model to the Gulf of California suggest that the ETP species are impacted more from predation than from fishing pressure. Results show that the system is in balance. Future approaches may be recommended. |
| Peer Reviewer 2                      | Some evidence is needed to support assertion that interactions with ETP are only indirect. It has not been demonstrated that $F = 0.25$ takes into account the ecological importance of the stock. As mentioned previously, this issue needs to be addressed.  |
| Team Response                        | As explained, there is no overlap in area between vaquita and the target fishery and therefore it is unlikely that there is a direct interaction. In addition the fishery is not occurring during times when the ETP birds are nesting reducing the potential indirect impact.<br><br>As explained above $F=0.25$ takes into consideration “the biology of the species” implying ecological importance.                    |

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| 2.3.3 Relevant information is collected to support the management of fishery impacts on ETP species, including:<br>- information for the development of the management strategy;<br>- information to assess the effectiveness of the management strategy; and<br>- information to determine the outcome status of ETP species. |   |
| Peer Reviewer 1  | Similar to the preceding indicator, the score and text for the rationale seem appropriate. “The information is sufficient to determine whether the fishery may be a threat to protection and recovery of the ETP species” in the context of the use of the Ecopath model. However, it may be necessary to be more explicit in terms of the information available in this approach and other approaches. |
| Peer Reviewer 2  | Need to establish observer program (or equivalent) and develop a harvest strategy that explicitly considers ecological importance of the stock.<br><br>Score should not be more than 80.  |
| Team Response  | Some more information is provided, the development of a monitoring program and harvest strategy that considers ecological importance is covered elsewhere. The team scored this indicator at 85 rather than 80 because the ecosystem model is available that takes into account ETP species   |

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| 2.4.1 The fishery does not cause serious or irreversible harm to habitat structure, considered on a regional or bioregional basis, and function. |  |
| Peer Reviewer 1  | Indicator score and text of the rationale seem appropriate. From the type of gears used in this fishery, it is unlikely that habitat structure and function will be reduced. In general, fishermen tend to avoid areas of risk that will harm their nets. I recommend citing the red book (INP 2006) as a trace reference, since it describes the fishery. |
| Peer Reviewer 2  | Adequate. Generally agree with assessors, but not sure that implied evidence is actually evidence. Should cite Chuenpagdee et al. (2003) here  |
| Team Response  | References are included  |

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| 2.4.2 There is a strategy in place that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to habitat types. |  |
| Peer Reviewer 1  | Rationale for this indicator is clearly explained. I have no suggestions or recommendations. |
| Peer Reviewer 2  | Adequate - agree   |
| <b>Team Response</b>   | <b>NA</b>  |

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| 2.4.3 Information is adequate to determine the risk posed to habitat types by the fishery and the effectiveness of the strategy to manage impacts on habitat types. |  |
| Peer Reviewer 1   | Rationale of this indicator is clearly explained. The evaluation team may have some information about null or low incidents of the fishery related to the habitat. I recommend citing the red book (INP 2006) as a trace reference because it describes the fishery. |
| Peer Reviewer 2   | Adequate - agree   |
| <b>Team Response</b>  | <b>Reference was included</b>  |

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| 2.5.1 The fishery does not cause serious or irreversible harm to the key elements of ecosystem structure and function. |  |
| Peer Reviewer 1  | Indicator score and text for this rationale seem appropriate.<br>Minor change in text: “The ecosystem index for the sardine fishery has been stable for the last 5 years”. It should read: “decades” in case it refers to the Fisheries Balance Index. |
| Peer Reviewer 2  | Adequate OK – few if any fisheries really understand this issue.   |
| <b>Team Response</b>   | <b>Corrected FBI has been stable for the last 5 decades</b>  |

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| 2.5.2 There are measures in place to ensure the fishery does not pose a risk of serious or irreversible harm to ecosystem structure and function. |  |
| Peer Reviewer 1   | Indicator score and text for the rationale seem appropriate. One point: it will help to explicitly state the management system target on this objective that is related to the protection of the Gulf of California ecosystem. |
| Peer Reviewer 2   | Adequate. There are few fisheries in the world that have a data-based strategy to deal with ecosystem impacts.   |
| <b>Team Response</b>  | <b>More explanations are included on the management system.</b>  |

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| 2.5.3 There is adequate knowledge of the impacts of the fishery on the ecosystem. |   |
| Peer Reviewer 1   | Score rationale of this indicator is clearly explain, I have no suggestions or recommendations. |
| Peer Reviewer 2   | Adequate – agree  |
| <b>Team Response</b>  | <b>NA</b>   |

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| 3.1.1 The management system exists within an appropriate and effective legal and/or customary framework which ensures that it:<br>- Is capable of delivering sustainable fisheries in accordance with MSC Principles 1 and 2; |  |
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| - Observes the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood; and |   |
| - Incorporates an appropriate dispute resolution framework.  |   |
| Peer Reviewer 1  | Rationale of this indicator is clearly explain, I have no suggestions or recommendations. |
| Peer Reviewer 2  | Adequate – agree  |
| <b>Team Response</b>   | <b>NA</b>   |

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| 3.1.2 The management system has effective consultation processes that are open to interested and affected parties.<br>The roles and responsibilities of organisations and individuals who are involved in the management process are clear and understood by all relevant parties. |   |
| Peer Reviewer 1  | Scoring rationale of this indicator is well documented and clearly explained with detail. It includes the legal structure of the fisheries system in Mexico and describes procedures and limitations. |
| Peer Reviewer 2  | Adequate – agree  |
| <b>Team Response</b>   | <b>NA</b>   |

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| 3.1.3 The management policy has clear long-term objectives to guide decision-making that are consistent with MSC Principles and Criteria, and incorporates the precautionary approach. |  |
| Peer Reviewer 1  | Similarly to the previous indicator scoring rationale is well documented and clearly explained with detail. It includes the legal structure of the fisheries system in Mexico and describes procedures. The main fisheries laws in Mexico are the General Law for Sustainable Fishing and Aquaculture (LGPAS), FAO Code of Conduct for Responsible Fisheries and management plans are under sector plans developed for six years of each administration. |
| Peer Reviewer 2  | Adequate – agree   |
| <b>Team Response</b>   | <b>NA</b>  |

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| 3.1.4 The management system provides economic and social incentives for sustainable fishing and does not operate with subsidies that contribute to unsustainable fishing. |   |
| Peer Reviewer 1   | Scoring rationale of this indicator is clearly explained and appropriate. It provides examples of economic incentives to specific sectors, programs and projects. |
| Peer Reviewer 2   | Adequate – agree  |
| <b>Team Response</b>  | <b>NA</b>   |

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| 3.2.1 The fishery has clear, specific objectives designed to achieve the outcomes expressed by MSC's Principles 1 and 2. |  |
| Peer Reviewer 1  | Although the management system of the sardine fishery of the Gulf of California properly consider the objectives of Principle 1 of the MSC does not considers the objectives of principle 2 of the MSC which are related to ecosystem conservation. Management plans for this fishery are currently under review and should consider these objectives. Text of the scoring rational are clearly explained and conditions are stated accordingly. |
| Peer Reviewer 2  | Adequate – agree. Need to complete management plan is clear.   |

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| Team Response | NA |
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| 3.2.2 The fishery-specific management system includes effective decision-making processes that result in measures and strategies to achieve the objectives. |   |
| Peer Reviewer 1   | To date, the mechanisms for decision making process has been through the academy's annual meetings and agreements with industry. This mechanism has been since the early 1990s. The objectives of the fishery have been clearly defined and there have been adjustments to the fishery and its implementation. It is expected that the management plan will clearly define the objectives of the fishery. The rating for this indicator is appropriate and the rationale clearly defined. |
| Peer Reviewer 2   | Adequate – agree  |
| Team Response   | NA  |

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| 3.2.3 Monitoring, control and surveillance mechanisms ensure the fishery’s management measures are enforced and complied with. |  |
| Peer Reviewer 1  | The monitoring system of this fishery has proved efficiency and has demonstrated its operation even when there have been non-compliance of the rules. The score seems adequate and the text of the rationale is clear. |
| Peer Reviewer 2  | Adequate – agree   |
| Team Response  | NA   |

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| 3.2.4 The fishery has a research plan that addresses the information needs of management. |  |
| Peer Reviewer 1   | Although there is an extensive program of research for this fishery it has been mainly oriented to the sustainability of the resource, however, it has not been developed a research program designed to estimate the impacts of the fishery to the ecosystem. The rating for this indicator seems appropriate and condition is clearly defined. |
| Peer Reviewer 2   | No comment   |
| Team Response   | NA   |

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| 3.2.5 There is a system for monitoring and evaluating the performance of the fishery-specific management system against its objectives.<br>There is effective and timely review of the fishery-specific management system. |   |
| Peer Reviewer 1  | The monitoring management system of this fishery is well defined and has been applied. The rating of this indicator is adequate and the justification is clearly defined, I have no further comments or observations. |
| Peer Reviewer 2  | Adequate – agree  |
| Team Response  | NA  |



## APPENDIX V: STAKEHOLDER INPUT INTO MSC FISHERY ASSESSMENTS WITH ASSESSMENT TEAM RESPONSES

| Table of Stakeholder Comments                |  |  |                            |
|--|--|--|----------------------------|
| Date   | To:  | From:                                    | Format                     |
| 4 March 2010                                 | Dr. Sabine Daume (SCS)   | Dr. Juan-Manuel Caudillo                 | e-mail—comments            |
| 9 March 2010                                 | Dr. Juan-Manuel Caudillo   | Dr. Sabine Daume (SCS)                   | Letter—response            |
| 9 March 2010                                 | Dr. Sabine Daume (SCS)   | Dr. Juan-Manuel Caudillo                 | e-mail—response            |
| 12 March 2010                                | Dr. Sabine Daume (SCS)   | Dr. Bourillon et al.                     | e-mail—comments            |
| 25 March 2010                                | Dr. Bourillon  | Dr. Sabine Daume (SCS)                   | e-mail—response            |
| 30 July 2010                                 | Dr. Sabine Daume (SCS)   | Mr. Daniel Suddaby (MSC)                 | Letter—comments            |
| 23 September 2010                            | Dr. Robert Hrubes (SCS)<br>Dr. Sabine Daume (SCS)  | Mr. Andrew Mallison (MSC)                | Letter—variance acceptance |
| January 2010                                 | MSC  | Assessment Team                          | Report—response            |
| 16 July 2010                                 | Mr. Jim Humphrys (MSC) and Mr. Brad Ack (MSC), Dr. Sabine Daume (SCS) and Dr. Exequiel Ezcurra | Dr. Exequiel Ezcurra                     | Letter—comments            |
| 6 August 2010                                | Mr. Jim Humphrys (MSC) and Mr. Brad Ack (MSC), Dr. Sabine Daume (SCS) and Dr. Exequiel Ezcurra | Dr. Daniel Lluch Belda (Assessment Team) | Letter—response            |
| Send 19 September 2010<br>Date: 16 July 2010 | Mr. Jim Humphrys (MSC) and Mr. Brad Ack (MSC), Dr. Sabine Daume (SCS) and Dr. Excuil Ezcurra   | Dr. Exequiel Ezcurra                     | Letter—comments            |
| January 2010                                 | Dr. Exequiel Ezcurra   | Assessment Team                          | Report—response            |
| 1 August 2010                                | SCS  | Dr. Luis Bourillón                       | MSC Template               |
| December 2010                                | Report   | SCS                                      | Report—response            |

**From:** Juan-Manuel Caudillo

**Sent:** Thursday, March 04, 2010 1:25 PM

**To:** Sabine Daume

**Subject:** RE: reference used for the Gulf of California Mexican Sardine MSC assessments

Dr. Duame:

I did reviewed the references used on the Gulf of California Mexican Sardine MSC assessments. I have some coments on it:

1.- I do not see any reference regarding stocks assessments used on the decision making for the fishey's management. I would like to have access to those assessments in order to provide better input into the process.

2.- The management plan of the Sardine Fishery, where you say it is available through request to the CAIANINPESCA's president is not clear to me because the following reasons: The Fishery's management plan development is responsibility of the Instituto Nacional de la Pesca (Art. 29, Section XV, Ley General de Acuacultura y Pesca Sustentable). So my question is, the management plan you refer is a proposal from the CANAINPESCA? If so is not an official management plan. As far as I understand, there is not an official management plan for any fishery in Mexico. In Synthesis the fishery you are evaluating does not have a management plan.

3.- I see that many of the references you mention are from 15 and more years old. Is all what exist?

Juan Manuel Garcia Caudillo

Blvd. Bucaneros 35, Playa Ensenada, Ensenada BC México 22880



09<sup>th</sup> March 2010

Dear Juan Manuel Garcia Caudillo

Thank you for submitting your comments regarding the list of reference that were used for the Gulf of California Mexican Sardine MSC assessment.

### 1. References for the stock assessment:

The stock assessment process is based on the methodology described in:

Nevárez-Martínez, M.O., Chávez, E.A., Cisneros-Mata, M.A. and D. Lluch-Belda. 1999. Modeling of the Pacific sardine *Sardinops caeruleus* fishery of the Gulf of California, Mexico. Fish. Res. 41: 273-283.

Nevárez-Martínez, M.O., Martínez-Zavala, M.A., Cotero-Altamirano, C.E., Jacob-Cervantes, M.L., Green-Ruiz, Y., Gluyas-Millán, G., Cota-Villavicencio, A. and J.P. Santos-Molina. 2006. Peces pelágicos menores. En: INAPESCA (ed.) Sustentabilidad y pesca responsable en México: Evaluación y Manejo. INAPESCA-SAGARPA, D.F. 263-301.

Their results are published in the Carta Nacional Pesquera, which forms the basis for the management decisions. The latest results of their assessment were reported and discussed at the following technical meetings:

Nevárez-Martínez, M.O. 2009. Reclutamiento y biomasa de la sardina monterrey (*Sardinops sagax*) en el Golfo de California, México. Presentación en el 17th Taller del Comité Técnico de Pelágicos Menores, Guaymas, Sonora, México, 10 a 12 de junio del 2009.

Martínez-Zavala, M.A., Nevárez-Martínez, M.O., Anguiano-Carrasco, M.L., Santos-Molina J.P. and A. Godínez-Cota. 2009. Pesquería de peces pelágicos menores en el golfo de California. Presentación en el 17th Taller del Comité Técnico de Pelágicos Menores, Guaymas, Sonora, México, 10 a 12 de junio del 2009.

### 2. Management Plan

The management plan is in draft (in its final revision) and was developed by INAPESCA

The proper reference is:

Nevárez-Martínez, M.O., Cotero-Altamirano, C.E., Garcia-Franco, W., Jacob-Cervantes, M.L., Green-Ruiz, Y.A., Gluyan-Millán, G., Martínez-Zavala, M.A. and J.P. Santos-Molina. En revisión. Propuesta de plan de manejo para la pesquería de pelágicos menores (sardina, anchovetas, macarela y afines). INAPESCA. 64 pp.

### 3. Completeness and age of references

The provided references list is comprehensive but not complete. The final list will be released with the draft report for public comments which is anticipated for the end of April. A quick scan of the references so far revealed however that more than 74% of all references are less than 15 years old;

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| 80-85 | 1  |
| 86-90 | 4  |
| 91-95 | 6  |
| 96-00 | 6  |
| 00-05 | 15 |
| 06-09 | 11 |

Please do not hesitate to contact me if you have any further questions.

Kind regards

**Sabine Daume PhD**

*Manager, Sustainable Seafood Certification Program*

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**From:** Juan-Manuel Caudillo

**Sent:** Tuesday, March 09, 2010 1:09 PM

**To:** Sabine Daume

**Subject:** RE: reference used for the Gulf of California Mexican Sardine MSC assessments

Thanks for your answer to my email. I would like to do some clarifications:

The age of the publications you mentions is very subjective you say that 74% of the references are less than 15 years old. Using your same analysis ; I would say that 53% of your references are older than 10 years at the end, the age of a paper would not constitute a criteria for discarding a scientific report. (Darwin's "El origen de las species" is very old right?). what we would analyze is the number of references that are not peer reviewed.

Regarding the management plan is it is a draft then is not official so it cannot be used as reference because it does not officially exist. In fact there is not a single fishery in Mexico with management plan in use.

Thanks again for your time and consideration

Juan Manuel Garcia Caudillo

Bldv. Bucaneros 35, Playa Ensenada

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**E-mail received 12 March 2010**

**To:** Dr. Sabine Daume

**Re:** Comprehensive list of references and documents that have been used for the assessment of the fishery under the MSC standards

**Date:** March 12<sup>th</sup>, 2010

In reference to the email received on February 24<sup>th</sup>, 2010 that informs stakeholders of the references used for the MSC assessment of the Gulf of California Mexican sardine fishery, we would like to make the following comments.

Our main concern is that many of the references that you have compiled correspond to sources that are impossible to consult, and hence are really not true references but rather unverifiable opinions. Many of the publications cited correspond to “gray literature” that is very difficult if not impossible to obtain, such as local reports, or publications from governmental offices that do not have a traceable ISBN number. Furthermore, some of the cited publications are the result of a rigorous peer-review process, but many others are not. Obviously, the trustworthiness of each is quite different.

A smaller, but significant, number of references correspond to sources that are impossible to verify, and hence do not constitute serious and trustable references, in the sense that any interest party may be able to be referred to them for reading. For example, some “references” correspond to talks given in meetings that do not seem to exist in written form, and hence cannot be consulted.

Examples of this are the following:

1. Cisneros-Mata, M.A. and M.A. Martínez Zavala Stakeholders involved and constituency developed to co-manage the small pelagics fishery of the gulf of California. VII Congreso de la Asociación de Investigadores del Mar de Cortés. Hermosillo, Son. México. 25–28 de mayo de 1999.
2. Martínez-Zavala, M.A., Nevárez-Martínez, M.O., Anguiano-Carrasco, M.L., Santos-Molina J.P. and A. Godínez-Cota. 2009. Pesquería de peces pelágicos menores en el golfo de California. Presentación en el 17th Taller del Comité Técnico de Pelágicos Menores, Guaymas, Sonora, México, 10 a 12 de junio del 2009.
3. Nevárez-Martínez, M.O. 2009. Reclutamiento y biomasa de la sardina monterrey (*Sardinops sagax*) en el Golfo de California, México. Presentación en el 17th Taller del Comité Técnico de Pelágicos Menores, Guaymas, Sonora, México, 10 a 12 de junio del 2009.
4. Salvadeo, C., Flores-Ramírez, S., Gómez-Gallardo, A. Jaume-Schinkel, S., Urban, J. and D. Lluch-Belda. 2007. The Bryde’s whale (*Balaenoptera edeni*) in La Paz Bay, México and its relationship with climatic changes and prey availability. 1st CLIOTOP International Symposium. La Paz, México, 3–7 Dec 2007.
5. Santos-Molina, J.P., Nevárez-Martínez, M.O., Cervantes-Higuera, H., Cervantes-Valle C. and A.R. Godínez-Cota. Crucero de Pesca exploratoria de pelágicos menores en el Golfo de California. Febrero de 2009. Presentación en el 17th Taller del Comité Técnico de Pelágicos Menores, Guaymas, Sonora, México, 10 a 12 de junio del 2009.

Other references given in the list correspond to unpublished reports that are not publicly available and hence cannot be consulted. Among these, the following are noteworthy:

1. Del Monte Luna, P. 2008. Technical Report to the Canaipes: La pesquería de pelagicos menores en Golfo de California: Efectos a nivel ecosistema y en especies no-objectivo. La Paz, BCS July 2008.
2. Martínez-Zavala, M.A., Nevárez-Martínez, M.O., Anguiano-Carrasco, M.L., Santos-Molina J.P. and Godínez-Cota A.R. 2006. Diagnósis de la pesquería de pelágicos menores en el golfo de California, temporada de pesca 1998/99 a 2002/2003. SAGARPA, Instituto Nacional de la Pesca. Centro Regional de Investigación Pesquera (Guaymas, Sonora, México). 94 p.
3. Nevárez-Martínez, M.O., Cotero-Altamirano, C.E., Garcia-Franco, W., Jacob-Cervantes, M.L., Green-Ruiz, Y.A., Gluyan-Millán, G., Martínez-Zavala, M.A. and J.P. Santos-Molina. En revisión. Propuesta de plan de manejo para la pesquería de pelágicos menores (sardina, anchovetas, macarela y afines). INAPESCA. 64 pp.
4. Salvadeo, C.J. 2008 Importancia trófica de los pelágicos menores en aguas del Golfo de California. Informe técnico interno del proyecto SEMARNAT-2002-C01-0278 Vulnerabilidad y adaptación del Golfo de California ante la variabilidad y el cambio climático. 13 pp.

Finally, one reference corresponds to an unpublished Master's thesis that is, once again, all but impossible to get:

- Suazo-Guillen, E. 2004. Biología reproductiva y hábitos de forrajeo del bobo café, *Sula leucogaster*, en dos islas del golfo de California, 2003 – 2004. Tesis de Maestría. CICESE. Ensenada, México. 70 pp.

There are hundreds of Master's dissertations discussing important aspects of the Gulf of California ecosystem, and one cannot but wonder why this one in particular was deemed to be of importance? What was the logic behind this inclusion? Its presence in the list does not seem warranted or useful. Finally, perhaps the most important problem with the reference list is the absence of what is probably the most critical reference, namely, the final version of the management plan for the sardine fishery. The reference list only mentions the following:

- Management Plan, The final version of the Management Plan for the sardine fishery may be obtained by contacting Ing. León Tissot, Manager of the Cámara Nacional de la Industria Pesquera en Guaymas, Son. at leontp47@hotmail.com

It is simply not acceptable that the most important reference, the one that should conform the center of the evaluation strategy, does not even correspond to a public document that can be consulted but is part of an indirect request system whose success depends on the goodwill and predisposition of the client. If there is a management plan for the sardine fishery, it should be published in an accessible form to any interested person. Otherwise, how can the quality of the certification process be monitored and examined by civil society? Lastly, in the same manner as there are references that do not seem to be appropriate and should be removed, there are many significant references that deal specifically with the Gulf of California sardine that are not included in the list that was sent to us. A quick search for references with a possible significance yielded at least 45 peer-reviewed papers that are not listed in the references that we received but that seem to be important. The list of these omitted references follows:

1. Aceves-Medina G, Jimenez-Rosenberg SPA, Hinojosa-Medina A, et al. 2003. Fish larvae from the Gulf of California. *Scientia Marina* 67(1): 1-11
2. Aceves-Medina G, Palomares-Garcia R, Gomez-Gutierrez J, et al. 2009. Multivariate characterization of spawning and larval environments of small pelagic fishes in the Gulf of California. *Journal of Plankton Research* 31(10): 1283-1297
3. Auth TD, Brocleur RD, Fisher KM. 2007. Diel variation in vertical distribution of an offshore ichthyoplankton community off the Oregon coast. *Fishery Bulletin* 105(3): 313-326
4. Barange M, Coetzee J, Takasuka A, et al. 2009. Habitat expansion and contraction in anchovy and sardine populations. *Progress in Oceanography* 83(1-4 Special Issue: Sp. Iss. SI): 251-260
5. Cisneros Mata MA, Montemayor Lopez G, Nevarez Martinez MO. 1996. Modeling deterministic effects of age structure, density dependence, environmental forcing, and fishing on the population dynamics of *Sardinops sagax caeruleus* in the Gulf of California. *California Cooperative Oceanic Fisheries Investigations Reports* 37: 201-208
6. De Anda-Montanez A, Arreguin-Sanchez F, Martinez-Aguilar S. 1999. Length-based growth estimates for Pacific sardine (*Sardinops sagax*) in the Gulf of California, Mexico. *California Cooperative Oceanic Fisheries Investigations Reports* 40: 179-183
7. De Anda-Montanez A, Seijo JC. 1999. Bioeconomics of the Pacific sardine (*Sardinops sagax*) fishery in the Gulf of California, Mexico. *California Cooperative Oceanic Fisheries Investigations Reports* 40: 170-178

8. Ehrhardt NM. 1991. Potential impact of a seasonal migratory jumbo squid (*Dosidicus gigas*) stock on a Gulf of California sardine (*Sardinops sagax caerulea*) population. *Bulletin of Marine Science* 49(1-2): 325-332
9. Fernández-Álamo MA, Farber-Lorda J. 2006. Zooplankton and the oceanography of the eastern tropical Pacific: A review. *Progress in Oceanography* 69(2-4): 318-359
10. Finney BP, Alheit J, Emeis KC, et al. 2010. Paleoecological studies on variability in marine fish populations: A long-term perspective on the impacts of climatic change on marine ecosystems. *Journal of Marine Systems* 79(3-4 Special Issue: Sp. Iss. SI): 316-326
11. Franco-Gordo C, Godinez-Dominguez E, Suarez-Morales E, et al. 2008. Interannual and seasonal variability of the diversity and structure of ichthyoplankton assemblages in the central Mexican Pacific. *Fisheries Oceanography* 17(3): 178-190
12. Galindo-Cortes G, De Anda-Montanez JA, Arreguin-Sanchez F, et al. 2010. How do environmental factors affect the stock-recruitment relationship? The case of the Pacific sardine (*Sardinops sagax*) of the northeastern Pacific Ocean. *Fisheries Research* 102(1-2): 173-183
13. Gamez-Meza N, Higuera-Ciapara I, de la Barca AMC, et al. 1999. Seasonal variation in the fatty acid composition and quality of sardine oil from *Sardinops sagax caeruleus* of the Gulf of California. *Lipids* 34(6): 639-642
14. Grant WS, Clark AM, Bowen BW. 1998. Why restriction fragment length polymorphism analysis of mitochondrial DNA failed to resolve sardine (*Sardinops*) biogeography: insights from mitochondrial DNA cytochrome b sequences. *Canadian Journal of Fisheries and Aquatic Sciences* 55(12): 2539-2547
15. Holmgren-Urba D, Baumgartner TR. 1993. A 250-year history of pelagic fish abundances from the anaerobic sediments of the central Gulf of California. *California Cooperative Oceanic Fisheries Investigations Reports* 34: 60-68
16. Lanz E, Nevarez-Martinez MO, Lopez-Martinez J, et al. 2008. Spatial distribution and species composition of small pelagic fishes in the Gulf of California. *Revista de Biología Tropical* 56(2): 575-590
17. Lecomte F, Grant WS, Dodson JJ, et al. 2004. Living with uncertainty: genetic imprints of climate shifts in East Pacific anchovy (*Engraulis mordax*) and sardine (*Sardinops sagax*). *Molecular Ecology* 13(8): 2169-2182
18. Lluch-Belda D, Lluch-Cota DB, Hernandez-Vazquez S, et al. 1991. Sardine and anchovy spawning as related to temperature and upwelling in the California Current System. *California Cooperative Oceanic Fisheries Investigations Reports* 32: 105-111
19. Lluch-Belda D, Lluch-Cota DB, Lluch-Cota SE. 2003. Baja California's biological transition zones: Refuges for the California sardine. *Journal of Oceanography* 59(4): 503-513
20. Markaida U, Sosa-Nishizaki O. 2003. Food and feeding habits of jumbo squid *Dosidicus gigas* (Cephalopoda : Ommastrephidae) from the Gulf of California, Mexico. *Journal of the Marine Biological Association of the United Kingdom* 83(3): 507-522
21. Martinez-Aguilar S, Arreguin-Sanchez F, Morales-Bojorquez E. 2005. Natural mortality and life history stage duration of Pacific sardine (*Sardinops caeruleus*) based on gnomonic time divisions. *Fisheries Research* 71(1): 103-114
22. Martinez-Aguilar S, Montanez JAD, Arreguin-Sanchez F. 1997. Density and capture index of *Sardinops sagax* (Pisces: Clupeidae) in the Gulf of California, Mexico. *Revista de Biología Tropical* 45(1B): 527-535
23. Martinez-Porchas M, Hernandez-Rodriguez M, Buckle-Ramirez LF. 2009. Thermal behavior of the Pacific sardine (*Sardinops sagax*) acclimated to different thermal cycles. *Journal of Thermal Biology* 34(7): 372-376

24. McClatchie S, Goericke R, Koslow JA, et al. 2008. The state of the California Current, 2007-2008: La Niña conditions and their effects on the ecosystem. *California Cooperative Oceanic Fisheries Investigations Reports* 49: 39-76
25. Molina RE, Manrique FA. 1997. Stomach contents of two planktivorous fishes of the Gulf of California during summer 1991. *Ciencias Marinas* 23(2): 163-174
26. Morales-Bojorquez E. 2002. Bayes theorem applied to the yield estimate of the Pacific sardine (*Sardinops sagax caeruleus* Girard) from Bahia Magdalena, Baja California Sur, Mexico. *Ciencias Marinas* 28(2): 167-179
27. Okada T, Morrissey MT. 2007. Seasonal changes in intrinsic characteristics of Pacific sardine (*Sardinops sagax*). *Journal of Aquatic Food Product Technology* 16(1): 51-71
28. Olson DB. 2001. Biophysical dynamics of western transition zones: a preliminary synthesis. *Fisheries Oceanography* 10(2): 133-150
29. Peguero-Icaza M, Sanchez-Velasco L, Lavin MF, et al. 2008. Larval fish assemblages, environment and circulation in a semi enclosed sea (Gulf of California, Mexico). *Estuarine, Coastal and Shelf Science* 79(2): 277-288
30. Peterson B, Emmett R, Goericke R, et al. 2006. The state of the California current, 2005-2006: Warm in the North, cool in the South. *California Cooperative Oceanic Fisheries Investigations Reports* 47): 30-74
31. Quinonez-Velazquez C, Nevarez-Martinez MO, Gluyas-Millan MG. 2000. Growth and hatching dates of juvenile pacific sardine *Sardinops caeruleus* in the Gulf of California. *Fisheries Research* 48(2): 99-106
32. Sanchez-Velasco L, Valdez-Holguin JE, Shirasago B, et al. 2002. Changes in the spawning environment of *Sardinops caeruleus* in the Gulf of California during El Nino 1997-1998. *Estuarine, Coastal and Shelf Science* 54(2): 207-217
33. Sanchez-Velasco L, Shirasago B, Cisneros-Mata MA, et al. 2000. Spatial distribution of small pelagic fish larvae in the Gulf of California and its relation to the El Nino 1997-1998. *Journal of Plankton Research* 22(8): 1611-1618
34. Santamaria Del Angel E, Alvarez-Borrego S, Muller-Karger FE. 1994. Gulf of California biogeographic regions based on coastal zone color scanner imagery. *Journal of Geophysical Research - Oceans* 99 (C4): 7411-7421
35. Schwartzlose RA, Alheit J, Bakun A, et al. 1999. Worldwide large-scale fluctuations of sardine and anchovy populations. *South African Journal of Marine Science - Suid-Afrikaanse Tydskrif Vir Seewetenskap* 21: 289-347
36. Silverberg N, Martinez A, Aguiniga S, et al. 2004. Contrasts in sedimentation flux below the southern California Current in late 1996 and during the El Nino event of 1997-1998. *Estuarine, Coastal and Shelf Science* 59(4): 575-587
37. Takasuka A, Oozeki Y, Kubota H, et al. 2008. Contrasting spawning temperature optima: Why are anchovy and sardine regime shifts synchronous across the North Pacific? *Progress in Oceanography* 77(2-3): 225-232
38. Taniguchi A. 1999. Differences in the structure of the lower trophic levels of pelagic ecosystems in the eastern and western subarctic Pacific. *Progress in Oceanography* 43(2-4): 289-315
39. Valle SR, Herzka SZ. 2008. Natural variability in delta O-18 values of otoliths of young Pacific sardine captured in Mexican waters indicates subpopulation mixing within the first year of life. *ICES Journal of Marine Science* 65(2): 174-190
40. Valle-Levinson A, Castro AT, de Velasco GG, et al. 2004. Diurnal vertical motions over a seamount of the southern Gulf of California. *Journal of Marine Systems* 50(1-2): 61-77

41. Velarde E, Tordesillas MDLS, Vieyra L, et al. 1994. Seabirds as indicators of important fish populations in the Gulf of California. *California Cooperative Oceanic Fisheries Investigations Reports* 35: 137-143
42. Vieyra L, Velarde E, Ezcurra E. 2009. Effects of parental age and food availability on the reproductive success of Heermann's Gulls in the Gulf of California. *Ecology* 90(4): 1084-1094
43. Ward TM, Hoedt F, McLeay L, et al. 2001. Have recent mass mortalities of the sardine *Sardinops sagax* facilitated an expansion in the distribution and abundance of the anchovy *Engraulis australis* in South Australia? *Marine Ecology - Progress Series* 220: 241-251
44. Yatsu A, Aydin KY, King JR, et al. 2008. Elucidating dynamic responses of North Pacific fish populations to climatic forcing: Influence of life-history strategy. *Progress in Oceanography* 77(2-3): 252-268
45. Yen PPW, Sydeman WJ, Bograd SJ, et al. 2006. Spring-time distributions of migratory marine birds in the southern California Current: Oceanic eddy associations and coastal habitat hotspots over 17 years. *Deep-Sea Research Part II - Topical Studies in Oceanography* 53(3-4): 399-418

In summary, the list provided has serious limitations, which could have been easily addressed by checking a standard scientific database such as the Web of Science from Thompson Scientific (which we consulted). The important point from our perspective is the transparency and traceability of the data used in the preparation of the report. We certainly hope that this limited bibliography is not a reflection of the quality of the assessment process, and we look forward for the publication of the final draft report.

Sincerely,

Dr. Exequiel Ezcurra

Dr. Luis Bourillón

Dra. Enriqueta Velarde

Dr. Juan Pablo Gallo

M. en C. Juan Manuel García Caudillo

Dr. Alejandro Rodríguez

M. en C. María de los Ángeles Carvajal

Dr. Jorge Torre

MPP. Stephen Cox

## SCS response

(Via email)

Dear Luis

Thank you for your comments. The list of reference was intended as an initial attempt to provide stakeholders with some of the documents and sources that were used during the assessment. This came about because questions have been asked by the stakeholders regarding the availability of these documents. The list is not complete and was not intended to support a full review of sardine fisheries worldwide.

Taken out of context it might be hard to judge their appropriateness. May I suggest to wait until the draft report is released and any comments and suggestions that remain can then be addressed more fully.

We are confident that at the time of the release of the public draft report there will be a specific website, dedicated to the certification process and hosted by the National Institute of Fisheries and Aquaculture, from which all references and documents can be accessed. This will give an easy access to all the documents and hopefully address some of your concerns. We got confirmation about this arrangement last night and I was waiting to hear back before I send you this reply.

Kind regards  
Sabine

### **Sabine Daume PhD**

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**Scientific Certification Systems**

*Setting the Standard for Sustainability*



30 July 2010

*Sent via email*

**SUBJECT: MSC Review and Report on Compliance with the Scheme Requirements (Gulf of California Sardine Public Comment Draft Report)**

Dear Sabine,

Please find a below the results of our review of compliance with scheme requirements.

|  |                                       |                                |
|--|---------------------------------------|--------------------------------|
|  | CB                                    | SCS                            |
|  | Lead Auditor                          | Sabine Daume                   |
|  | Fishery                               | Gulf of California<br>Sardine  |
|  | Fishery<br>assessment<br>product type | Public Comment<br>Draft Report |
|  | Type of review                        | Desk study                     |

| No. | Type of finding | Scheme requirement                 | Reference              | Details   |
|-----|-----------------|------------------------------------|------------------------|---|
| 1   | Major           | FCM v 6.1, Appendix A, 4.1         | N/A                    | The report shall describe in detail the unit of certification for the assessment and provide a rationale for choosing the unit of certification. No such details are provided.          |
| 2   | Major           | TAB Directive 029 v1, paragraph 9. | Section 2.1, pages 5-7 | Certifiers shall include a detailed summary of submissions received during the site visits (issues of concern material to the outcome) and explicit responses from the assessment team. |
| 3   | Major           | FCM v6.1, Appendix A, 4.4          | Figure 2, page 15.     | References to the sources of information used in a report shall be provided. No reference to the source of  |

|   |       |  |                         |  |
|---|-------|--|-------------------------|--|
|   |       |  |                         | Figure 2 is provided.  |
| 4 | Major | FCM v6.1, Appendix A, 3.2  | Section 5, pages 15-17. | The report shall include a summary of, amongst other things, the status of the stocks as indicated by stock assessments, including a description of the assessment methods, standards, and stock indicators, biological limits used. The background section of the report provides very little detail on these matters.  |
| 5 | Major | Chain of Custody Standard v2.1, paragraph 3.3.<br><br>FCM v6.1, paragraph 3.5.1<br><br>Policy Advisory 5 v2.1, paragraph 5.  | Section 7, pages 21-22  | Certified and non-certified fish must be kept separate so that only MSC certified fish enter further certified chains of custody. Section 4.4 and Section 5 of the Public Comment Draft Report (pages 14-15) indicates that the composition of catches can vary significantly, yet no information is presented to describe how catches from the stock under assessment are separated from catches from other stocks.<br><br>Note: See comment XX below. Section 6.1 (page 17) of the report notes the fishery has very low levels of by-catch. The apparent contradiction between sections 4.4 and 5 and Section 6.1 should be reviewed. |
| 6 | Major | Section 3.5.1 of the FCM,v6 'If the certification body is satisfied that the system of tracking and tracing in the fishery is sufficient to ensure all fish and fish products identified as such by the fishery originate from the evaluated fishery, then the certification | Pg 21, Section 7        | Section 7 does not clearly identify all the eligible vessels.  |

|    |       |  |                       |  |
|----|-------|--|-----------------------|--|
|    |       | body shall clearly state within its certification report that fish and fish products from the fishery may enter into further chains of custody                                       |                       |  |
| 7  | Major | Section 5.2, Appendix I of FCM v6<br>'the assurances the certification body can make about the point to which products from the fishery can be traced'                               | Pg21, Section 7       | The report does not describe the point to which products from the fishery can be traced as the list of all ports where landing occurs is not provided.   |
| 8  | Major | PA 3, v1.1 The target eligibility date, rationale and assessment shall be included in the traceability section of the 'Preliminary Draft Report', the 'Public Comment Draft Report'' | Pg 21, Section 7      | The report does not state the target eligibility date.   |
| 9  | Major | FCM v6.1, Appendix 1 paragraph 5.1   | PI 1.1.1, pages 27-28 | A detailed rationale which justifies the score awarded to a performance indicator shall be provided. The rationale does not justify the score of 90 against the scoring issues.<br><br>No detail is provided as to the target reference point in place for the fishery. No evidence is provided that the stock is fluctuating around this reference point. |
| 10 | Major | FCM v6.1, Appendix 1 paragraph 5.1<br><br>FAM v1, paragraphs 6.2.26 & 6.2.27   | PI 1.1.2, pages 28-29 | A detailed rationale which justifies the score awarded to a performance indicator shall be provided. The rationale does not justify the score of 85 against the scoring issues.<br><br>At the SG80 level, the limit reference point must be set above a level where there is an  |

|    |       |                                    |                      |  |
|----|-------|------------------------------------|----------------------|--|
|    |       |                                    |                      | <p>appreciable risk of impairing reproductive capacity. No detail is provided as to whether the limit reference point in this fishery meets this requirement.</p> <p>At the SG80 level for a low trophic level species, the target reference point must take into account the ecological role of the stock. No evidence is presented that a 0.9 <math>F_{MSY}</math> target takes into account the ecological role of the stock in the Gulf of California.<sup>1</sup></p> |
| 11 | Major | FCM v6.1, Appendix 1 paragraph 5.1 | P 1.2.1, pages 29-30 | <p>A detailed rationale which justifies the score awarded to a performance indicator shall be provided. The rationale does not justify the score of 80 against the scoring issues.</p> <p>At the SG80 level, monitoring is in place and evidence exists that the harvest strategy is meeting its objectives. Detail needs to be provided on the monitoring in place to ensure the harvest strategy is meeting objectives.</p>  |
| 12 | Major | FCM v6.1, Appendix 1 paragraph 5.1 | P 1.2.2, page 31     | <p>A detailed rationale which justifies the score awarded to a performance indicator shall be provided. The rationale does not justify the score of 80 against the scoring issues.</p> <p>At the SG80 level, the main uncertainties shall be taken into account in the selection of the harvest control rules. No details of the uncertainties (climatic, at-sea grading of catch etc.) or how these</p>   |

<sup>1</sup> As noted in further correspondence with the certifier and client, the MSC is actively reviewing and revising requirements pertaining to low trophic level species, including reference points used in the management of these fisheries.

|    |       |  |                          |   |
|----|-------|--|--------------------------|---|
|    |       |  |                          | uncertainties have been considered is presented.  |
| 13 | Major | FCM v6.1, paragraph 3.4.5<br><br>TAB Directive 014 v1.1, paragraph | Condition 1.2.4, page 34 | <p>Certifiers shall specify conditions that closely follow the narrative or metric form of the performance indicators and scoring guideposts used in the assessment tree. Certifiers must not be prescriptive about the means of meeting conditions, although recommendations or suggestions may be made.</p> <p>The current wording of the condition does not follow the narrative or metric of the performance indicator and includes prescriptive wording as to how the condition may be achieved.</p> |
| 14 | Major | FCM v6.1, Appendix 1 paragraph 5.1<br><br>FAM v1, paragraph 7.2.2  | PI 2.1.1, page 34        | <p>Assessment teams shall use their expert judgment to determine and justify in writing which species are considered ‘main’ and which are not.</p> <p>No such justification is provided.</p>  |
| 15 | Major | FCM v6.1, Appendix 1 paragraph 5.1                                 | P 2.1.2, pages 34 & 35   | <p>A detailed rationale which justifies the score awarded to a performance indicator shall be provided. The rationale does not justify the score of 85 against the scoring issues.</p> <p>At the SG80 level, there shall be an objective basis for confidence that the partial strategy will work. Within the rationale it is note that the harvest rate is not set for individual species. On this basis, it appears unlikely that there is confidence that the strategy will work.</p>                  |
| 16 | Major | FCM v6.1, Appendix 1 paragraph 5.1                                 | P 2.2.1, pages 36 &      | A detailed rationale which justifies the score awarded to a   |

|    |       |  |                          |   |
|----|-------|--|--------------------------|---|
|    |       | FAM v1, paragraph 7.3.2  | 37                       | <p>performance indicator shall be provided. The rationale does not justify the score of 80 against the scoring issues.</p> <p>No information is presented to indicate that trigger fish are likely to be within biologically based limits, or if outside that demonstrably effective mitigation measures are in place such the fishery does not hinder recovery or rebuilding.</p> <p>Assessment teams shall use their expert judgment to determine and justify in writing which species are considered ‘main’ and which are not.</p> <p>No such justification is provided.</p> |
| 17 | Major | FCM v6.1, paragraph 3.4.5<br><br>TAB Directive 014 v1.1, paragraph | Condition 2.2.3, page 38 | <p>Certifiers shall specify conditions that closely follow the narrative or metric form of the performance indicators and scoring guideposts used in the assessment tree.</p> <p>The current wording of the condition does not follow the narrative or metric form of the performance indicator or scoring guideposts.</p>  |
| 18 | Major | FCM v6.1, Appendix 1 paragraph 5.1                                 | P 2.3.1, pages 38 & 39   | <p>A detailed rationale which justifies the score awarded to a performance indicator shall be provided. The rationale does not justify the score of 80 against the scoring issues.</p> <p>The rationale speaks specifically to the fishery’s impact on Vaquitas and not to other noted ETP species.</p>   |
| 19 | Major | FCM v6.1, Appendix 1 paragraph 5.1                                 | PI 3.1.2, pages 47-50    | <p>A detailed rationale which justifies the score awarded to a performance indicator shall be</p>   |

|    |       |  |                          |   |
|----|-------|--|--------------------------|---|
|    |       |  |                          | <p>provided. The rationale does not justify the score of 85 against the scoring issues.</p> <p>At the SG80 level, the management system should demonstrate consideration of the information obtained. Within the rationale it is noted that “there is limited evidence that the management system seeks for outside information beyond scientific research”.</p>  |
| 20 | Major | FCM v6.1, Appendix 1 paragraph 5.1                                 | PI 3.1.4, page 51        | <p>A detailed rationale which justifies the score awarded to a performance indicator shall be provided. The rationale does not justify the score of 85 against the scoring issues.</p> <p>At the SG80 level, the management system incentives that are consistent with achieving the MSCs outcomes expressed for Principle 1 and 2 and seek to ensure negative incentives do not arise. The rationale does not state how the subsidisation of fuel (generally considered a bad subsidization practice for environmental outcomes) is controlled such that negative incentives do not arise.</p> |
| 21 | Major | FCM v6.1, paragraph 3.4.5<br><br>TAB Directive 014 v1.1, paragraph | Condition 3.2.1, page 53 | <p>Certifiers shall specify conditions that closely follow the narrative or metric form of the performance indicators and scoring guideposts used in the assessment tree. Certifiers must not be prescriptive about the means of meeting conditions, although recommendations or suggestions may be made.</p> <p>The current wording of the condition does not follow the narrative or metric of the</p>  |

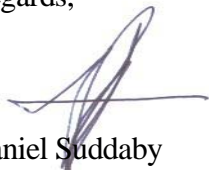
|    |          |                                    |  |  |
|----|----------|------------------------------------|--|--|
|    |          |                                    |  | performance indicator and includes prescriptive wording as to how the condition may be achieved.   |
| 22 | Major    | FCM v6.1, Appendix 1 paragraph 5.1 | PI 3.2.3, pages 54-55  | <p>A detailed rationale which justifies the score awarded to a performance indicator shall be provided. The rationale does not justify the score of 80 against the scoring issues.</p> <p>At the SG80 level, the control system in place must demonstrate an ability to enforce management measures and show that sanctions are consistently applied. No evidence is provided to satisfy these requirements.</p> |
| 23 | Guidance | General                            | Introduction section, page 5   | <p>The MSC's mission has been updated to:</p> <p>“Our mission is to use our ecolabel and fishery certification programme to contribute to the health of the world's oceans by recognising and rewarding sustainable fishing practises, influencing the choices people make when buying seafood, and working with our partners to transform the seafood market to a sustainable basis.”</p>                       |
| 24 | Guidance | General                            | Section 4.4 (page 14), Section 5 (pages 15-17), Section 6.1 (page 17) and Section 6.11 (pages 17-18) | <p>The discussions about other species taken in the fishery are confusing and potentially contradictory. While in certain parts, it is stated that the fishery is very clean (&lt;1% bycatch, page 17) in other parts suggest higher rates of bycatch (Table 2, page 18). These elements of the report should be reviewed for clarity and to ensure no contradictions are made.</p>                              |
| 25 | Guidance | Policy Advisory 5                  | Section 7,   | In order to ensure sufficient  |



|    |          |                                     |                     |  |
|----|----------|-------------------------------------|---------------------|--|
|    |          | v2.1, paragraph 5                   | pages 21-22         | coverage of information to stakeholders and other certifiers, the MSC recommends information within the traceability section be structured using the sub-headings provided.  |
| 26 | Guidance | General                             | Section 10, page 27 | The report indicates the use of AHP in the assessment process. As the assessment used the FAM, AHP will not have been used in assigning weightings of particular performance indicators within the assessment tree. Please review this section to ensure it is an accurate reflection of the assessment process. |
| 27 | Guidance | TAB Directive 10 (v2.1), Section 3. | Section 12, page 61 | Section 12 of the report (page 61) indicates 'certificate sharing' is anticipated in this fishery, thus the MSC reminds the certifier of the requirements of Section 3 of TAB Directive 010.   |

This report is provided for action by the Certification Body and ASI in order to improve consistency with the MSC scheme requirements; MSC does not review all Certification Bodies work products and this review should not be considered a checking service. If any clarification is required, please contact the MSC Fishery Assessment Manager, Dan Hoggarth for more information.

Regards,



Daniel Suddaby  
Senior Fisher Certification Manager  
Standards and Licensing Department

cc: Accreditation Services International

## Team response to MSC comments on Gulf of California Sardine PCDR received on 30 July 2010

Each individual finding and guidance stated in the MSC submission is addressed by the team:

| No. | Type of finding | Scheme requirement         | Reference | Details  |
|-----|-----------------|----------------------------|-----------|--|
| 1   | Major           | FCM v 6.1, Appendix A, 4.1 | N/A       | The report shall describe in detail the unit of certification for the assessment and provide a rationale for choosing the unit of certification. No such details are provided. |

Team response 1: Specific section (4.1) was included to describe the unit of certification and a complete list of names and permit numbers of vessels that are included in the unit of certification are provided in Appendix 1

|   |       |                                    |                        |   |
|---|-------|------------------------------------|------------------------|---|
| 2 | Major | TAB Directive 029 v1, paragraph 9. | Section 2.1, pages 5-7 | Certifiers shall include a detailed summary of submissions received during the site visits (issues of concern material to the outcome) and explicit responses from the assessment team. |
|---|-------|------------------------------------|------------------------|---|

Team response 2: N.A. a variance was granted from MSC regarding this finding (see MSC letter dated 23 Sept. 2010). However specific stakeholder comments (e.g. those received regarding the PCDR) have been individually addressed.

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|---|-------|---------------------------|--------------------|--|
| 3 | Major | FCM v6.1, Appendix A, 4.4 | Figure 2, page 15. | References to the sources of information used in a report shall be provided. No reference to the source of Figure 2 is provided. |
|---|-------|---------------------------|--------------------|--|

Team response 3: References to the data source are now provided.

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|---|-------|---------------------------|-------------------------|---|
| 4 | Major | FCM v6.1, Appendix A, 3.2 | Section 5, pages 15-17. | The report shall include a summary of, amongst other things, the status of the stocks as indicated by stock assessments, including a description of the assessment methods, standards, and stock indicators, biological limits used. The background section of the report provides very little detail on these matters. |
|---|-------|---------------------------|-------------------------|---|

Team response 4: Section 5 of the report was modified adding a complete subsection (5.3) with the description of the Stock Assessment, Reference Points and Harvesting strategy for the fishery.

|   |       |   |                        |   |
|---|-------|---|------------------------|---|
| 5 | Major | Chain of Custody Standard v2.1, paragraph 3.3.<br><br>FCM v6.1, paragraph 3.5.1<br><br>Policy Advisory 5 v2.1, paragraph 5. | Section 7, pages 21-22 | Certified and non-certified fish must be kept separate so that only MSC certified fish enter further certified chains of custody. Section 4.4 and Section 5 of the Public Comment Draft Report (pages 14-15) indicates that the composition of catches can vary significantly, yet no information is presented to describe how catches from the stock under assessment are separated from |
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|  |  |  |  | catches from other stocks.<br><br>Note: See comment XX below. Section 6.1 (page 17) of the report notes the fishery has very low levels of by-catch. The apparent contradiction between sections 4.4 and 5 and Section 6.1 should be reviewed. |
|--|--|--|--|--|

Team response 5: Section 7 was updated. The composition of the catch e.g. retained species can vary but the amount of bycatch (species that are not retained and sold) taken in this fishery is continuously low. The sections have been revised to clarify what is considered under bycatch see also response to no 24.

|   |              |   |                  |   |
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| 6 | <i>Major</i> | Section 3.5.1 of the FCM,v6 ‘If the certification body is satisfied that the system of tracking and tracing in the fishery is sufficient to ensure all fish and fish products identified as such by the fishery originate from the evaluated fishery, then the certification body shall clearly state within its certification report that fish and fish products from the fishery may enter into further chains of custody | Pg 21, Section 7 | Section 7 does not clearly identify all the eligible vessels. |
|---|--------------|---|------------------|---|

Team response 6: As stated above, there is now a list of eligible vessels appended to the report (Appendix 1)

|   |              |   |                 |  |
|---|--------------|---|-----------------|--|
| 7 | <i>Major</i> | Section 5.2, Appendix I of FCM v6 ‘the assurances the certification body can make about the point to which products from the fishery can be traced’ | Pg21, Section 7 | The report does not describe the point to which products from the fishery can be traced as the list of all ports where landing occurs is not provided. |
|---|--------------|---|-----------------|--|

Team response 7: The list of eligible vessel (Appendix 1) also include the port of landing

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|---|--------------|---|------------------|--|
| 8 | <i>Major</i> | PA 3, v1.1 The target eligibility date, rationale and assessment shall be included in the traceability section of the ‘Preliminary Draft Report’, the ‘Public Comment Draft Report’ | Pg 21, Section 7 | The report does not state the target eligibility date. |
|---|--------------|---|------------------|--|

Team response 8: The target elegebility date was included in section 7 according to TAB –D021 and PA 5(v2).

|   |              |                                    |                       |   |
|---|--------------|------------------------------------|-----------------------|---|
| 9 | <i>Major</i> | FCM v6.1, Appendix 1 paragraph 5.1 | PI 1.1.1, pages 27-28 | A detailed rationale which justifies the score awarded to a performance indicator shall be provided. The rationale does not justify the score of 90 against the scoring issues. |
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|  |  |  |  | No detail is provided as to the target reference point in place for the fishery. No evidence is provided that the stock is fluctuating around this reference point. |
|--|--|--|--|---|

Team response 9: The rationale to support the score of this PI was modified, with information of the recent Recruitment and SSB values and with recent F values and compared with the reference point  $0.9F_{MSY} = 0.25$ .

|    |       |  |                       |  |
|----|-------|--|-----------------------|--|
| 10 | Major | FCM v6.1, Appendix 1 paragraph 5.1<br><br>FAM v1, paragraphs 6.2.26 & 6.2.27 | PI 1.1.2, pages 28-29 | <p>A detailed rationale which justifies the score awarded to a performance indicator shall be provided. The rationale does not justify the score of 85 against the scoring issues.</p> <p>At the SG80 level, the limit reference point must be set above a level where there is an appreciable risk of impairing reproductive capacity. No detail is provided as to whether the limit reference point in this fishery meets this requirement.</p> <p>At the SG80 level for a low trophic level species, the target reference point must take into account the ecological role of the stock. No evidence is presented that a <math>0.9 F_{MSY}</math> target takes into account the ecological role of the stock in the Gulf of California.<sup>2</sup></p> |
|----|-------|--|-----------------------|--|

Team response 10: The rationale to support the score of this PI was modified in order to state more clearly, the reference points and their rationale, as well as the performance of F in recent years, showing that the values have been better for maintaining BMSY. In addition, explanations of the evidences on how the target reference points have allowed the ecological role of the stock to continue are presented.

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|----|-------|------------------------------------|----------------------|---|
| 11 | Major | FCM v6.1, Appendix 1 paragraph 5.1 | P 1.2.1, pages 29-30 | <p>A detailed rationale which justifies the score awarded to a performance indicator shall be provided. The rationale does not justify the score of 80 against the scoring issues.</p> <p>At the SG80 level, monitoring is in place and evidence exists that the harvest strategy is meeting its objectives. Detail needs to be provided on the monitoring in place to ensure the harvest strategy is meeting objectives.</p> |
|----|-------|------------------------------------|----------------------|---|

<sup>2</sup> As noted in further correspondence with the certifier and client, the MSC is actively reviewing and revising requirements pertaining to low trophic level species, including reference points used in the management of these fisheries.

Team response 11: The rationale for this PI was modified in order to describe the harvesting strategy and its relationship with the reference points, as well as the monitoring system more clearly.

|    |       |                                    |                  |   |
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| 12 | Major | FCM v6.1, Appendix 1 paragraph 5.1 | P 1.2.2, page 31 | <p>A detailed rationale which justifies the score awarded to a performance indicator shall be provided. The rationale does not justify the score of 80 against the scoring issues.</p> <p>At the SG80 level, the main uncertainties shall be taken into account in the selection of the harvest control rules. No details of the uncertainties (climatic, at-sea grading of catch etc.) or how these uncertainties have been considered is presented.</p> |
|----|-------|------------------------------------|------------------|---|

Team response 12: The rationale of this PI was modified to be more explicit in regards to the harvest control rules, and how its application account for uncertainties.

|    |       |   |                          |   |
|----|-------|---|--------------------------|---|
| 13 | Major | <p>FCM v6.1, paragraph 3.4.5</p> <p>TAB Directive 014 v1.1, paragraph</p> | Condition 1.2.4, page 34 | <p>Certifiers shall specify conditions that closely follow the narrative or metric form of the performance indicators and scoring guideposts used in the assessment tree. Certifiers must not be prescriptive about the means of meeting conditions, although recommendations or suggestions may be made.</p> <p>The current wording of the condition does not follow the narrative or metric of the performance indicator and includes prescriptive wording as to how the condition may be achieved.</p> |
|----|-------|---|--------------------------|---|

Team response 13: The wording of the condition was modified following the narrative of the performance indicator.

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|----|-------|--|-------------------|--|
| 14 | Major | <p>FCM v6.1, Appendix 1 paragraph 5.1</p> <p>FAM v1, paragraph 7.2.2</p> | PI 2.1.1, page 34 | <p>Assessment teams shall use their expert judgment to determine and justify in writing which species are considered ‘main’ and which are not.</p> <p>No such justification is provided.</p> |
|----|-------|--|-------------------|--|

Team response 14: The background information (section 6.1.1) and the rational of 2.1.1 were updated to clearly state which species are considered “main” and justification for that decision has been provided. The score in 2.1.1 was lowered and a condition assigned to this PI and recommendations made to introduce an assessment for the main retained species.

|    |       |                                    |                        |   |
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| 15 | Major | FCM v6.1, Appendix 1 paragraph 5.1 | P 2.1.2, pages 34 & 35 | A detailed rationale which justifies the score awarded to a performance indicator shall be provided. The rationale does not justify the |
|----|-------|------------------------------------|------------------------|---|

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|--|--|--|--|--|
|  |  |  |  | <p>score of 85 against the scoring issues.</p> <p>At the SG80 level, there shall be an objective basis for confidence that the partial strategy will work. Within the rationale it is note that the harvest rate is not set for individual species. On this basis, it appears unlikely that there is confidence that the strategy will work.</p> |
|--|--|--|--|--|

Team response 15: The score in 2.1.1 and 2.1.2 was lowered and a condition assigned to this PI to address the issue that harvest rates are not set for individual species. The rationale was revised accordingly. We also advised in section 7, that SCS considers applying TAB-D030 v1 at the first annual surveillance audit which will involve considering the relative amounts of other retained species in the fishery in the most recent fishing year and if the product can carry the MSC logo.

|    |       |  |                                   |   |
|----|-------|--|-----------------------------------|---|
| 16 | Major | <p>FCM v6.1, Appendix 1 paragraph 5.1</p> <p>FAM v1, paragraph 7.3.2</p> | <p>P 2.2.1, pages 36 &amp; 37</p> | <p>A detailed rationale which justifies the score awarded to a performance indicator shall be provided. The rationale does not justify the score of 80 against the scoring issues.</p> <p>No information is presented to indicate that trigger fish are likely to be within biologically based limits, or if outside that demonstrably effective mitigation measures are in place such the fishery does not hinder recovery or rebuilding.</p> <p>Assessment teams shall use their expert judgment to determine and justify in writing which species are considered ‘main’ and which are not.</p> <p>No such justification is provided.</p> |
|----|-------|--|-----------------------------------|---|

Team response 16: Section 6.1 has been expanded to explain why there are no “main” bycatch species in the fishery (low bycatch, total <1% of total catch). In addition the rationale of 2.2.1 was modified to include this explanation.

|    |       |   |                                 |  |
|----|-------|---|---------------------------------|--|
| 17 | Major | <p>FCM v6.1, paragraph 3.4.5</p> <p>TAB Directive 014 v1.1, paragraph</p> | <p>Condition 2.2.3, page 38</p> | <p>Certifiers shall specify conditions that closely follow the narrative or metric form of the performance indicators and scoring guideposts used in the assessment tree.</p> <p>The current wording of the condition does not follow the narrative or metric form of the performance indicator or scoring guideposts.</p> |
|----|-------|---|---------------------------------|--|

Team response 17: The condition has been re-worded to follow the narrative of the 80 guidepost more closely.

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|----|-------|------------------------------------|------------------------|---|
| 18 | Major | FCM v6.1, Appendix 1 paragraph 5.1 | P 2.3.1, pages 38 & 39 | <p>A detailed rationale which justifies the score awarded to a performance indicator shall be provided. The rationale does not justify the score of 80 against the scoring issues.</p> <p>The rationale speaks specifically to the fishery's impact on Vaquitas and not to other noted ETP species.</p> |
|----|-------|------------------------------------|------------------------|---|

Team response 18: The information in section 6.2 has been updated and specific reference is made to this in the rationale of PI 2.3.1.

|    |       |                                    |                       |   |
|----|-------|------------------------------------|-----------------------|---|
| 19 | Major | FCM v6.1, Appendix 1 paragraph 5.1 | PI 3.1.2, pages 47-50 | <p>A detailed rationale which justifies the score awarded to a performance indicator shall be provided. The rationale does not justify the score of 85 against the scoring issues.</p> <p>At the SG80 level, the management system should demonstrate consideration of the information obtained. Within the rationale it is noted that "there is limited evidence that the management system seeks for outside information beyond scientific research".</p> |
|----|-------|------------------------------------|-----------------------|---|

Team response 19: The comment quoted was part of a draft that was accidentally left in the report. However, after reviewing the full operation of the management system and the calls for public comments, which are detailed below, it is no longer warranted.

The several instances of the management system (from the integration of a General Law as the LGPAS down to the Fishing Chart and specific conditions discussed at the annual meetings of the Comité Técnico de Pelágicos Menores) are open to the participation of the civil society.

- a. The Consejo Nacional de Pesca y Acuicultura (the predecessor of the one described below) referred to by the stakeholders included at least two members from NGOs from the civil society: one from the Foundation for the Conservation of Billfishes and another from the sport fishing groups in Baja California Sur.
- b. The current Consejo Nacional de Pesca y Acuicultura Sustentables includes the Undersecretary of Environmental Affairs of the Secretariat of the Environment and Natural Resources, the Director General of Enforcement of Fisheries and Marine Resources of the Procuraduría Federal de Protección al Ambiente (the Federal Attorney for Environmental Protection), a member of academia (The National Autonomous University) and the President of the Colegio Nacional de Profesionales de la Pesca (the National Association of Fisheries Professionals).
- c. Regarding the more specific concerns about the natural resources and the environment, the SEMARNAT has Consejos Consultivos para el Desarrollo Sustentable (Advisory Councils for Sustainable Development), both at the national and regional levels, where input from all sectors of

society to promote protection, conservation and restoration of ecosystems and natural resources is encouraged. Participants in these councils are appointed in a democratic manner. They are a direct connection to the representatives of the environmental sector into the Consejo Nacional de Pesca y Acuicultura Sustentables, described above, since the Undersecretary of SEMARNAT and the Federal Attorney for Environmental Protection are part of it.

- d. As stated in the report, the civil society may have full access (and it is further requested) to The Draft Regulation of the General Law on Sustainable Fisheries and Aquaculture in order to express comments:

*Following the agreement of the Consejo Nacional de Pesca y Acuicultura as of July 1<sup>st</sup>, 2009... the last version of the draft Regulation of the General Law of Sustainable Fisheries and Aquaculture was made available to the fisheries and aquaculture sector, as well as to the general public for the purpose of obtaining comments before July 10<sup>th</sup>, 2009...*

- e. The procedures for the establishment of NOMs are explicitly defined in the law itself, and incorporate not only public access to the process, but ask for it in the Diario Oficial de la Federación (DOF, Official Federal Government Gazette), the official communication medium:

In Article 44:

*The federal government agencies are responsible for the elaboration of the first drafts of NOMs and to submit them to the Comités Consultivos Nacionales de Normalización (CCNN, National Consulting Normalization Committees). Other national normalization organisms may also submit first order drafts to the CCNNs. These will, in turn, integrate the second order drafts. They will also search for the existence of similar NOMs, in which case coordination between agencies will be mandatory. Further, they will take in account other national and international norms. The CCNNs will comment the draft within a period not longer than 75 days.*

*The originating agencies will then answer to comments and do the necessary modifications within the following 30 days. The result will then be the Project of NOM, that will be published in the Diario Oficial de la Federación (DOF, Official Federal Government Gazette). This will remain posted for public scrutiny for 60 days during which any interested party may revise the documentation that will be available with the corresponding CCNN and submit any comments or suggestions.*

*The CCNN will analyze the comments and suggestions and, in due course, will modify the project within the following 45 days. Then answers to comments and suggestions will be published in the DOF at least 15 days in advance of the final publication of the NOM.*

The CCNN for the fisheries sector is known as the Comité Consultivo Nacional de Normalización de Pesca Responsable (National Consultive Committee for the Normalization of Responsible Fisheries) and is constituted by government officials from the CONAPESCA, the Director General of Norms (Secretariat of Economy), the President of the National Chamber of the Fisheries and Aquaculture Industries, the President of the National Organization of Fisheries Cooperatives, the Chief of Staff of the Navy, the Director General and other officials of Merchant Shipping (Secretariat of Communications and Transportation), representatives from the Secretariat of Public Health and Secretariat of Tourism; the Director of the Institute of Marine Sciences of the National Autonomous University of Mexico, a representative from the National Waters Commission, the Undersecretary of the Secretariat of the Environment and Natural Resources, the regional Directors of INAPESCA, the Director General of the *Procuraduría de la Defensa del Ambiente* (Attorney for the Defense of Environment), representatives from the net manufacturing industry, marine equipment and cables industry, as



well as the Director of INAPESCA and the Colegio de Profesionales de la Pesca (Association of Fisheries Professionals).

A recent example of the interactions between the originating governmental section and the public comments may be found in the Diario Oficial de la Federación of October 3<sup>rd</sup>, 2006, that displays the answers to comments from public scrutiny for the integration of NOM PESQ 029.

- f. Dr. Enriqueta Velarde, member of academia and NGOs has participated in the annual meetings of the Comité Técnico de Pelágicos Menores; the invitation open for other potential participants is shown in the Reports of the Committee.

Memorias del XVII Taller de Pelágicos Menores,

As for the National Fishing Chart, its formal definition is stated as follows: “La Carta Nacional Pesquera ... tendrá carácter informativo para los sectores productivos y será vinculante en la toma de decisiones de la autoridad pesquera en la adopción e implementación de instrumentos y medidas para el control del esfuerzo pesquero, en la resolución de solicitudes de concesiones y permisos para la realización de actividades pesqueras, y en la implementación y ejecución de acciones y medidas relacionadas con dichos actos administrativos” (*The National Fishing Chart will have informational nature for the productive sectors and will be binding for the adoption and implementation of instruments and measures of control for fishing effort, in the resolution of granting of concessions and permits for fisheries activities and in the implementation and execution of actions and measures related to such administrative procedures*). Certainly, while it is not a rule of law it consists of a series of guidelines that authorities are expected to follow.

At this time, the new (2010) version of the National Fishing Chart has been under public scrutiny at the “Comisión Nacional de Mejora Regulatoria” (COFEMER, *National Commission for Regulatory Improvement*) and received two comments from the general public, none of them related to the small pelagic fishes.

The new version of the National Fishing Chart considers the following additional issues:

*Reference points for the fishery: Maximum sustainable yield. Exploitation rate: 0.25 exploitation rate is considered.*

*Fishing effort: No increase of fishing effort, meaning no more permits for commercial fishing, unless substituting active actual ones.*

*... not permitting fishing fleet displacement between fishing areas; particularly, impede that boats from the west coast move to the Gulf of California. Fleet size by area should remain as follows: 38 boats at Sonora (the area under the certification process), 22 boats at Baja California (Ensenada), 5 in Baja California Sur (Magdalena Bay) and 7 in Sinaloa. The Management Plan should be strengthened and the points here expressed included in it.*

In conclusion, we believe that all the major process of integration of laws and subsidiary regulations are mostly open to public scrutiny, that the call for participation is implicit and explicit in the rules and that it is in fact a transparent and open process; whether or not to participate is a personal and institutional choice. Nonetheless, we considered that further actions could be implemented, thus assign the indicator 85.

|    |       |                                    |                   |   |
|----|-------|------------------------------------|-------------------|---|
| 20 | Major | FCM v6.1, Appendix 1 paragraph 5.1 | PI 3.1.4, page 51 | A detailed rationale which justifies the score awarded to a performance indicator shall be provided. The rationale does not justify the score of 85 against the scoring issues.<br><br>At the SG80 level, the management system |
|----|-------|------------------------------------|-------------------|---|

|  |  |  |  |  |
|--|--|--|--|--|
|  |  |  |  | incentives that are consistent with achieving the MSCs outcomes expressed for Principle 1 and 2 and seek to ensure negative incentives do not arise. The rationale does not state how the subsidisation of fuel (generally considered a bad subsidization practice for environmental outcomes) is controlled such that negative incentives do not arise. |
|--|--|--|--|--|

Team response 20: Subsidies to primary activities, mostly agriculture and fisheries, are widespread in the world, including Developed Countries. Although basically inadequate from their likely deleterious effects on fisheries sustainability, they are a consequence of several aspects, including a) the former pressure on the governments to support a primary sector that traditionally gets the minor profit of the productive chain; support that finally resulted in widespread subsidizing; and b) the need of governments to facilitate primary sectors in light of the competition of developed countries with lower fuel prizes.

Fisheries in Mexico have been both overinvested and subsidized for fuel, but the management system has engaged in a process to end with this practices. Fuel subsidies began during 1996 as an incentive to shrimp producers to help lever the fuel cost to that for the U.S. shrimp fleet; while it originally consisted in a sizeable amount of the major operating cost, with a complicated procedure to estimate the amount for each boat depending on its size, etc., its relative importance has been steadily decreasing. By 2006, the amount was fixed to Mex\$ 2.00 per liter, while the prize of diesel has constantly increased. The CANAINPESCA estimates that the sardine fishery fleet used subsidy for about 70-80% of the total expenditure, the remaining being paid at regular prizes, since quotas per boat based on engine size are in effect (Ing. León Tissot P., CANAINPES Guaymas; leontp47@hotmail.com)

There is at present another example of incentives aiming at improving the sustainability of fisheries within the general management system. The shrimp fishery has been long recognized to be overinvested, with more boats than those needed for MSY. The program calls for voluntary retirement of boats in change for a premium of MEX\$ 1'300,000 and is now open to receive applications. The Sonora shrimp fleet decreased from 528 boats during 2008 to 277 during 2010 as a result.

|    |       |  |                          |  |
|----|-------|--|--------------------------|--|
| 21 | Major | FCM v6.1, paragraph 3.4.5<br><br>TAB Directive 014 v1.1, paragraph | Condition 3.2.1, page 53 | Certifiers shall specify conditions that closely follow the narrative or metric form of the performance indicators and scoring guideposts used in the assessment tree. Certifiers must not be prescriptive about the means of meeting conditions, although recommendations or suggestions may be made.<br><br>The current wording of the condition does not follow the narrative or metric of the performance indicator and includes prescriptive wording as to how the condition may be achieved. |
|----|-------|--|--------------------------|--|

Team response 21: Condition 3.2.1 has been revised to follow the narrative of the performance indicator

|    |       |                                    |                       |  |
|----|-------|------------------------------------|-----------------------|--|
| 22 | Major | FCM v6.1, Appendix 1 paragraph 5.1 | PI 3.2.3, pages 54-55 | <p>A detailed rationale which justifies the score awarded to a performance indicator shall be provided. The rationale does not justify the score of 80 against the scoring issues.</p> <p>At the SG80 level, the control system in place must demonstrate an ability to enforce management measures and show that sanctions are consistently applied. No evidence is provided to satisfy these requirements.</p> |
|----|-------|------------------------------------|-----------------------|--|

Team response 22: Official information translated from the CONAPESCA web page: December 7th, 2010 Mazatlán, Sin. (where CONAPESCA headquarters are located) CONAPESCA completed more than 33 thousand actions of monitoring and surveillance with the purpose of deterring illegal fishing activities. During 2010, 50 million Mex\$ (some 4 million US dollars) were utilized and, up to October, 572 routes have been completed by CONAPESCA, in coordination with the Mexican Navy, both at sea and inner waters.

The Director General of Monitoring and Surveillance in CONAPESCA, Rigoberto García Soto, reported that 16,696 terrestrial and 16,318 marine missions, in addition to 2,493 revision sites; 5,444 “actas” (official reports, signed by the authority, the involved individual(s) and witnesses) were completed.

Further, 3.53 tons were detained to larger boats, 2.64 tons to smaller boats, 13,175 fishing gears, 193 vehicles, 38 large boats, 491 small boats, 402 outboard engines and 1,614 units of fishing products. A total of 143 individuals were arrested.

Guidance:

|    |          |         |                              |  |
|----|----------|---------|------------------------------|--|
| 23 | Guidance | General | Introduction section, page 5 | <p>The MSC’s mission has been updated to:</p> <p>“Our mission is to use our ecolabel and fishery certification programme to contribute to the health of the world’s oceans by recognising and rewarding sustainable fishing practises, influencing the choices people make when buying seafood, and working with our partners to transform the seafood market to a sustainable basis.”</p> |
|----|----------|---------|------------------------------|--|

Team response 23: The MSC mission statement was updated in the report.

|    |          |         |   |   |
|----|----------|---------|---|---|
| 24 | Guidance | General | Section 4.4 (page 14), Section 5 (pages 15-17), Section | <p>The discussions about other species taken in the fishery are confusing and potentially contradictory. While in certain parts, it is stated that the fishery is very clean (&lt;1% bycatch, page 17) in other</p> |
|----|----------|---------|---|---|

|  |  |  |  |   |
|--|--|--|--|---|
|  |  |  | 6.1 (page 17) and Section 6.11 (pages 17-18) | parts suggest higher rates of bycatch (Table 2, page 18). These elements of the report should be reviewed for clarity and to ensure no contradictions are made. |
|--|--|--|--|---|

Team response 24: The difference between “retained” (other small pelagic species) and bycatch species was clarified in the relevant sections.

|    |          |                                     |                        |   |
|----|----------|-------------------------------------|------------------------|---|
| 25 | Guidance | Policy Advisory 5 v2.1, paragraph 5 | Section 7, pages 21-22 | In order to ensure sufficient coverage of information to stakeholders and other certifiers, the MSC recommends information within the traceability section be structured using the sub-headings provided. |
|----|----------|-------------------------------------|------------------------|---|

Team response 25: The suggested subheadings are now used in the traceability section 7.

|    |          |         |                     |  |
|----|----------|---------|---------------------|--|
| 26 | Guidance | General | Section 10, page 27 | The report indicates the use of AHP in the assessment process. As the assessment used the FAM, AHP will not have been used in assigning weightings of particular performance indicators within the assessment tree. Please review this section to ensure it is an accurate reflection of the assessment process. |
|----|----------|---------|---------------------|--|

Team response 26: This has been updated

|    |          |                                     |                     |  |
|----|----------|-------------------------------------|---------------------|--|
| 27 | Guidance | TAB Directive 10 (v2.1), Section 3. | Section 12, page 61 | Section 12 of the report (page 61) indicates ‘certificate sharing’ is anticipated in this fishery, thus the MSC reminds the certifier of the requirements of Section 3 of TAB Directive 010. |
|----|----------|-------------------------------------|---------------------|--|

Team response 27: Certificate sharing is unlikely to occur in this fishery but since there are other vessels in the south of the Gulf of California that target sardines (but do not land at the same ports as the vessels included in the unit of certification), the CB will follow the steps outlined in Tab 010 section 3.



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Date: 23<sup>rd</sup> September 2010

Robert J. Hrubes, PhD,  
Senior Vice President,  
Scientific Certification Systems.

Dear Robert,

I write with reference to your letter of 10 September 2010 relating to the Gulf of California, Mexico sardine fishery and your difficulties in complying with the new reporting requirements brought in with TAB Directive D-029 v1.

Given the specific and lengthy history of this fishery assessment, MSC accepts that it would be both difficult and unnecessary for the requirements of TAB D-029 to be applied prior to the adoption of the FAM default assessment tree in May 2009. We therefore accept your request as a variation from the requirements set out by TAB D-29 for the meetings that occurred prior to May 2009.

Please be assured we have no intention of making all TAB directives or other policy changes automatically retrospective or retroactive. In our consultation processes and governance review we consider the impact of changes and will set implementation dates accordingly. Where difficulties are encountered with individual long running assessments, we are happy to consider variations as on this occasion.

I hope that the above comments provide the guidance you require. If you have further questions, please let me know.

Yours sincerely,

A handwritten signature in blue ink, appearing to read 'AMallison'.

Andrew Mallison  
Director, Standards & Licensing.

cc: Dan Hoggarth      MSC Senior Fisheries Assessment Manager  
Daniel Suddaby      MSC Senior Fisheries Certification Manager  
Brad Ack              MSC Special Projects Director  
Jim Humphreys      MSC Fisheries Director, Americas



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July 16, 2010

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Dear Jim and Brad,

Thank you for inviting all stakeholders and interested parties in the Gulf of California Mexican Sardine Fishery to present their review comments to the MSC Public Comment Draft Report v.3 "Gulf of California, Mexico – Sardine Fishery." Many of the stakeholders that participated in the process are now filling the evaluation form, which will be sent soon to the MSC and to Dr. Sabine Daume with our joint comments. I completely endorse the comments that are included in that form. However, apart from those more technical observations, I want to address a small group of issues that I consider of the utmost importance in the certification of the Mexican sardine fishery. This is the reason behind this letter.

Transparency is the most fundamental principle of any certification. If a fleet states that its boats are fishing responsibly and wants to be recognized for it, the fleet managers should be able to provide information on how many boats have been out fishing, how many days they have been at sea, what was the total catch, what species were caught, and what was the biomass of each harvested species, together with simple statistics on size distribution of the harvested fish. It seems contradictory that a fishing fleet might expect a certification of their

activities as “sustainable” while at the same time withholding information on their landings, boats, and days at sea. In an open society, a certification plays the role of informing the public that the product has achieved a certain level of quality in its production, coupled with some rigorous standards. It follows then, that the public should be able to check at any time the sources of information that support the certification.

For this reason, it was particularly distressing to see in the MSC Public Comment Report v.3 for the Sardine Fishery that no sources were given for the graph in Figure 2 (Gulf of California Mexican Sardine Fishery: Total catch, number of fishing trips and boats, and CPUE per year 1969-2010). It was even more distressing to be told by the assessment team that the sources were public and easily accessible in INAPESCA’s website ([www.inapesca.gob.mx/index.php?option=com\\_content&task=view&id=306&Itemid=306](http://www.inapesca.gob.mx/index.php?option=com_content&task=view&id=306&Itemid=306)), only to find, when I went into the website, that the information was not there. The website contained a series of publications and unpublished reports related to the sardine fishery, some of them based on the analysis of sardine landings, but did not contain the actual data that gave base to those reports. So, the basic question I was making, how much sardine has been caught in the Gulf of California in the last decades, and how many boats have been operating in the region, could not be accurately and precisely answered with the information in the website. Sadly, the statement contained in the report that all the data sources for the analysis of stock were available in the website, was wrong.

From that point on, the meeting progressed into more and more contradictions. First and foremost, none of the members of the assessment team was able to explain during our meeting why does the Draft Report mention a source of information which, when consulted, does not deliver what they declare, namely, the collected facts and data about the fishery. Dr. Lluch kept insisting that the information was public, but he failed to provide a public source, only being able to suggest that we should look into CONAPESCA’s website (<http://www.conapesca.sagarpa.gob.mx/>) for the *Anuario Estadístico de Pesca* that does not contain the necessary information, nor does it contain the information that the assessment team used and was committed to make available. Dr. Sosa, in an effort to help, gave the attendees the address of his own personal ftp website at CICESE where he stores published papers and some unpublished Power-Point slideshows on the sardine fishery. Sadly, none of those papers contained the original data that would have been needed. Some of the slideshows contained graphs with analyzed versions of the data, but none of them gave a source nor any had the original data.

If the assessment team cannot give a credible and accessible source for their data, and gives evasive replies when asked about it, one cannot but wonder how they got the information to make their assessment, or if they even ever consulted first hand information. Furthermore, having failed to provide the source of information that the assessment team declared to have used, it was regrettable that a researcher as distinguished as Dr. Sosa was forced to suggest, at the spur of the moment, to the interested stakeholders to check his own personal file-transfer server. First and foremost, Dr. Sosa’s ftp server did not contain the detailed numerical information about the fishery that he assured we could find there. Secondly, and most

importantly, surely there are better ways to allow information access to the public than a private and personal ftp server at a research center that has in principle nothing to do with the fishing industry.

The truth is that at the end of the meeting with the stakeholders, the assessment team (Drs. Chet Chaffee, Daniel Lluch Belda, Oscar Sosa Nishizaki, and Sabine Daume) could not give a credible source for their most central and fundamental information, that contained in Figure 2 and that forms the *pièce de résistance* of the whole report. This is very important, I believe, and not a matter of personal stubbornness. If we are to monitor and evaluate in any coherent way the stock of the sardine fishery, having public access to data on landings, boats, and fishing effort is of the utmost importance. With the current available information, the basic condition of stock sustainability cannot be verified. Perhaps the stock is being managed sustainably, perhaps not, but currently the only evidence we have is the opinion of three experts, who had to go through the embarrassment of admitting that they did not have the necessary information at hand, and they do not even seem to know where the information is available. So, should we accept the certification based on the old adagio of “trust me, I am an expert”? Personally, I think this is not an adequate way to move forward.

During the meeting with stakeholders it was the formal commitment of the assessment team to make sure that they would get from the client all the information on the sardine fishery uploaded to the INAPESCA website at [www.inapesca.gob.mx/index.php?option=com\\_content&task=view&id=306&Itemid=306](http://www.inapesca.gob.mx/index.php?option=com_content&task=view&id=306&Itemid=306). On June 21, 2010, the stakeholders got an e-mail from Sabine Daume stating that “*as of that date there were still some documents missing.*” Dr. Daume went on to ensure us that “*the comment period of (at least) 30 days will be reset starting on the day when all documents were posted to allow sufficient time to review the report with the supporting documents.*”

Accordingly, on July 5, 2010, Dr. Sabine Daume sent all stakeholder and interested parties in the fishery an e-mail stating that “*all documents were now available on the INAPESCA website at [www.inapesca.gob.mx/index.php?option=com\\_content&task=view&id=306&Itemid=306](http://www.inapesca.gob.mx/index.php?option=com_content&task=view&id=306&Itemid=306), and that “SCS had extended the public comment period for the draft report until August 2nd at 5pm PST.”* I immediately visited the INAPESCA website, only to find, much to my dismay, the same series of publications and unpublished reports related to the sardine fishery, very similar to what we had seen a month earlier. After all the work and effort, it was still impossible to know how much sardine is been fished in the Gulf of California, and how many boats are operating there. The site contained no original data.

We have been working on these issues for over four years now, and I have personally been accumulating an increasing level of frustration over the failure to meet the requirements of a serious certification process. Together with other stakeholders, we have invested a lot of personal time and effort working for two objectives: (a) Committed stakeholders would really like the Gulf of California to be certified as sustainable, as the certification would set an immensely important precedent in Mexican fisheries, and, (b) because of the importance of this certification, all interested parties should want the process to be a model of transparency and



public participation. That is, we would really like the fleet to be fishing responsibly and to be recognized for it, but we would also like to see updated information on boats, landings, and size distribution of the harvested fish.

Instead, we have got a succession of comments and assurances from fisheries experts that expect the stakeholders to accept their word, not providing any serious evidence to buttress their opinions. They have provided us with information on Mexican legislation and norms, as well as reprints of published papers that most researchers can get with the stroke of a key from their university library. However, four years after the process started, the basic and central information, which could be contained in a simple spreadsheet, is still seemingly treated as a secret of state.

All other extractive industries certified as sustainable, such as tropical timber loggers or wildlife hunting/managers/outfitters have to report every year how much of the resource has been estimated to exist in the field, and how much is being extracted each year. Those figures are open, verifiable, and accessible, they are regularly used by international agencies such as ITTO or CITES, and they are a fundamental part of the continued certification process. I fail to understand why in the case of the Gulf of California sardine fishery this has become such a complicated issue. As in any other certified extractive activity, the information should be openly accessible all the time.

Is this too much to ask? I do not think so. Let me end with the phrase I started this letter: In an open society, a certification should play the role of informing the public that the product has achieved a certain level of quality in its production, coupled with some rigorous standards. It follows then that the public should be able to check at any time the sources of information that support the certification. As long as this is not achieved and as long as information is reserved from the public I will not be able to stop seeing the certification process as a failure in attracting public participation, as well as a betrayal of the basic principles of transparency and free access to information that should guide social interactions in any democratic society.

I hope the Marine Stewardship Council can understand my anxiety over this issue and appreciate my concerns about the process.

Yours truly,

A handwritten signature in blue ink, appearing to read 'Ejmc', with a vertical line extending downwards from the 'j'.

Exequiel Ezcurra



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July 16, 2010

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Dear Jim and Brad,

I am writing this letter to follow-up on our last teleconference. I want to thank you for inviting me to discuss my concerns with Dr. Sabine Daume, member of the certifier team for the Mexican sardine fishery, and to allow her to try to answer my concerns. I also want to apologize for taking so long to follow-up on this topic, but I have been traveling intensely this summer doing field work, and found it difficult to get the time and peace of mind to write this letter.

As you may recall, my main concern (apart from the comments made by Mexican stakeholders that participated in the process and which I endorse fully) was about an issue of transparency. In a nutshell, my comment was that if a fleet declares that its boats are fishing sustainably and wants to be certified for it, the fleet managers should be able to provide information on how many boats have been out fishing, how many days they have been at sea, what was the total catch, what species were caught, and what was the biomass of each harvested species, together with simple statistics on size distribution of the harvested fish. It seemed to me contradictory that a fishing fleet might expect a certification of their activities as "sustainable" while at the same time withholding information on their landings, boats, and days at sea. In my opinion, the public should be able to check at any time the sources of information that support the certification.

In the specific case of the Draft Report v.3 “Gulf of California, Mexico – Sardine Fishery,” as you may recall, my criticism focused largely on the information given in Figure 2 of the report (Gulf of California Mexican Sardine Fishery: Total catch, number of fishing trips and boats, and CPUE per year 1969-2010), a dataset for which Dr. Daume accepted that the information is, for the most part, not publicly available. She also accepted that the information that is publicly available, namely that contained in the *Anuario de Pesca* published by CONAPESCA, contains total catches of many pelagic species recognized globally under the name of “sardine,” but does not contain information on the species and the fishery under certification, the Pacific sardine in the Gulf of California.

After a long and respectful exchange of ideas on these issues over the phone during our joint teleconference, towards the end of the conference-call Dr. Daume indicated that the information contained in Figure 2 was only part of a general and introductory description of the fishery, but that it had played no part in the actual scoring of the fishery under the MSC principles. At that point, if I recall our teleconference correctly, I was told by Brad Ack, in his role as Director of Special Projects, that the MSC could not force the certification solicitants to present transparent and verifiable data except if that data was needed for, or used in, the scoring of the fishery. I hope I am not betraying the richness of a long and at times passionate exchange of ideas, but it is my recollection that, in summary, those were the main points of our discussion.

The central point, then, is reduced to testing if actually the data used to construct Figure 2—which, I want to stress again, is not publicly verifiable—played any role in the certification process. It is clear after the conference with Dr. Daume and the MSC, that the certifying team now argues that it did not, and hence there is no obligation on their part to disclose that information to the stakeholders.

A quick scan of the report, however, will immediately show that the certifying team’s contention is contradicted by the text of the report itself. For example, for scoring criterion 1.1.1 (“*The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing*”), the fishery got a score of 90 points, based to a large extent on the following argument: “*In 1993 the abundance of Pacific sardine began to recover, and even [if] landings have shown several fluctuations, since 2005 landings have almost doubled (Fig. 2).*”

Similar arguments crop up in other parts of the report, where direct or indirect mention to the unverifiable data presented in the introduction is given. For example, in the argumentation for scoring criterion 1.2.1 (“*There is a robust and precautionary harvest strategy in place*”) the certifiers make again explicit reference to the information contained in Figure 2 as proof of the good compliance of the fleet with the criterion. Arguing that, although some boats have changed their base ports there has not been an overall increase in the number of boats fishing sardine in the Mexican Pacific, the report presents the following text as proof of evidence: “*Some boats have switched base ports from the western coast of the Baja California Peninsula to Guaymas and Yavaros, where the sardine fishery under assessment is based. This explains the increase in the number of boats to 40, which have participated in this fishery in recent years (Figure 2).*”

At this point, the final decision stands with the MSC, but I want with this letter to stress that my original criticism has not been satisfied, and that my first letter to the MSC stands in its full terms. I can only end, again, with my original contention: In an open society, a certification should play the role of informing the public that the product has achieved a certain level of quality in its production, coupled with rigorous and verifiable standards. The public should be able to check at any time the sources of information that support the certification. As long as this is not achieved and as long as information is reserved from the public I will continue to believe that the certification process for the Pacific sardine in the Gulf of California is a betrayal of the basic principles of transparency and free access to information that should guide the way any democratic society operates.

I thank the Marine Stewardship Council, and you both in particular, for your patience with this discussion, and hope once again that you may appreciate my concerns about the process.

Yours truly,

A handwritten signature in blue ink, appearing to read 'Ezcurra', with a long vertical line extending downwards from the bottom of the signature.

Exequiel Ezcurra



August 6th, 2010

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Dear all:

Dr Sabine Daume sent me today a copy of Dr Ezcurra’s letter (July 16<sup>th</sup>, 2010) re the Mexican sardine fishery certification. I would like to set forward some comments, as follows:

First of all, I prepared figure 2 that has been the subject of most comments by Dr Ezcurra. It was never my intention to set the fundamentals for the certification process, but only to give a general idea of the size and evolution of the fishery. Thus, I obtained, as one usually does, information as updated as possible from different sources. In fact, it was done independently of the detailed analysis of the dynamics of the fishery.

While any beginner in fisheries biology would recognize the limited reach of such basic statistics in evaluating the sustainability of a fishery, it is clear that Dr Ezcurra, being a noted plant ecologist, may not be aware of this fact.

Total landings were obtained mostly from the Anuarios Estadísticos de Pesca, available at the CONAPESCA web site as properly quoted by Dr Ezcurra. I updated them with data shown in a presentation by Dr Manuel Nevarez, which is available at the INAPESCA web site devoted to the relevant information for the fishery: [http://www.inapesca.gob.mx/portal/documentos/publicaciones/pelagicos/Nevarez-Martinez\\_TPM2009.pdf](http://www.inapesca.gob.mx/portal/documentos/publicaciones/pelagicos/Nevarez-Martinez_TPM2009.pdf)

California sardine landings were provided by Dr Roberto Félix Uraga ([rfelix@ipn.mx](mailto:rfelix@ipn.mx)) as coauthor of the following document:

ASSESSMENT OF THE PACIFIC SARDINE RESOURCE IN 2009 FOR U.S. MANAGEMENT IN 2010, by Kevin T. Hill, Nancy C. H. Lo, Beverly J. Macewicz, Paul R. Crone, and Roberto Felix-Uraga. This document is one of a yearly review of the California sardine fishery performed by US and Mexican scientists.

The California sardine landings series is continuously updated as part of the ongoing work performed by the fisheries group at CICIMAR since the early 1980s, of which Dr Félix Uraga is a relevant member.

The number of boats and fishing trips was obtained from the above referred presentation by Dr Manuel Nevarez and updated by the CANAINPES Guaymas; most information is available in the published paper by Cisneros et al:

Cisneros-Mata, M.A., M.O. Nevárez-Martínez & M.G. Hammann. 1995. The rise and fall of the Pacific sardine, *Sardinops sagax caeruleus* Girard, in the Gulf of California, Mexico. CalCOFI Rep. 36: 136-143.

CPUEs were obtained by simple divisions.

The figure does not show other information mentioned by Dr Ezcurra, such as days at sea, species caught, biomass of each harvested species and size distribution of the harvested fish. This information was not needed for a general description of the size and evolution of the fishery.

Secondly, I think that Dr Ezcurra is misinterpreting the role of the evaluation team in the certification process. The members of the team, while being experts in fisheries biology and in the specific fishery dealing with, do not perform any analysis of the fishery; they review the analysis done by those whose work is that. Unless some doubt arises, there is no real need to go for the original data. In this case, the corresponding analysis has been mostly performed by personnel of INAPESCA, as should be.

Other specific issues (such as the role of sardines in the ecosystem) were the subject of specific studies by proper scientists and were material for a published paper by a most recognized group of scientists, authored by Dr Andrew Bakun, commissioned and supported by the Lenfest Ocean Program. By the way, in this paper experts outside the evaluation team properly discussed the management and sustainability of the fishery; I would strongly suggest Dr Ezcurra to review it. It is, in fact, an independent review of the management of the fishery by a team commissioned by the Pew Charitable Trusts, and I believe that it effectively discards the concern of Dr Ezcurra about the “trust me, I am an expert” issue:

Bakun, A. et al. 2009. Issues of ecosystem-based management of forage fisheries in “open” non-stationary ecosystems: the example of the sardine fishery in the Gulf of California. Rev Fish Biol Fisheries. DOI 10.1007/s11160-009-9118-1

Alternatively, I understand Dr Ezcurra’s anxiety on the information from the fishery. Together with Dr Enriqueta Velarde, Dr Miguel Cisneros and Dr Miguel Lavin they published a paper on the prediction of sardine fisheries based on seabird ecology and El Niño anomalies that analyzed data up to 1999, and it is more than understandable that he would like to follow up this line of research. At that time, personnel from the CRIP Guaymas provided them with up to date data; thus, I don’t understand (nor am in the position to do so) why Dr Ezcurra has not obtained the recent and relevant information from the same source. Further, I talked today to Dr Manuel Nevarez, and he informed me that last year he and Dr Enriqueta Velarde interchanged information, he supplied her with data from the fishery while she provided him with recent information on marine birds.

I believe that transparency should be a must for any fishery, leave aside a certified one. I am confident that Mexican fishery management systems are rapidly evolving to meet this requirement, including open participation in consulting bodies and dissemination of up to date information, as decreed by corresponding laws and regulations, and as we set the condition 3.2.4 in our report:

“By the first surveillance audit, evidence should be provided to the CB that information from the fishery, including data, analysis and minutes from the technical bodies, have been disseminated in a timely fashion to all interested parties. In addition, a research plan should be made available to the public that includes a strategic approach to research and reliable information that is sufficient to achieve the objectives consistent with MSC’s Principles 1 and 2”.

Certainly, if Dr Ezcurra is concerned about the evidences for sustainability of the fishery, I hope he could refer to the published materials including the above mentioned recently published information; if, on the other hand, he aims at getting the original and basic information to redo the analysis of the fishery, demanding it by objecting figure 2 would not appear to be the proper procedure. I am certain that those scientists that have been working on the sardine fishery for many years (some of them almost 30) would not object sharing their information; he should, however, ask them directly.

I really hope we can move beyond this issue.

Daniel Lluch Belda

A handwritten signature in black ink, appearing to read 'Daniel Lluch Belda', with a long horizontal stroke extending to the right.



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July 16, 2010

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I want to thank in a heartfelt manner all the effort that the MSC and the certification team has made to answer my concerns. I can only have good words of appreciation towards all of you for your willingness to listen and understand. However, I want also to stress that, although I am grateful for some of the information provided by Dr. Lluch, my concerns have not been completely appeased after receiving his letter. I would like to explain this in some detail:

1. First, my initial request was simple, and I still abide by it: *The public should be able to check at any time the sources of information that support the certification.* Initially, I thought that this would be a very simple request to comply with, but Dr. Lluch's letter has confirmed that this will not be the case.
2. As disclosed by Dr. Lluch., some of the information has been put together in a comprehensive paper titled "*Assessment of the Pacific Sardine resource in 2009 for U.S.*"



*management in 2010*” drafted by a group of Mexican and American scientists (Hill et al.). For the first time since our discussion started, I learn that the detailed raw information does exist in a unified form in a publicly-searchable document (although the document itself states that “*it does not represent any agency determination or policy*”). I **really commend the certification team** for disclosing their sources, and make a call for the document, or at least the compiled information on the Mexican Pacific Sardine, to be uploaded to the sardine certification website at INAPESCA.

3. With the boats and the fishing effort, however, we have not been so successful. Dr. Lluch states that the number of boats and fishing trips was obtained from a presentation by Dr. Manuel Nevárez, available at the INAPESCA web site devoted to the fishery: <[http://www.inapesca.gob.mx/portal/documentos/publicaciones/pelagicos/Nevarez-Martinez\\_TPM2009.pdf](http://www.inapesca.gob.mx/portal/documentos/publicaciones/pelagicos/Nevarez-Martinez_TPM2009.pdf)>. However, that slide presentation does not contain a single slide or even a single mention of the number of boats or the fishing effort. Dr. Lluch continues to explain that most of this information is also available in the published paper by Cisneros-Mata et al. (1995; *CalCOFI Rep.* 36: 136-143). Clearly, a paper published in 1995 cannot be providing information about the last 15 years, which are the ones where our interest concentrates vis-à-vis the certification process.
4. Dr. Lluch recommends that I read the paper by Bakun et al. (2010, *Rev. Fish. Biol. Fisheries* 20:9–29), an independent review of the management of the fishery by a team commissioned by the Pew Charitable Trust, which, in his opinion, effectively discards my concerns about the fishery and data access. I had read the recommended paper before and did not find in it anything that sanctions the current management of the fishery as sustainable. Rather, the paper underscores the same objections I have made: Talking about the need of a collaborative effort to ensure sustainability of the GoC sardine fishery, Bakun et al. state that “*willingness to share what might be considered proprietary information would probably be vital in accomplishing it.*” (p. 24). Further down the paper, the authors write that “*in the absence of a published fishery management plan and up-to-date stock assessments of the major species, it is difficult to tell whether the actual management measures that are taken every year are sufficient to sustain the resource and achieve the broader objectives of ecosystem based management.*” (p. 25). As you can see, the Pew-sponsored paper by Bakun et al. makes clear emphasis in my own points, namely (a) the unwillingness by both government and fishing industry to share information on the fishery, and (b) the absence of published fishery data and updated stock assessments.
5. Finally, Dr. Lluch makes reference to my papers with Dr. Velarde on seabirds and sardines, stating that, because in the past we have obtained information directly from researchers at the CRIP Guaymas, then we should be able to keep on getting information from the same source (which indeed we have). In short, if information can be obtained from informal sources, then why demand an open and formal system? Very respectfully, I think this interpretation misses my point, which is based on an issue of principle: If the MSC is going to certify the Mexican Sardine fishery as sustainable, then the public should have the right to independently verify that certification, by being provided formal, open, and predictable access to the updated basic data at any time.

Mexico's Supreme Court recently established, after a series of three lengthy litigations, that industries looking for a certification as "environmentally friendly" companies (*Industria Limpia*) must make the information supporting that certification publicly accessible (the court ruling is publicly available; I can get it for you if you are interested). Information access is a matter of principle, a fundamental issue of transparency and not a matter of a researcher pursuing his own personal agendas, as Dr. Lluch implies in the end of his letter, when he states that "scientists that have been working on the sardine fishery for many years would not object sharing their information" with me, but that I "should, however, ask them directly."

The suggestion that I am going through all this effort in responding to the MSC call for commentaries only in order to get data for my next research paper is offensive. I have been directly involved in the certification of tropical timber in the Yucatán peninsula, of dozens of wildlife hunting ranches in Mexico's north, and I was Chair of the CITES convention in 1994. In all these cases, information supporting the certification that endorses the extraction of species from the wild has been publicly accessible in a very transparent manner — otherwise the whole purpose of a certification would have been betrayed.

If this is routine procedure in other areas of natural resource use, I fail to see why it has become such a contentious issue in the case of the Mexican Sardine fishery. The MSC itself has stated myriad times that **stock abundance is the key indicator of the sustainability of a fishery**. Shouldn't we then have the right to demand transparent access to the basic and fundamental information that allows the MSC to make these evaluations of the fishery's stock?

I thank again everyone for your understanding and support on this issue. I very specially thank Dr. Daniel Lluch, because, although we clearly uphold different perspectives on this matter, he has been at all times patient and willing to explain his perspective on things. A true gentleman.

I do not expect any further reply to this letter, but want to ask the MSC and the members of the certification team to file this letter as the third one in a series I have sent, describing a policy concern that I have wanted to express. When the time comes, the MSC will have to make a decision on this issue, and I will take that decision very respectfully. However, I also want to make sure that my concerns with respect to transparency and information access are heard.

Yours truly,



Exequiel Ezcurra

## **Team response to Exequiel Ezcurra`s final letter**

SCS has been working with the fishery client on the availability of documents pertaining to the Pacific sardine fishery and details of total catch, number of boats and catch per unit effort from 1969/70 to 2008/09 are now publically available on the Inapesca website at

<http://www.inapesca.gob.mx/portal/publicaciones/pesqueria-de-pelagicos-menores-en-el-golfo-de-california>.

The compiled information is provided in a table in Annex 1 page 17 and can be found under seperate heading ([here](#)).

A new Policy Advisory from the MSC (PA 22) came into effect on the 7th of February 2011 requiring CB to report on the total catch taken by the client group in the two most recent years. This will be provided in the annual surveillance reports which will be publically available on the MSC website.

Furthermore the client has committed to update this and other information regarding this fishery on a regular bases (see clients action plan in section 11 related to condition 3.2.4).

## Stakeholder input Gulf of California Sardine Fishery Aug 1<sup>st</sup> 2010. Received by e-mail

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Fishery: Gulf of California, Mexico - Sardine Fishery  
Certification Body: Scientific Certification Systems

I wish to indicate that I am a stakeholder in this fishery, please keep me informed about each stage of the assessment process

Comment type is coded as follows:

1. I do not believe all the relevant information available has been used to score this performance indicator
2. I do not think the information and/or rationale used to score this performance indicator is adequate to support the given score
3. I do not believe the condition(s) set for this performance indicator are adequate to improve the fishery's performance to the SG80 level
4. Other

### PI 1.1.1 Comment type 2

The certifier gave a score of 90 for this PI. This score fluctuates between high likelihood and high degree of certainty that the stock is at a level which maintains high productivity and has low probability of recruitment overfishing. Since all the raw basic information about landings for the target species, fishing effort (number of boats and geographical distribution of effort) is not public, nobody can verify if the population analysis done by NAPESCA scientists are correct or could be improved. The only information made public for this report was a Power Point presentation of analyzed data and the graphs provided in Figure 2 on Page 15. How a second opinion on the adequacy of the management system is possible if data is not accessible?

According to Martínez Aguilar et al. (2009), the sardine catchability becomes highest when its abundance is lowest. This opens the possibility that highest historical production records could reflex low stock abundances. This could also be the initial signal of a collapse, as it happened with the Peruvian anchovy during the 1970 decade. If the fishery is currently at its highest historical records of catch does it means we have to believe that managers have a high degree of certainty that the stock is healthy?

Team response: Based on the latest assessment by the INAPESCA, the recent estimations of the population biomass are the highest for the last 20 years, with an increasing trend since 1993. In order to score, the assessment team evaluated the assessment method currently in use, and the information facilitated by the client and the official institution that assess the fishery (INAPESCA). The score was not influenced by the accessibility of the data to third parties assessments, because the scoring guildpost under this Pi does not ask about the availability of data.

Around the world, small pelagic populations are assessed by several methods, including the stochastic age-structured, density dependent dynamic model used by INAPESCA in the Gulf of California. However, after reviewing several small pelagic fisheries Barange et al. (2009) concluded that the most effective monitoring programs are based on fishery independent surveys, which are considered as a complement for the conventional assessment methods, this was our rationale for Condition 1.2.4. Nevertheless, following INAPESCA assessments of the fishery and the increasing tendency of the estimated population biomass and the recruitment biomass (with the largest values in recent years), indicated to us that the stock is, with a high degree of certainty, above the point where the recruitment will be impaired and it is above the reference point, so we decided on a score of 90.

We have to point out that: based on Martínez-Aguilar et al. (2009) figure 4, the catchability becomes higher when its abundance is lowest, and this happened when catches are at its lowest (see season 72 and 92 in figure 2, in our report, and compare with figure 4 of Martínez-Aguilar et al. (2009). In contrast, when catchability is at its lowest, abundance is at its highest and catches are high, as season 87 and 88 (compare in the same figures as above).

#### PI 1.1.2 Comment type 2

The certifier gave a score of 85 for this PI. The rationale mentions that for low trophic species, the target reference point takes into account the ecological role of the stock. The certifier made the conclusion that the target reference point used by managers of  $0.9MSY = 0.25$  to be an  $F$  value that is "safer biologically" and thus takes into account the ecological role of the stock. We need more supporting information from the certifier of the justification that this is a "safe value" and it is considering the ecological role of the stock to all the species that feed on sardine included in Appendix I (page 69). This is the same request was made by Peer Reviewer 2 to PI 2.3.2 and the response of certifier we believe is incomplete and not satisfactory (see Page 86).

Team Response: The assessment team did not conclude that the  $F$  value was "safer biologically". We stated in the rationale of PI 1.1.2 that: "*During the development of the model, Nevárez-Martínez et al. (1999) found that a value of 0.27 would yield the Maximum Sustainable Yield (MSY) that is slightly below the Maximum Economical Yield. They decided to use  $0.9F_{MSY} = 0.25$ , because it would not only produce higher economic returns, and be safer biologically, but would also reduce the intrinsic oscillations that they found during modeling.*" (see Nevárez-Martínez et al. (1999) page 282). Then the assessment team stated that: "*Even though it is not explicitly expressed in the document, we considered that this reference point takes into account the ecological role of the stock (stated as a reference value of  $F$  as safer biologically).*" Then, in order to improve the assessment process of the fishery, we include in condition

3.2.1, that Management Plan “....shall include proper and formal consideration of the role of the resource on the maintenance of the ecosystem, particularly as food for other species and these considerations should be incorporated into the harvest control rules”. Besides these considerations, in order to score, we also took into consideration that stock has been showing an increasing tendency in its population biomass since 1992, even the stock has been under fishing pressure, and we interpreted this as the management actions have been appropriate and had let the stock to accomplish its role in the ecosystem. Finally, the wording of the rationale for the PI was modified in order to be clearer and Section 5.3 was added in the report.

#### 1.1.3 Comment type 4

It is not clear what is the fishery unit under certification and who is client for this assessment. Sometimes *Sardinops caeruleus* is mentioned in the report and others is *Sardinops sagax* mentioned. On page 5 the certifier states that it was the Gulf of California sardine fishery that went through pre-assessment. Given the multispecific nature of the fishery, it is hard to believe that even with technology available, fishing trials can be directed to a single species.

On page 4 in the list of acronyms it is stated that CANAIPECA is the client, however, this is a National Organization. On page 30 it is stated that some boats moved from western Coasts of the Baja California Península to the Gulf of California. We want clarification on the number of boats, name of boats, and which unit of CANAIPECA was the client for this assessment, since we know it is not the entire fleet that is pursuing MSC certification.

There is no explanation of how the harvest strategy is adjusted after no-fishing is declared in areas when the 30% limit of undersize sardine (<150 mm SL) has been reached. One can assume that for their re-opening, fishing in those areas is needed. How is the harvest strategy preventing the incentive to catch undersize sardine and discard it before landing, until the closed area is ready to be fished again? This is more than a possibility as 85% of the catch is used for reduction, as it is stated in page 14. Undersized sardine is as usefull as adult sardine for this market. How is this enforced? In the two stakeholder consultation meetings in June-July 2008, in Bahia Kino, Sonora and Ensenada, Baja California, reports were delivered to the assessment team of masive discards of sardine, that washed upon the shore, fouling the beaches of Miramar Bay (in Guaymas), Bahía de los Angeles, and Ensenada Patos (north of Tiburón Island).

Team response: The Unit of Certification is explained in detail in the report in section 7 with reference to Appendix I, where the names of the 36 fishing vessels, which are considered as the unit of certification, are listed with the name of the companies that owns them, and the number of their fishing permit or concession. Also, we included that the Sonora Delegation of CANAINPECA is the client.

After an area with undersize sardine is close, fishing continues in other areas where sardine are larger. If the opening of the area is need, an observer from INAPESCA participates in a fishing trip to the area and the decision is taken based on the observation, and this wording was added to the rationale. Also, a statement that the fishery is closed during August to October to avoid small fishes and reproductive females will be added.

The assessment team took into consideration the oral and written statements by the stakeholders on the claim of massive discard of small sardine. By reviewing records of local and federal authorities, the assessment team did not find any information of a bail for discards of undersize fishes, and no observer's records or wrong doing reports were found. Nevertheless, considering that this matter is very important to clarify, and for other reasons, the assessment



team included Condition 3.2.4, that clearly specifies that the client by the first surveillance audit should provide evidence that: *“the information from the fishery, including data, analysis and minutes from the technical bodies, have been disseminated in a timely fashion to all interested parties”* and *“a research plan should be made available to the public that includes a strategic approach to research and reliable information that is sufficient to achieve the objectives consistent with MSC’s Principles 1 and 2.”* With this, the assessment team expects that any speculation of wrong doing can be avoided. Finally, the wording of the rationale for the PI was modified to clarify and Section 5.3 was added to the report.

### 1.2.3 Comment type 2

The certifier gave a score of 90 to this PI. However, currently the estimation of the stock structure, abundance, and productivity, is using fishery-dependent information making the assessment not as robust as it is implied for a 90 score. It would be desirable that other research and sampling methods (e.g. diet analyses for sea birds and mammals and fishes) would be applied. We attach a PDF version of a scientific paper in press, related to this subject (Velarde et al. in press.pdf).

The use of acoustic techniques for biomass assessment seems to be still in its developing phase, testing the methodology and training technicians, based on the information provided in the report on Page 32 and 74. This data must be tested for accuracy before being used in the stock assessment models.

Team response: PI 1.2.3 assesses the amount of information to support the harvest strategy. In order to score this PI, the assessment team considered the amount of information that is systematically produced by INAPESCA, and which has allowed the use of the current assessment model and the one used to manage the fishery under the current harvest strategy. Also, the team considered the other information described in the rationale, taking into consideration the importance for the current harvesting strategy.

In the rationale, the comment on the use of acoustic techniques to complement the assessment is very important, because it will complement the current assessment, and we agree that the data must be tested for accuracy before they are used in the stock assessment.

### 1.2.4 Comment type 1

The certifier gave a score of 75 to this PI and triggered condition 1.2.4. The report is not considering important findings on patterns of stock hyperstability or density-dependent catchability for this fishery, reported by Martinez-Aguilar et al. (2009), that suggest the risk of overfishing (or spatial depletion) because population size decreases as catchability values increase in stock hyperstability situations.

Without including this well documented phenomenon, the harvest strategy is not precautionary as we do not have ways to determine if current historical record catches are not a reflection of this. This omission is suspicious, since the work of Martinez-Aguilar et al. (2009) is cited in this section, but only for its suggestion to use a constant harvest-rate to manage this fishery. The presence of hyperstability is also documented, although not using the term “hyperstability”, by Velarde et al. (1994) and Velarde et al. (in press) in the diet of seabirds that feed on sardine and CPUE of birds fishing for food, a fact not considered in the report. Currently the proportion of sardine in the diet of seabirds nesting in the Gulf of California Midriff Island Region is virtually zero, while the fishing season 2007-08 reported a record 488,639 MT catch (see pag. 28), and last fishing season 2008-2009 the catch was 524,155 MT. The history of the anchovy fishery collapse off Peru and Chile in the 1970's reports high abundance and historical catches right

before the stocks collapsed. It took over 30 years for the collapsed population to recover. The Gulf of California sardine fishery management system must exercise extreme precaution.

Team response: We agree that stock hyperstability or density-dependent catchability is an important issue to consider by the persons in charge of the assessment. However, we point out that high catchability and high catches are not the same. Also, as we mentioned above, we have to point out that: based on Martínez-Aguilar et al. (2009) figure 4, the catchability becomes higher when its abundance is lowest, and this happened when catches are at its lowest (see sea season 72 and 92 in figure 2, in our report, and compare with figure 4 of Martínez-Aguilar et al. (2009)), and the opposite when catchability is at its lowest, abundance is at its highest and catches are high, as season 87 and 88 (compare in the same figures as above). Furthermore, Martínez-Aguilar et al. (2009) concluded that a constant harvest rate of 0.29 should be applied to this fishery as a management strategy, which is larger than the one recommended by INAPESCA, as Martínez-Aguilar et al. (2009) stayed in page 80 of their publication. However, both methods (INAPESCA and Martínez-Aguilar et al., 2009) are fishery dependent, so a fishery independent method (as the acoustic method already under development) will be the only way to overcome the problem of having hyperstability shown in the data, because the biomass will be assessed directly in the field and follows the general trend of improving assessment in small pelagic in the world (Barange et al. 2009).

#### 1.2.4 Continued. Comment type 2

The certifier gave a score of 75 to this PI and triggered condition 1.2.4. Based on the limitations of the stock assessment methods, expressed in the scoring rationale (pag. 33), we believe the score should be lower.

Team response: Considering the rationale for PI 1.2.4, and considering the current trends in the estimated population biomass and recruitment biomass, we believe that the score is justified.

#### 1.2.4 Comment type 3

The certifier gave a score of 75 to this PI and triggered condition 1.2.4. Condition 1.2.4 establish two years (second surveillance audit) for evidence that fishery-independent data is collected, and four years of "some proof" that this data is incorporated into stock assessment. We think that evidence of collection of fishery-dependent data should be available to the certifier and all interested parties by the first surveillance audit, considering the fact that the fishery and its managers are working towards this objective since 2009, and data is already being collected, as stated in Action Plan (pag. 58). We also believe that the certifier should give specific examples of the kind of proof expected, as in the condition 2.2.3. Also we consider that incorporation of this information into stock assessment should be demonstrated by the second surveillance audit, since the risk of not evaluating properly the stock status is too high to wait four fishing seasons with increasingly greater landings.

Team response: The Condition was modified following the narrative of the 80 scoring guidepost of the performance indicator. This follows ISO standards and has been part of the MSC Directive to certifiers (TAB – D33v1). However the team agreed to shorten the timeframe when this should be achieved to the 3<sup>rd</sup> annual surveillance audit.

#### 2.1.1 Comment type 2

The certifier gave a 85 score to this PI. In the scoring rationale the certifier states the high



degree of certainty that retained species of small pelagics are within biologically based limits, but also recommends specific assessments for the main retained species. This is both contradictory and useless, since recommendations that are not part of a condition will not have any value to improve the fishery, since there is no incentive for the client to implement this change. The certifier should revise the score, lower it, and establish a condition for this PI, and make mandatory the specific stock assessments and reference points for main retained species. This is particularly critical for the anchovy (*Engraulis mordax*) that is ecologically important in the seabird diet in years of low sardine abundance. This is necessary for ensuring the stability of the trophic chain and the industry.

Team response: According to Nevárez-Martínez et al. (2006) anchovy (*Engraulis mordax*) comprise less than 1% of the catch in the Sonora region (unit of certification). It can also not be regarded as particularly vulnerable and is therefore not considered a main retained species under the MSC guidelines (FAM 2009 v.2.1). Broader ecosystem impacts like the dietary value for other species are considered under PI 2.5.1-1.5.3. However, the score in 2.1.2 was lowered to 75 and a new condition was included. The team concluded that there is a high degree of certainty that the main retained species are within biologically based limits, but recognizes that this may not be the case in the future if these management tools are not in place.

#### 2.1.2 Comment type 2

The certifier gave a 85 score to this PI. As in the previous PI the certification team makes recommendation that are not mandatory and have no way to be followed in its implementation by interested parties. The certifier acknowledge the fact that harvest rate is set for whole catch and not for individual species, therefore, we have no certainty that the management strategy for target sardine is ensuring no risk to retained species. The certifier should revise the score, lower it, and establish a condition for this PI, and make mandatory the specific stock assessments and reference points for main retained species. This is particularly critical for the anchovy (*Engraulis mordax*) that is ecologically important in the seabird diet in years of low sardine abundance.

Team response: Considering the comments, the score for this PI was lowered to 75 and a new condition was included. Even currently there is a high degree of certainty that the main retained species are within biologically based limits, the team recognizes that this may not be the case in the future if these management tools are not in place for individual species.

#### 2.2.1 Comment type 1

The certifier gave a 80 score to this PI. The report only mentions by-catch of giant squid and triggerfish. However the report fails to mention reports provided to the assessment team in two stakeholder consultation meetings in June-July 2008, in Bahia Kino, Sonora and Ensenada, BC, where the small-scale commercial fishing sector provided written accounts of direct catch by the sardine fleet of commercially important fish like sierra mackarel, curvina, snapper, mullet, mantarays and triggerfish. It must be stated that the fleet does not have license to catch these species, thus this is not by-catch but illegal direct catch.

Team response: The team investigated this claim and came to the conclusion that the gear and boats as well as the landing and processing sites are not set up for other than small pelagic species, therefore this practice is unlikely to occur on a regular basis or with large quantities other than small pelagic species. Potential illegal operations and reporting issues are covered under Principle 3, PI 3.2.3

The report does not make any mention that most of the catch is done at night, during periods of moonless nights, known as "oscuros," when the skipper uses the light created by the bioluminescence when the sardine schools swim rapidly and in synchrony. Although experienced skippers and crew can tell the type and size of fish just by looking at this light, there is no way to know for sure until the catch is landed in the deck. This is a consideration to make in the uncertainty of catching sub-legal fish.

Team response: According to the stock assessment scientist at CONAPESCA (Dr Nevarez) pre-season assessments are conducted to determine the size composition of the catch and if it is not favorable the start of the season is delayed. Examples of this can be found in the industry meeting minutes that are now available on the CONPESCA website.

The report did not consider sea bird by catch incidents, which were verbally communicated during meeting with stakeholders representing artisanal and sport fisheries and conservationists. Those incidents involved species included at the Mexican Official Standard for threatened and endangered species (NOM-059-ECOL-2001; *Larus heermanni* and *Pelecanus occidentalis californicus*); which populations live and nest at the main fishing area of the regional sardine fleets (Midriff Island Region and Las Encantadas Archipelago).

Team response: ETP species including seabirds are covered under PI 2.3.1, a complete list and potential interactions are described in more details in the general background sections 6.1 and 6.2 of the report. It is very unusual that seabirds are caught directly by a purse seiner.

### 2.2.2 Comment type 3

The certifier gave a 70 score to this PI, and triggered condition 2.2.2. This condition asks for "some" evidence that by-catch species are likely to be within biologically based limits to be provided by the third surveillance audit. If the only information used to set this timeline is that there is by-catch of squid and triggerfish and the management body have evidence that both are within limits, we do not understand the rationale used to establish that much time. We believe that evidence should be in place by the first surveillance audit.

Team response: The timeline was set to include all identified main bycatch species. It is a logical sequence of events to wait for results to be presented first and then establish if there is evidence that these species are in biologically based limits. It is possible to stipulate that evidence will be thought for squid and triggerfish by the first surveillance audit?

### 2.2.3 Comment type 3

The certifier gave a 70 score to this PI, and triggered condition 2.2.3. This condition request to implement a scientifically defensible and comprehensive monitoring and reporting system for by-catch of the fishery, and provided as example an observer program on board, or video monitoring systems. We believe that an observer program should be established, and that such program should be independent to the client and to the management body. It is unacceptable that this observer program is based on the work of one postgraduate student, as it is stated in the Action Plan (pag. 58).

Team response: We share your concerns. The team has responded to the client's action plan and expressed their concern. The action plan has since been revised and improved to include an industry independent observer program.

Video systems would not function to establish validity of claims on the impact of the fishery on ETP species (see below).

Team response: The comment has been taken and the reference to video surveillance has been deleted in the report. It was only regarded as an example and the comment was added "if that can be shown to be suitably effective".

### 2.3.1 Comment type 1

The certifier gave a 80 score to this PI. The analysis is incomplete and apparently based on perceptions and not in scientific work. No trace references are listed to support the claims of the certifier that the fishery "is thought to be unlikely to create unacceptable impacts and they are likely to be within limits of national and international requirements." For example, only possible interactions with the vaquita (*Phocoena sinus*) are mentioned and catalogued as "unlikely." No further comments are made in the report on documented interactions with sealions, common dolphins, and other marine mammals (data from ITESM-Campus Guaymas and CIAD), neither with seabirds and seaturtles that are in the ETP category. Reports in Gallo-Reynoso (2003) state that from a random sample of 37 common dolphin with age known, half had its death attributed to interaction with fishing gear, and almost half of those with sardine purse seine nets.

Team response: The list of ETP species that occur in the area where the sardine fishery operates is clearly stated in the background information of the report 6.2. However the report, Table 4 and particularly the rational of this indicator has been amended to explain more specifically why interactions with marine mammals, seabirds and turtles are likely to be very low and which species are on any national or international legally binding lists. Specific reference have been made that fishing is conducted at night. The team has reviewed the report by Gallo-Reynoso (2003). The report focuses on gillnet fisheries but the sardine fishery is mentioned. However, it is very difficult to attributed scares to particular type of fishing gear and therefore there is no scientific basis to do this here. The observer program that will be implemented to fulfill the condition for continued certification will provide scientific data on the amount and type of interactions with ETP species.

Of particular concern is the seabird mortality during fishing operations. The report fails to mention photographic accounts of brown pelican mortality during sardine boat fishing provided to the assessment team in two stakeholder consultation meetings in June-July 2008, in Bahia Kino, Sonora and Ensenada, BC

The certifier must include a table of all species ETP that exist in the fishing area, under national and international standards, and list interaction levels with those that information/records exist.

Team response: As mentioned above, the report has been revised to clearly state all ETP species in the area of sardine fishery operations that are recognized by national legislation (NOM-059-SEMARNAT-2001) and binding international agreements (CITES). Specifically Table 4 has been amended to reflect that. Brown Pelicans (*Pelecanus occidentalis*) are neither listed in the NORM-59 nor CITES listed. They are listed on IUCN as a species of least concern, which is a non binding list. So even if interactions with brown pelicans occur and they can be attributed to the sardine fishing vessels these are highly likely to be within national and international limits.

### 2.3.2 Comment type 2

The certifier gave a 80 score to this PI. This score implies that precautionary management

strategies are in place to ensure the fishery does not pose a serious risk or irreversible harm to ETP. The only strategy mentioned for managing those impacts is indirect (stay at or below  $F < 0.25$ ), as the report assumes all impacts are indirect since all species rely indirectly on sardine in their diet. As explained above not all impacts are indirect, and the fishery have no management strategy to deal with direct mortality of seabirds and marine mammals in fishing operations. The score should be lowered and must trigger a new condition to develop management strategies to minimize impact, once the direct effects on mortality are determined.

Team response: As mentioned marine mammals, seabirds and turtles are protected under the national legislation (NOM-059-SEMARNAT-2001). Interactions with species that are recognized by national legislation or binding international agreements are rare. The observer program that will be implemented to fulfill the condition for continued certification will provide scientific data on the amount and type of interactions with ETP species. If direct interactions are detected the fishery client has agreed to respond with appropriate actions.

### 2.3.3 Comment type 1

The certifier gave a 85 score to this PI. This score implies that effects of the fishery on ETP species are known, and indirect effects are unlikely to create unacceptable impacts on those species. We do not believe the information provided is adequate to support this score, neither think that the broad analysis with Ecopath and Ecosim models is useful, since the interactions with ETP are not only because of the forage nature of sardines, but because the direct impacts of fishing on ETP species mortality. In addition the study area for the Ecopath analysis used, published by Morales-Zarate et al. (2004), is the northern Gulf, thus 85-90% of the distribution area of the sardine fishery is outside the analysis. The score should be lowered and trigger a new condition, linked to condition 2.2.3, in order to have an independent observer program to gather information about the nature and severity of these interactions.

Team response: As mentioned above if direct interactions with ETP species occur these will be documented by the observer program, a condition that was already set for PI 2.2.3. Recognizing that the Ecopath and Ecosim model was applicable only for the northern Gulf a credit of only 5 was given (instead of 80 a score of 85 overall).

### 2.4.1 Comment type 1

The certifier gave a score of 95 to this PI. Information of the operation of boats in shallow waters (less than 40 meter deep), inside bays of islands and mainland, along sandy bottoms, was given to the CB during two stakeholder consultation meetings in June-July 2008, in Bahia Kino, Sonora and Ensenada, Baja California, but was not included in the analysis. However, the main cause of concern is the impact of the fishery destroying the feeding habitat of marine mammals, fish, seabirds, by removing large amounts of food, and destroying prime feeding locations. Small-scale fishers, researchers and natural history tour operators, report that the occurrence of large "feeding frenzy" or "bochinches" that are gatherings of thousands of birds, several whales, hundreds of dolphins is becoming more rare due to lack of large sardine schools.

Team response: The comments by stakeholders have been taken into consideration by the team and have been discussed during their deliberations. However as stated, purse seiners are intentionally avoiding bottom contact because the net is easily damaged and repair or replacement is very expensive. Indirect effects from the removal of the sardine as a food source for predators are considered under ETP and ecosystem PIs (2.3.1 and 2.5.1) it is not related to

habitat.

#### 2.4.1 Continued, Comment type 2

The certifier gave a score of 95 to this PI. Without more information of the impacts of the net on sandy bottoms, and of the impact of fishing on the feeding habitat of marine mammals, by extracting large amounts of food for fish, seabirds, marine mammals, this score is too high.

Team response: Purse seiners are expected to have negligible impact on the habitat compare to other fishing gear. Even if bottom contact occurs, despite of being generally avoided, displacement should be limited because of the gears low weight. As stated above, indirect effects from the removal of the sardine as a food source for predators are considered under ETP and ecosystem PIs (2.3.1 and 2.5.1).

#### 2.4.2 Comment type 2

The certifier gave a score of 95 to this PI. The only strategy mentioned to avoid habitat impact, refers to impact on the bottom of the ocean and by-catch. The impact to feeding habitat of several species is not incorporated. Therefore the score is too high.

Team response: As mentioned above indirect effects from the removal of the sardine as a food source for predators are considered under ETP and ecosystem PIs (2.3.1 and 2.5.1) it is not related to habitat.

#### 2.5.1 Comment type 2

The certifier gave a score of 80 to this PI. The report analyze the impact of the extraction of sardine on the ecosystem structure of the entire Gulf of California. We consider that this unit of analysis is too coarse and disguise important impacts on the ecosystem function of key species. For example the effects of the extraction of sardine on nesting seabirds diet has been studied in detail in this fishery. The quality of the diet is critical during the reproductive phase. It has been demonstrated that reproductive success is correlated with prey availability. Seabirds and the sardine purse seiners are competitors, and intense fishing pressure on key areas can lead to food depletion and/or availability of food items with lower nutritional value, that will negatively impact breeding success as well. The fishery is causing serious harm to key elements of ecosystem function and structure for nesting seabirds. The report claims that the fishery does not takes place during the times that seabirds are nesting. In the team response to Peer Reviewers on 2.3.2 it is stated that. "the fishery is not occurring during times when ETP birds are nesting, reducing the potential indirect impacts." This is not true, as three decades of data of Dr. Enriqueta Velarde, that have studied nesting seabirds at Rasa Island can demonstrate. In addition to this, Martínez-Zavala et al. (2009) reports official data where the highest catch of sardine is during March, April, May for the 2008/2009 fishing season.

Team response: Particular mention of these studies is given in the background section of this report under 6.3.2. Studies by Dr. Enriqueta Velarde (e.g. Velarde et al. 1994) found that a change in prey stock abundance may have result in a change in diet of these seabirds, indicating that these seabird populations are sustained by the availability of other small pelagic fish species in the Gulf of California, by adjusting their diet to the more abundant species. As indicated by the comments from the peer reviewer this is an issue that should and is covered under ETP species, since the seabirds are not depleted due the depletion of key prey species and therefore not interruption the structure and function of the ecosystem.



### 2.5.2 Comment type 3

The certifier gave a score of 75 to this PI, and triggered condition 2.5.2. The CB recognizes that: "there is no strategy in place to restrain impacts of the fishery on the ecosystem." The fishery has been reluctant in the past to recognize the need to use spatial tools to restrain those impacts. Specifically the need to leave important areas protected from fishing mortality, in order to reduce their impacts on the marine ecosystem in key areas. This behaviour has precluded or delayed the creation of marine protected areas in the past, and is based on their assumption that all areas in the Gulf are key to the operation of the fleet. In the past some areas of juvenile high concentration, mostly in the Midriff Island region of the Gulf, were recognized as key to sardine recruitment processes, and were voluntarily closed to extraction through decisions of the industry with support from authorities. We believe that condition 2.5.2 must include considerations of areas that should be off-limits to this fishery based on the following: a) areas surrounding key seabird nesting islands, b) areas important for sardine recruitment, that have sub-legal and juveniles sardine. There is enough information on the behaviour of the fleet, and the behaviour of nesting seabirds to design those areas. In spite of the relevance of this subject and its specific mention in the latest draft of Regulations for the Mexican General Law for Sustainable Fisheries and Aquaculture (available on-line at CONAPESCA's website), the draft management plan has only one objective in synchrony with this idea (see objective VI.II.1 at Page 25 of the Draft Management Plan of the Fishery). Article 38 of the Mexican General Law for Ecologic Equilibrium and Environmental Protection offers the solution for the absence of strategy for restraining impacts of the fishery to the ecosystem, by means of voluntary and public environmental audits. This way, the industry could propose mitigation plans, the Mexican Attorney for Environmental Protection would monitor their implementation and the general society could participate in the process.

Team response: As stated in the background section of the report under 6.3, there are currently 11 MPAs throughout the Gulf and NGOs together with national and international scientists are working towards the goal of establishing a network of marine reserves in the Gulf. The 11 MPAs throughout the Gulf could be interpreted as a partial strategy. However the assessment team decided to impose a condition because no strategy is in place that states explicitly to restrain the impacts of the fishery on the ecosystem. We believe that condition 2.5.2 includes the stakeholder's concerns.

Currently there are no areas closed for sardine fishing, and it is not within the reach of the certification team to ask for closed areas to be implemented as part of a condition of certification. It is not a requirement of the MSC to have closed area and the Performance Indicators or guidelines of the MSC standard do not ask for closed areas or MPAs. This would require a formal and different procedure which is already established (*General law for the ecological equilibrium and the protection to environment*) (LGEEPA, 1,I,IV) in the Reglamento de la Ley del Equilibrio Ecológico y la Protección del Ambiente en Materia de Areas Naturales Protegidas (*Regulations of the General law for the Ecological Equilibrium and the protection to environment related to natural protected Areas*), Title IV, Chapter I, Article 45:

"Los estudios que justifiquen la expedición de las declaratorias para el establecimiento de las áreas naturales protegidas, serán elaborados por la Secretaría, y en su caso, ésta podrá solicitar la colaboración de otras dependencias del Ejecutivo Federal, así como de organizaciones públicas o privadas, universidades, instituciones de investigación o cualquier persona física o moral con experiencia y capacidad técnica en la materia"

*(The studies to justify the declaration of the establishment of natural protected areas will be*

made by the Secretariat [the Secretaría del Medio Ambiente y Recursos Naturales, Ministry of the Environment and Natural Resources] and, if appropriate, it will request the collaboration of other branches of the Federal Government, as well as private or public organizations, universities, research institutions or any person with enough experience and technical skills on the matter). The formal procedure is described in detail along the I Chapter, including the provisions for public consultation and scrutiny in Article 47:

“Los estudios previos justificativos, una vez concluidos, deberán ser puestos a disposición del público para su consulta por un plazo de 30 días naturales, en las oficinas de la Secretaría y en las de sus Delegaciones ubicadas en las entidades federativas donde se localice el área que se pretende establecer. Para tal efecto, la Secretaría publicará en el Diario Oficial de la Federación y en la Gaceta Ecológica un aviso a través del cual se dé a conocer esta circunstancia” (*Such studies, once concluded, will be posted to public scrutiny for a period of 30 natural days at the offices of the Secretariat and its Delegations at each State in which the protected area is to be declared. To this aim, the Secretariat will publish an announcement in the “Diario Oficial de la Federación” [the official federal gazette] and in the “Gaceta Ecológica” [the ecological gazette]*).

Regarding the underlined paragraph in the stakeholder submission above, it should be noted that the General Law for Ecologic Equilibrium and Environmental Protection includes the provision for perform voluntary, but not public, environmental audits (Article 38 bis). Such environmental audits may only be undertaken by expert and trained environmental auditors, which have to be certified by the Secretariat of the Environment and Natural Resources, following the rules and procedures to perform such process. Thus, there is no provision for the open “general society” to participate in the process.

On the other hand, the specific closures of times and/or areas for any particular fishery are a matter dealt with in the “Normas Oficiales” (*official norms*), integrated by means of the procedures described under point 3.1.2. That is the process in which any person may participate as explained.

In addition, the “Carta Nacional Pesquera” is the “presentación cartográfica y escrita que contiene el resumen de la información necesaria del diagnóstico y evaluación integral de la actividad pesquera y acuícola, así como de los indicadores sobre la disponibilidad y conservación de los recursos pesqueros y acuícolas, en aguas de jurisdicción federal, cuyo contenido tendrá carácter informativo para los sectores productivos y será vinculante en la toma de decisiones de la autoridad pesquera en la adopción e implementación de instrumentos y medidas para el control del esfuerzo pesquero, en la resolución de solicitudes de concesiones y permisos para la realización de actividades pesqueras y acuícolas, y en la implementación y ejecución de acciones y medidas relacionadas con dichos actos administrativos” (*contains the abstracts of the necessary information about diagnostic and integral evaluation of the fisheries activities ... as well as the indicators about availability and conservation of fisheries resources ... its contents will be of informative nature for the fisheries sector and will have effects on the decision taking processes of the authorities about adoption and implementation of instruments and measures to control fishing effort ...*). The new version of the Carta Nacional Pesquera has been posted for public scrutiny and comments at the “Comisión Federal de Mejora Regulatoria” (*Federal Commission for Regulation Improvement*) web page; this is also a process in which modifications may be suggested.

<http://www.diputados.gob.mx/LeyesBiblio/pdf/130.pdf>  
[www.cofemer.gob.mx](http://www.cofemer.gob.mx)

### 2.5.3 Comment type 1

The rationale used for this score that refers to the results of the Ecopath and Ecosim models fail to consider that competition for food between functional groups and the fishing industry is exacerbated when the resource is scarce, and when it is close to the surface, thus available to the purse-seine net, and to plunge diving seabirds trying to eat. Therefore is more competition, than fishing pressure, what is impacting the trophic structure.

Team response: The publication by Morales-Zárate et al. (2004) detailing results of the Ecopath and Ecosim models was only one of many studies that was referenced to support the score of this PI. The main findings are that the key elements of the ecosystem and the main functions are broadly understood and that most species that prey on sardines are opportunists and feed on a variety of other species. The models were only cited to elevate the score from 80 to 85.

### 3.1.2 Comment type 2

The certifier gave a score of 85 to this PI. The management system is currently not open to all interested and affected parties. The Consejo Nacional de Pesca y Acuicultura does not have any seats open for the representation of interests from the civil society, in the form of Mexican marine conservation NGOs. The Consejo Estatal de Pesca y Acuicultura in Sonora is not operational, and also does not have participation of the NGO community. The Comité Técnico de Pelágicos Menores does not see the value of having NGOs present. The current score is therefore not reflecting this limitation in participation of all interested parties, and we believe it is too high.

Team response: The several instances of the management system (from the integration of a General Law as the LGPAS down to the Fishing Chart and specific conditions discussed at the annual meetings of the Comité Técnico de Pelágicos Menores) are open to the participation of the civil society.

- a. The Consejo Nacional de Pesca y Acuicultura (the predecessor of the one described below) referred to by the stakeholders included at least two members from NGOs from the civil society: one from the Foundation for the Conservation of Billfishes and another from the sport fishing groups in Baja California Sur as shown in <http://www.sagarpa.gob.mx/transparencia/conapesca.html>
- b. The current Consejo Nacional de Pesca y Acuicultura Sustentables includes the Undersecretary of Environmental Affairs of the Secretariat of the Environment and Natural Resources, the Director General of Enforcement of Fisheries and Marine Resources of the Procuraduría Federal de Protección al Ambiente (the Federal Attorney for Environmental Protection), a member of academia (The National Autonomous University) and the President of the Colegio Nacional de Profesionales de la Pesca (the National Association of Fisheries Professionals).  
[http://www.conapesca.sagarpa.gob.mx/wb/cona/cona\\_comite\\_consultivo\\_nacional\\_de\\_pesca\\_responsab](http://www.conapesca.sagarpa.gob.mx/wb/cona/cona_comite_consultivo_nacional_de_pesca_responsab)
- c. Regarding the more specific concerns about the natural resources and the environment, the SEMARNAT has Consejos Consultivos para el Desarrollo Sustentable (Advisory Council for Sustainable Development), both at the national and regional levels, where



input from all sectors of society to promote protection, conservation and restoration of ecosystems and natural resources is encouraged. Participants in these councils are appointed in a democratic manner. They are a direct connection to the representatives of the environmental sector into the Consejo Nacional de Pesca y Acuacultura Sustentables, described above, since the Undersecretary of SEMARNAT and the Federal Attorney for Environmental Protection are part of it.

[http://webkreator.com.mx/consejos\\_consultivos/nacional.html](http://webkreator.com.mx/consejos_consultivos/nacional.html)

- d. As stated in the report, the civil society may have full access (and it is further requested) to The Draft Regulation of the General Law on Sustainable Fisheries and Aquaculture in order to express comments:

*Following the agreement of the Consejo Nacional de Pesca y Acuacultura as of July 1<sup>st</sup>, 2009... the last version of the draft Regulation of the General Law of Sustainable Fisheries and Aquaculture was made available to the fisheries and aquaculture sector, as well as to the general public for the purpose of obtaining comments before July 10<sup>th</sup>, 2009...*

<http://www.sagarpa.gob.mx/saladeprensa/Paginas/ForoReglamentodePesca.aspx>

- e. The procedures for the establishment of NOMs are explicitly defined in the law itself, and incorporate not only public access to the process, but ask for it in the Diario Oficial de la Federación (DOF, Official Federal Government Gazette), the official communication medium:

In Article 44:

*The federal government agencies are responsible for the elaboration of the first drafts of NOMs and to submit them to the Comités Consultivos Nacionales de Normalización (CCNN, National Consulting Normalization Committees). Other national normalization organisms may also submit first order drafts to the CCNNs. These will, in turn, integrate the second order drafts. They will also search for the existence of similar NOMs, in which case coordination between agencies will be mandatory. Further, they will take in account other national and international norms. The CCNNs will comment the draft within a period not longer than 75 days.*

*The originating agencies will then answer to comments and do the necessary modifications within the following 30 days. The result will then be the Project of NOM, that will be published in the Diario Oficial de la Federación (DOF, Official Federal Government Gazette). This will remain posted for public scrutiny for 60 days during which any interested party may revise the documentation that will be available with the corresponding CCNN and submit any comments or suggestions.*

*The CCNN will analyze the comments and suggestions and, in due course, will modify the project within the following 45 days. Then answers to comments and suggestions will be published in the DOF at least 15 days in advance of the final publication of the NOM.*

The CCNN for the fisheries sector is known as the Comité Consultivo Nacional de Normalización de Pesca Responsable (National Consultive Committee for the Normalization of Responsible Fisheries) and is constituted by government officials from the CONAPESCA, the Director General of Norms (Secretariat of Economy), the President of the National Chamber of the Fisheries and Aquaculture Industries, the President of the National Organization of Fisheries Cooperatives, the Chief of Staff of the Navy, the Director General and other officials of Merchant Shipping (Secretariat of Communications and Transportation), representatives from the Secretariat of Public Health and Secretariat of Tourism; the Director of the Institute of Marine Sciences of the National Autonomous

University of Mexico, a representative from the National Waters Commission, the Undersecretary of the Secretariat of the Environment and Natural Resources, the regional Directors of INAPESCA, the Director General of the *Procuraduría de la Defensa del Ambiente* (Attorney for the Defense of Environment), representatives from the net manufacturing industry, marine equipment and cables industry, as well as the Director of INAPESCA and the Colegio de Profesionales de la Pesca (Association of Fisheries Professionals).

A recent example of the interactions between the originating governmental section and the public comments may be found in the Diario Oficial de la Federación of October 3<sup>rd</sup>, 2006, that displays the answers to comments from public scrutiny for the integration of NOM PESQ 029.

[http://www.diputados.gob.mx/LeyesBiblio/regley/Reg\\_LPesca.pdf](http://www.diputados.gob.mx/LeyesBiblio/regley/Reg_LPesca.pdf)

<http://www.sagarpa.gob.mx/saladeprensa/Paginas/ForoReglamentodePesca.aspx>

<http://www.dof.gob.mx/index.php?year=2006&month=10&day=03>

- f. Dr. Enriqueta Velarde, member of academia and NGOs has participated in the annual meetings of the Comité Técnico de Pelágicos Menores; the invitation open for other potential participants is shown in the Reports of the Committee.

Memorias del XVII Taller de Pelágicos Menores,

<http://www.inapesca.gob.mx/portal/component/content/article/21-foros-y-eventos/71-pesqueria-pelagicos>

In conclusion, we believe that all the major process of integration of laws and subsidiary regulations are mostly open to public scrutiny, that the call for participation is implicit and explicit in the rules and that it is in fact a transparent and open process; whether or not to participate is a personal and institutional choice. Nonetheless, we considered that further actions could be implemented, thus assign the indicator 85.

### 3.1.3 Comment type 2

The certifier gave a score of 100 to this PI. We believe this score is too high since the management plan and policy does not make explicit consideration of the keystone ecological role of the sardine. None of the management long-term objectives mentioned in the Draft Management Plan are related to this role. This limitation is made explicit in the lenguaje of condition 3.2.1 that calls for "proper and formal consideration of the role of the resource in the maintenance of the ecosystem, particularly as food for other species and these considerations should be incorporated into the harvest rules." It is also referred in the rationale for condition 3.2.4 that mentions "There is no specific plan as yet to look at the impacts of the fishery on the ecosystem." Finally, Mexico's adherence to the FAO Code of Conduct for Responsible Fisheries is not enough argument to support this score.

Team response: It should be noted that this indicator does not deal with specific implementation of the precautionary approach:

"At its most basic, this performance indicator forms an important part of the overall understanding of the use or otherwise of a precautionary approach in the fishery under assessment but is not concerned with the operational implementation of the precautionary approach within the 'day-to-day' management of the fishery itself. This performance indicator deals only with the high or broad management policy context..." (Marine Stewardship Council Fisheries Assessment Methodology and Guidance to Certification Bodies. Version 1, 21 July 2008)

Further, the Draft Management Plan (Plan de Manejo) specifically states in its objectives:

#### VI:III Reducing environmental interactions

Specific objectives:

Forbid or restrain fishing activities in the ecologically most significant areas.

Enforce measures to reduce catch and mortality of small sized fishes.

Promote responsible fisheries practices.

Interested stakeholders are encouraged to participate at the appropriate timing in the workshops for the integration of the Management Plan, which are called by the INAPESCA. The workshops for the Sardine Fishery Management Plan are to be called by late 2010 and early 2011 (Dr Manuel Nevarez, INAPESCA, [manuel.nevarez@prodigy.net.mx]). A present example of such a call (in this case for the lobster Management Plan) can be found at

[http://www.inapesca.gob.mx/portal/documentos/convocatoria/AVISO%20INAPESCA\\_TALLERES\\_PM%20LANGOSTA-2010.pdf](http://www.inapesca.gob.mx/portal/documentos/convocatoria/AVISO%20INAPESCA_TALLERES_PM%20LANGOSTA-2010.pdf)

#### 3.1.4 Comment type 1

It is recognized in the report that the fleet is receiving fuel subsidies from Governmental programs of support to the primary sector. However, it is not analyzed if this fuel subsidy is working against a sustainable fishery. For instance, we know from the report that the maximum number of boats is fixed, with no new fishing licenses (see Figure 2. page 15). We know as well that only 40 boats from the fleet of Sonora are the subject of this assessment (this information was provided directly from the CB, since the report does not have this information). Figure 2 also show that the CPUE per boat has grown dramatically in the last four-five years. One interpretation for this growth in CPUE is that boats are doing more trips per unit of time, this more possible when the main cost of boat movement, fuel coast, is subsidized. How is this subsidized fishing effort acting in the fishing patterns of the fleet? Specially in fishing areas that are close to Guaymas, and in areas of juvenile recruitment. We do not know if subsidized fuel is also used illegally to lower the cost of processing plants that reduce sardine into fish meal, therefore providing another incentive to direct 85% of the catch to the production of fish meal for animal feeds. We do not know how the increasing demand of fish meal by the growing aquaculture shrimp sector in Sonora (that is vertically integrated to the fishery in the main companies) is producing negative incentives that are causing overfishing.

Team response: Subsidies to primary activities, mostly agriculture and fisheries, are widespread in the world, including Developed Countries<sup>3</sup>. Although basically inadequate from their likely deleterious effects on fisheries sustainability, they are a consequence of several aspects, including a) the former pressure on the governments to support a primary sector that traditionally gets the minor part of the productive chain; support that finally resulted in widespread subsidizing; and b) the need of governments to facilitate primary sectors in light of the competition of developed countries with lower fuel prizes.

Fisheries in Mexico have been both overinvested and subsidized for fuel, but the management system has engaged in a process to end with this practices. Fuel subsidies began during 1996 as an incentive to shrimp producers to help lever the fuel cost to that for the U.S. shrimp fleet; while it originally consisted in a sizeable amount of the major operating cost, with a complicated procedure to estimate the amount for each boat depending on its size, etc., its relative

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<sup>3</sup> Organisation for Economic Co-operation and Development; OECD Publishing, 2001: 237 pp.

importance has been steadily decreasing. By 2006, the amount was fixed to Mex\$ 2.00 per liter, while the price of diesel has constantly increased. The CANAINPESCA estimates that the sardine fishery fleet used subsidy for about 70-80% of the total expenditure, the remaining being paid at regular prices, since quotas per boat based on engine size are in effect (Ing. León Tissot P., CANAINPES Guaymas; leontp47@hotmail.com)

There is at present another example of incentives aiming at improving the sustainability of fisheries within the general management system. The shrimp fishery has been long recognized to be overinvested, with more boats than those needed for MSY. The program calls for voluntary retirement of boats in change for a premium of MEX\$ 1'300,000 and is now open to receive applications. The Sonora shrimp fleet decreased from 528 boats during 2008 to 277 during 2010 as a result of this program.

Boats get fuel subsidy on a quota basis that is not enough for even their normal operation, let alone any further increase in time at sea. There is no possibility of using subsidized fuel for the plant operations. Regarding the increasing demand of fish meal for the aquaculture industry, this is basic market law, but has never been considered as a subsidy.

It has been shown in the published materials that the most likely interpretation of these ample variations in landings are the effect of different levels of abundance of the population which are, in turn, caused by changing environmental conditions. Recently, the article by Bakun et al. (2009) has reviewed the available information and its references contain most of them.

[http://www.conapesca.gob.mx/wb/cona/programa\\_de\\_retiro\\_voluntario\\_de\\_embarcaciones\\_cam](http://www.conapesca.gob.mx/wb/cona/programa_de_retiro_voluntario_de_embarcaciones_cam)

Bakun, A., E.A. Babcock, S.E. Lluch-Cota, C. Santora and C.J. Salvadeo. 2009. Issues of ecosystem based management of forage fisheries in "open" non-stationary ecosystems: the example of the sardine fishery in the Gulf of California. *Rev. Fish. Biol. Fisheries*. DOI 10.1007/s11160-009-9118-1.

#### 3.1.4 Continued. Comment type 2

The certifier gave a score of 85 to this PI. The scoring guidepost for 80 mention that the management system should have provisions to seek to ensure that negative incentives does not arise. We do not believe that the rationales provided in the report show that fuel subsidy is not perverse. We do not see how the current management system is ensuring that negative incentives does not arise. Therefore the score is too high.

Team response: Same as 3.1.4 (1) above

#### 3.2.1 Comment type 3

The certifier gave a score of 75 to this PI, therefore triggered condition 3.2.1. Firstly, this low score and its accompanying condition supports our claim that score of PI 3.1.3 is too high. Secondly, we do not understand the criteria used for the time frame to comply, since the draft management plan for this fishery is in its final draft stage, and in our opinion does not warrant two years to make it operational. In our opinion one year is enough (first surveillance audit).

The Draft Management Plan yet lacks of a minimum satisfactory development of sections stated as mandatory by the Mexican General Law of Fisheries and its Regulations (also in final draft stage, available online at CONAPESCA's website):

- It lacks of strategies for promoting the participation of individuals and communities related to

the fishery in its administration (see Fraction III of Article 39 of Chapter III of the Mexican General Law for Sustainable Fisheries and Aquaculture). Of particular concern is the lack of participation of Seri Indian Communities in this plan.

- It lacks of socioeconomic indicators of the populations employed by the fishery as impact indicators for the proposed management strategy (see Fraction VI of Article 39 of Chapter III of the Mexican General Law for Sustainable Fisheries and Aquaculture).

- There is uncertainty on the authority of the management objectives stated (according the Article 39 of the General Law of Sustainable Fisheries and Aquaculture and Article 67 of Title IV of the Regulations Draft for the General Law, they must be defined by the National Fisheries Council and/or the State Fisheries Councils).

- The Draft Management Plan lacks of objectives, goals, strategies and indicators for social and environmental aspects related to the minor pelagic fisheries (see Fraction IV of Article 37 of Chapter IX of the Regulations Draft for the General Law for Sustainable Fisheries and Aquaculture).

- The Draft Management Plan lacks of strategies, tactics and responsibilities for stakeholders involved in the implementation of the management plan (see Article 68 of Title IV of the Regulations Draft for the General Law for Sustainable Fisheries and Aquaculture).

- The Draft Management Plan lacks of explicit considerations for the ecosystem derived from the fishing activity, for reducing the impact of fishing operations over non-target species (see Article 69 of Title IV of the Regulations Draft for the General Law for Sustainable Fisheries and Aquaculture)

In addition to all the previous, the draft management plan lacks of operative budget and cost distributions among users, posing serious doubts about the feasibility of the management strategy proposed.

**Team response:** All the above issues concern the Draft Management Plan that is in the implementation stage. As shown by the many comments, there is still a considerable amount of work involved in this process, which will certainly span beyond one year; thus we established the time frame for the second audit.

All these matters should certainly be dealt with during the workshops for the implementation of this plan, and it would be of utmost importance that the concerned stakeholders raising these comments participate in them, the very same way that other are participating in similar processes for other fisheries at this time.

### 3.2.2 Comment type 2

The certifier gave a score of 85 to this PI. The SG for a score of 80 include a management system that has decision-making processes that respond to issues identified in transparent, timely and adaptive manner. We believe that the current system is not transparent enough. The MSC assessment process serve as a good venue to bring more transparency to the decision-making system, but it is not sufficient. For example, the public does not have access to basic information and raw data of the fishery and how it is managed, being the sardine a natural resource under public trust. Reiterated formal inquiries by scientists and NGOs to have access to data bases with information on



the total catch per species, number and specifications of licenced boats, CPUE, fishing areas, have not been granted. This information is currently only accesible to the management authorities (scientists at CRIP) and the industry. The SG for a score of 80 also include provisions for the use of the best available information to guide decision-making under a precautionary approach. Robust information from nesting seabirds diet, is not used in the management system. This information has proved to have statistically significant forecasting value of the sardine availability to the fleet, since birds catch sardine that will recruit to the fishery in the following year (see Velarde at al. in press). We believe current score is too high, and that the CB must cosider a condition in this PI.

**Team response:** The management system does have a decision-making process that responds to issues in timely and adaptive manner. On the line of the comment by the stakeholders, we considered that transparency of the process is not enough and thus imposed a condition (see Condition 3.2.4).

Given prior comments by stakeholders, including letters directed to MSC, the INAPESCA (*the National Fisheries Institute, the official fisheries research institution in Mexico*) opened a web site (<http://www.inapesca.gob.mx/portal/publicaciones/pesqueria-de-pelagicos-menores-en-el-golfo-de-california>) where most of the relevant information was uploaded at the disposal of any interested person.

It should be noted, however, that this is not required by the MSC and is not customary. In a recent search for similar information (landings, effort and composition of the catch) to MSC certified marine fisheries (76) by Dr Germán Ponce D., a scientist in the CICIMAR ([gponced@ipn.mx](mailto:gponced@ipn.mx)), he was able to obtain answer from 19 (57 didn't respond). From the ones that did, 12 directed him to an official (either governmental or international commission) site, 4 directed him to the documents in the MSC site and 3 declared that such information is restricted and/or confidential.

While the certifying team agrees that transparency is desirable, it worked on the usual basis, such as published articles, reports, etc. and, if needing detailed information, it can be requested directly from the scientists who generate and hold the data.

### 3.2.3 Comment type 2

The certifier gave a score of 80 to this PI. The monitoring system by VMS has proved not to be effective to enforce the respect of core areas of the few marine protected areas that are off-limits from sardine fishing. The monitoring system of the catch, that INAPESCA have implemented in landing points, is not public, therefore the general public have no means to verify if the monitoring methodology is statistically robust. The enforcement efficiency of CONAPESCA officials is not verifiable either, since no public reports exist of their inspection visits, number of sanctions, follow-up of administrative sanctions. The CB mentions that there is no evidence of systematic non-compliance, but the trace references does not mention any documents from enforcement authorities to justify this assertion. The 30% limit of sub-legal sardine, is stated only in the Carta Nacional Pesquera, not in any formal regulatory instruments. The CNP has only value as a reference instrument, and violations are not the ground of a legal sanction. Therefore, the only regulatory mechanism that is mentioned and available to control the harvest, since the fishery is not managed by TAC, is not enforceable by authorities.

**Team response:** The assessment team has found no evidence that the monitoring system is not effective for enforcing the respect of the marine protected areas. Marine protected areas (MPAs) are by no means few; the map attached shows them at the Gulf of California, and they cover all of the northern area, the large islands and their surrounding marine space and all of the islands in the gulf

(shown in green). UNEP (the United Nations Environmental Program) reports almost 2 million hectares of natural protected areas in the Gulf of California. The “Comisión Nacional de Áreas Naturales Protegidas” (*National Commission for Natural Protected Areas*, CONANP), the federal government agency in charge of natural protected areas, states in its web page that:

“Al igual que el Área de Protección de Flora y Fauna Islas del Golfo de California en el Estado de Baja California y el Parque Nacional Zona Marina del Archipiélago de San Lorenzo ... la Reserva de la Biosfera Bahía de los Ángeles, canales de Ballenas y de Salsipuedes... son atendidas en su conjunto, como un grupo o Cluster de áreas protegidas federales en la Región de las Grandes Islas del Golfo de California, y están bajo la misma Dirección .... Por ello, las actividades y acciones que se realizan en un área protegida incluyen a las otras dos. Así, esta AP cuenta con un Programa Permanente de Inspección y Vigilancia en coordinación con la Delegación Federal de la PROFEPA en el Estado de Baja California y el Sector Naval de Santa Rosalía, BCS, de la 4ª Región Naval de la Secretaría de Marina-Armada de México. Existe también un programa de monitoreo biológico para especies centinelas en coordinación con el Instituto Nacional de Ecología, La Universidad de California en Davis, Africam Safari, el Laboratorio de Medicina de la Conservación del Instituto Politécnico Nacional”.

*(As with the Area of Protection for flora and fauna of the Gulf of California Islands in the state of Baja California and the National Park Marine Zone of the San Lorenzo Archipelago, the Biosphere Reserve of Bahia de los Angeles, Ballenas and Salsipuedes Channels are taken care together, as a group or cluster of federal protected areas at the large islands region of the Gulf of California and under a sole Direction ... thus the activities and actions in one of them cover the other two. These protected areas have a permanent inspection and monitoring program in coordination with the Federal Delegation of the Attorney for the Defense of Environment in the state of Baja California and the navy sector in Santa Rosalía, BCS, from the 4<sup>th</sup> naval zone of the Ministry of the Navy. There is also a program for the biological monitoring for sentinel species coordinated with the National Institute of Ecology, the University of California Davis, Africam Safari and the Laboratory for conservation Medicine of the National Politechnic Institute).*

Further, talking about the San Lorenzo Archipelago Marine Zone National Park, it states that:

“El aprovechamiento de los peces pelágicos menores que se desarrolla en la zona del PN-ZMASL definitivamente es una actividad económica muy relevante y es compatible con los objetivos de conservación y aprovechamiento sustentable de los recursos naturales de esta área protegida”. *(The exploitation of small pelagic fishes that is undertaken at the zone is definitively a most relevant economic activity and is compatible with the objectives of conservation and sustainable use of the natural resources in this protected area).*

On the other hand, the procedures for monitoring landings follow standards in fisheries science and have been developed within the frame of the global management system, reviewed at various levels, including the INAPESCA and CONAPESCA internal reviews. Further, the INAPESCA itself was reviewed by FAO in 2005 (Csirke et al, 2005).

As for the National Fishing Chart, its formal definition is stated as follows: “La Carta Nacional Pesquera ... tendrá carácter informativo para los sectores productivos y será vinculante en la toma de decisiones de la autoridad pesquera en la adopción e implementación de instrumentos y medidas para el control del esfuerzo pesquero, en la resolución de solicitudes de concesiones y permisos para la realización de actividades pesqueras, y en la implementación y ejecución de acciones y medidas relacionadas con dichos actos administrativos” *(The National Fishing Chart will have informational nature for the productive sectors and will be binding for the adoption and implementation of instruments and measures of control for fishing effort, in the resolution of granting*

of concessions and permits for fisheries activities and in the implementation and execution of actions and measures related to such administrative procedures). Certainly, while it is not a rule of law it consists of a series of guidelines that authorities are expected to follow.

<http://bahiaadelosangeles.conanp.gob.mx/>

<http://sanlorenzo.conanp.gob.mx/>

<http://www.unep-wcmc.org/sites/wh/pdf/ISLANDS%20of%20BAYA%20CALIFORNIA.pdf>

#### 3.2.4 Comment type 4

The report mentions that research on the ecosystem is undertaken by universities in the area, and INAPESCA has no research plan to look at impacts of the fishery on the ecosystem, therefore the CB have imposed condition 3.2.4. The report also mentions that Appendix II list the research expenditure of CRIP, while the information provided in Appendix II is the list of economic support provided by the client to CRIP directly for research on sardine. We do not have any information in the report about other sources of economic support of the scientific research on sardine, other than those provided by the industry, the client in this assessment. We believe in the co-responsibility of the industry in supporting research of the fishery, since it is in their own interest to know as much as possible about the nature and behaviour of the stocks that support their business. Without other sources of information, we do not have the ability to rule out potential conflicts of interest between government research results and the industry self-interest, in contrast to public interests to have a sustainable and well-managed fishery. The role of marine conservation NGOs to support research is ignored.

Team response: The information in Appendix II shows, effectively, the list of economic support provided by the industry to the CRIP; we have made this point clear in the new version of the Final Report.

Scientific research in Mexico, and specifically in the area in question, is mostly supported by some governmental organizations in the country, mostly the Consejo Nacional de Ciencia y Tecnología (*National Council for Science and Technology*, CONACYT), through a number of financial sources: a) the sector funds, including those for basic science (Secretaría de Educación Pública/CONACYT), environmental (SEMARNAT; Secretaría del Medio Ambiente y Recursos Naturales/CONACYT), Secretaría de Agricultura, Ganadería, Desarrollo Rural, Pesca y Alimentación (SAGARPA/CONACYT), among others; b) the mixed funds, in which CONACYT and the four state governments participate together. Other particular funds are also available through the CONACYT, including funding for young scientists, collaborative projects with foreign institutions, etc.

Other financial source of support is that of the Comisión Nacional para la Biodiversidad (CONABIO) that supports research on biodiversity. Further, other occasional sources come directly from the state governments. Further, of course, the self supported projects from each institution have been crucial for having a considerable wealth of knowledge about the Gulf of California. International support comes also for a number of projects completed and in progress, such as the David and Lucille Packard Foundation, among others.

Recent revision papers as the two below (itself supported by 1. CONACYT, the CIBNOR and The David and Lucille Packard Foundation; 2. The Lenfest Ocean Program) among others, have a sizable list of references that may partially reflect the amount of knowledge on the ecosystem of the Gulf of California.



Lluch-Cota, S. E., A. Aragón-Noriega, F. Arreguín-Sánchez, D. Aurióles-Gamboa, J. J. Bautista-Romero, R. Brusca, R. Cervantes-Duarte, R. Cortéz-Altamirano, P. Del-Monte-Luna, A. Esquivel-Herrera, G. Fernández, M. Hendrickx, S. Hernández-Vázquez, H. Herrera-cervantes, M. Kahru, M. Lavín, D. Lluch-Belda, D. Lluch-Cota, J. López-Martínez, S. G. Marione, M. Nevárez-Martínez, S. Ortega-García, E. Palacios-Castro, A. Parés-Sierra, G. Ponce-Díaz, M. Ramírez-Rodríguez, C. A. Salinas-Zavala, R. A. schwartzlose and P. Sierra-Beltran (2007). "The Gulf of California: Review of ecosystem status and sustainability challenges." *Progress in Oceanography* 73: 1-26.

Bakun, A. Babcock, E.A. Lluch-Cota, S.E. Santora, C. and C.J. Salvaedo. 2009. Issues of ecosystem-based management of forage fisheries in open "non-stationary ecosystems: the example of the sardine fishery in the Gulf of California. *Rev. Fish. Biol. Fisheries*. DOI 10.1007/s11160-009-9118-1.

Finally, the search for funding to research is, without any doubt, one of the most demanding activities in scientific research. There are, as seen in the preceding paragraphs, a good number of opportunities, aside the potential interest of the industry.

UNEP (2007) reports on budget for conservation at the Gulf of California as follows: Until 2000 the Gulf Reserves were under-funded, though in the 1990s the World Bank/GEF via the Mexican Fund for Nature Conservation granted US\$16.5 million, and several national and international donors made donations. In 2000 the Federal government granted CONAMP 147 million pesos (US\$15.7 million) but expenses that year totalled 226.7 million pesos, 60% going to central offices. A second GEF grant in 2002 totalled \$31.1 million. Since then, US\$13,320,000 has come from private commercial companies. In-kind contributions to management worth US\$450,000 have come from WWF, CI, TNC and PRONATURA. In 2003 the South Californian Fund for Protected Natural Areas was established to promote and coordinate giving. The budget in 2003/4 was US\$1,092,195 channelled via CONANP plus US\$710,400 from donors plus US\$412,776 from the GEF. Entrance fees are charged via tourist service companies and to individuals.

<http://www.unep-wcmc.org/sites/wh/pdf/ISLANDS%20of%20BAYA%20CALIFORNIA.pdf>

### 3.2.5 Comment type 4

It is in the spirit of the MSC certification process to provide market incentives to fisheries that are well-managed and sustainable. Implicit in this is the democratization of fisheries management, as well-informed and responsible citizens can reward fisheries in the market-place when acting as consumers of seafood products. Since the sardine fishery in the Gulf of California is directing 85% of their catch to produce fish meals, this is not possible. The industry is apparently not interested in using the MSC logo, if the fishery is certified, in the fish meal, but instead use the MSC certification to make sustainability claims in the media. Under this scenario, external review of the management system of sardine, as a public good, must include public review of its performance. The MSC assessment process is providing one venue to the public to achieve something similar, and the fishery management system should include explicit provisions for this, apart to the MSC process of surveillance audits.

Team response: The fundamental aim of the MSC certification program is defined by its vision and mission:

... the world's oceans teeming with life, and seafood supplies safeguarded for this and future generations ... by means of using our ecolabel and fishery certification programme to contribute to the health of the world's oceans by recognising and rewarding sustainable fishing practises,

influencing the choices people make when buying seafood, and working with our partners to transform the seafood market to a sustainable basis ... (from <http://www.msc.org/about-us/vision-mission> )

Beyond the assumed market response with increased prices of certified products, the MSC is effectively becoming a sustainability standard worldwide, with a well deserved prestige attached to their logo. Several certified fisheries (notably some selling their products in Asia) do not actually use the MSC logo to obtain higher product price; the advantage of having it rests more fundamentally in the recognition of it being a well managed and sustainable fishery. This is, and should be, the most rewarding attitude for MSC.

This certification process has been a long and expensive one, spanning almost four years and four meetings with stakeholders; in spite of this fact, the industry has remained firm in its objective of certifying the fishery. The certification process, if completed, would result in tighter rules and more stringent controls for them, further aiming at sustainability. It appears to be excessive just for making sustainability claims in the media.

Throughout the comments by these stakeholders there is a misconception of the role of the “public review” of fisheries sustainability. Not anybody has the professional training to evaluate a fishery in each and all the components of sustainability; voluntary environmental audits are considered within the General Law for Ecological Equilibrium and Environmental Protection in its Article 38 bis (as mentioned in issue 2.5.2 by stakeholders, above), but it also states that such environmental audits may only be undertaken by expert and trained environmental auditors, which have to be certified by the Secretariat of the Environment and Natural Resources, following the rules and procedures to perform such process:

“ARTÍCULO 38 BIS.- Los responsables del funcionamiento de una empresa podrán en forma voluntaria, a través de la auditoría ambiental, realizar el examen metodológico de sus operaciones ... La Secretaría ... elaborará los términos de referencia que establezcan la metodología para la realización de las auditorías ambientales ... establecerá un sistema de aprobación y acreditamiento de peritos y auditores ambientales, determinando los procedimientos y requisitos que deberán cumplir los interesados para incorporarse a dicho sistema ... desarrollará programas de capacitación en materia de peritajes y auditorías ambientales ...”

*(Article 38 bis. Those responsible for the functioning of a company may, voluntarily, through an environmental audit, undertake the methodological review of its operations ... The Ministry [of the Environment and Natural Resources] will ... establish the terms of reference that define the methodology for the procedures of environmental audits ... will set up a system of approval and accreditation of experts and environmental auditors, establishing the procedures and requirements that those persons interested will have to meet in order to incorporate to such system ... and develop training programs in the subjects of environmental audits...)*

<http://www.diputados.gob.mx/LeyesBiblio/pdf/148.pdf>

Additional Comments (end of section 5)

Nature of first Comment: 1

Comment:

I wish to comment on other portions of the report (e.g. background information, species biology, peer review reports and CB responses, list of consultees, etc.)

Justification:

The CB changed the staff in charge of this assessment half-way through the process. This change seem to have caused the loss of some information provided by stakeholders to the

assessment team. This is unacceptable, as the stakeholders in this fishery include small-scale fishers, Indian tribes, and sport-fishers that made the effort to attend one consultation meeting to provide their input, and none was reflected or even mentioned in the draft report.

It should be remembered that initial serious shortcomings in the stakeholder consultation process forced one stakeholder to file a formal complaint to ASI of the performance of the assessment company. As a result the process improved and allowed more participation.

However, another explanation of this absence, is that the assessment team did not consider that the reports and accounts provided had value, dismissing its importance. This is extremely disturbing, since the burden-of-proof to show and demonstrate non-compliance to the MSC standard must not be only in the stakeholders. To have a fair and just system, the CB must place the same amount of doubt to claims of the client and managers that the fishery is in compliance to the MSC standard.

**Team response:** The information that is referred to and was provided by stakeholders has been taken into account during the assessment and is referred to in the final version of this report (e.g. stakeholders concerns about interactions with ETP species and Gallo- Reynoso (2003) report in section 6.2). In addition, the team responded to each of the concerns that were raised in this stakeholder submission, individually and explicitly.

Nature of second Comment: left blank

Comment: I wish to provide general comments about the assessment of this fishery against the MSC Principles and Criteria for Sustainable Fishing

Justification:

The input provided here reflect the views of several stakeholders from Mexico, from the NGO and scientific sectors, as well as small-scale, first nations, and sport-fishing community. In addition to the comments expressed above, there are strong concerns that the MSC standard must be revised. The case of the Gulf of California sardine fishery must open the floor for discussion on the applicability of a sustainability standard to a fishery that burns 85% of first quality animal protein, superb fish that could go to direct human consumption in Mexico, to produce fish meal to feed shrimp grown in aquaculture farms, that are not sustainable, and then export those shrimp to offshore markets. This is a strong contradiction, and the MSC must be fully aware of this, since it will be part of challenges and criticism that will accompany the final phases of this assessment.

**Team response:** None of the MSC principle and criteria of the standard cover the fishery products beyond the port of landing. Neither do the Performance Indicators ask about the processing or markets of the specific fishery. They focus the questions around the sustainability of the fishery and the fishing methods and the impacts on the environment. The assessment team does not have any means of taking these concerns into consideration.

On a positive note, the MSC assessment process, and the need to adhere to MSC policies, produced changes in the transparency of the management system that are positive. The fact that we now have a website with some official information of this fishery available to the public is commendable. We hope that the client in this assessment and the management authorities recognize the value of collaboration with conservation NGOs to improve the sustainability of this important fishery, regardless of the outcome of this process.

Team response: Thank you for your comment. We recognize that the involvement of stakeholders and NGOs is a very important part of the process and we have continuously worked with the client of this fishery to improve the website and the availability of the information. Furthermore, as part of the condition to continue certification, the client has committed to update the information on the website on a regular basis (see clients action plan in section 11 related to condition 3.2.4).