# MarinTrust Standard V2

# Whole fish Fishery Assessment Report Template

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# Table 1 Application details and summary of the assessment outcome

| Application details and summary of the assessment outcome | | | |
|---|---|---|---|
| **Name:** **Sardinas de Sonora S.A. de C. V** | | | |
| **Address:** | | | |
| **Country:** **Mexico** | | **Zip:** | |
| **Tel. No.** | | **Fax. No.** | |
| **Email address:** | | **Applicant Code** | |
| **Key Contact**: | | **Title:** | |
| **Certification Body Details** | | | |
| **Name of Certification Body:** | | | |
| **Assessor Name** | **CB Peer Reviewer** | **Assessment Days** | **Initial/Surveillance/ Re-approval** |
| Heri | | 5 | Surveillance 1 |
| **Assessment Period** | 2021 | | |
| | | | |
| **Scope Details** | | | |
| **Management Authority (Country/State)** | | Secretariat of Agriculture, Livestock, Rural Development, Fisheries and Food SAGARPA, Mexico | |
| **Main Species** | | Anchoveta *Engraulis mordax* )<br>Monterrey (Pacific) sardine (*S. sagax* )<br>Thread Herring (*Opisthonema* spp)<br>Sardina Bocona (*Cetengraulis mysticetus*)<br>Mackerel (*Scomber japonicus*)<br>Japonesa (*Etremeus teres*)<br>Leatherjackets (*Oligoplites* sp.) | |
| **Fishery Location** | | Eastern Central Pacific FAO 77: Baja California, México | |
| **Gear Type(s)** | | Purse Seine | |
| **Outcome of Assessment** | | | |

| | |
|---|---|
| **Overall Outcome** | PASS |
| **Clauses Failed** | NONE |
| **CB Peer Review Evaluation** | Approve |
| **Fishery Assessment Peer Review Group Evaluation** | Approve seeAppendix |
| **Recommendation** | PASS |

# Table 2. Assessment Determination

| Assessment Determination |
| --- |
| The catch of small pelagics represents around 30% of total landings in Mexico, with more than 80% of the harvest taking place in the Gulf of California. The fishery began at the end of the 1960's; landings increased to a peak in 1988-89 to nearly 300,000 mt whereupon the fishery declined abruptly to less than one-third of landings the following year. Landings have been highly variable since, increasing (2010-2015) to more than 500,000 mt. Two fleets fish in the areas West of Baja California and Baja California South; other fleets operate inside the Gulf of California (Figure 1).<br><br>Small pelagic species being assess in this surveillance audit are Californian anchovy/Anchoveta, Monterey (Pacific) Sardine, Thread Herring, Mackarel, Bocona Sardine, Japanese Sardine and Leatherjackets. Three species, Monterey Sardine, Mackarel and Thread Herring are fall under Category A because managed under Fihsery Management Plan, while Anchoveta and Bocona are fall under Category B as it is passively managed under the Fisheries Management Plan (FMP) for small pelagics. Japanese Sardine and Leatherjackets fall under Category D as the catch are less than 5% and no species-specific management regime in place. All seven species were assess accordingly and passed.<br><br>In 2018 an MSC Fishery Assessment Report on the Small Pelagics fishery in Sonora (Gulf of California) was published by SCS Global Services. In October 2020 an MSC Second Surveillance Audit Report (Southern Gulf, Thread Herring Fishery, Sonora) re-assessed and renewed the client's certificate to MSC requirements.<br><br>Fishers in general comply with most regulatory mechanisms defined in Law. However, it was found that the small pelagic fishery systematically exceeds the allowable proportion of undersized fish in the catch. This is being addressed in the proposal to modify the current NOM 2018 (Norma Oficial Mexicana). A new approach to the allowed proportion of fish under the size limit has been introduced. This revision is in its final steps. The MSC Assessment Team concluded that it was reasonable to wait for the revised NOM and re-evaluate the fishery performance on this issue for the next fisheries assessment.<br><br>Anchoveta, Monterrey (Pacific) sardine, Thread Herring, Mackarel, Bocona Sardine, Japanese Sardine and Leatherjackets are not listed in the current CITES appendices of endangered species and are not listed in the current IUCN Redlist of threatened or endangered species (website accessed 03.10.21).<br><br>The Species listed in this report are approved for use in the assessment area under the current Marin Trust Standard v 2.0 for whole fish. |
| **Fishery Assessment Peer Review Comments** |
| |
| **Notes for On-site Auditor** |
| |

# Table 3 General Results

| General Clause | Outcome (Pass/Fail) |
|---|---|
| M1 - Management Framework | PASS |
| M2 - Surveillance, Control and Enforcement | PASS |
| F1 - Impacts on ETP Species | PASS |
| F2 - Impacts on Habitats | PASS |
| F3 - Ecosystem Impacts | PASS |

# Table 4 Species- Specific Results

**List all Category A and B species. List approximate total percentage (%) of landings which are Category C and D species; these do not need to be individually named here**

| Category | Species | % landings | Outcome (Pass/Fail) | |
|---|---|---|---|---|
| Category A | Monterrey (Pacific) sardine *Sardinops sagax* | 10 | A1 | PASS |
| | | | A2 | PASS |
| | | | A3 | PASS |
| | | | A4 | PASS |
| Category A | Thread Herring (*Opisthonema* spp) | 31 | A1 | PASS |
| | | | A2 | PASS |
| | | | A3 | PASS |
| | | | A4 | PASS |
| Category A | Mackarel (*Scomber japonicus*) | 8 | A1 | PASS |
| | | | A2 | PASS |
| | | | A3 | PASS |
| | | | A4 | PASS |
| Category B | Anchoveta (*Engraulis mordax* ) | 20 | PASS | |
| Category B | Bocona Saridine (*Cetengraulis mysticetus*) | 26 | PASS | |
| Category D | Japanese sardine ( *Etremeus teres*) | 3 | PASS | |
| Category D | Leatherjackets (*Oligoplites sp*) | 2 | PASS | |

# Table 5 Species Categorisation Table

| Common name | Latin name | Stock | IUCN Redlist Category[1] | % of landings | Management | Category |
|---|---|---|---|---|---|---|
| Monterrey (Pacific) sardine | *Sardinops sagax* | FAO 77 | Least Concern | 10 | SAGARPA | A |
| Thread Herring | *Opisthonema* spp | FAO 77 | Least Concern | 31 | SAGARPA | A |
| Mackarel | *Scomber japonicus* | FAO 77 | Least Concern | 8 | SAGARPA | A |
| Anchoveta | *Engraulis mordax* | FAO 77 | Data Deficient 2020 (Least Concern 2010) | 20 | SAGARPA | B |
| Bocona Saridine | *Cetengraulis mysticetus* | FAO 77 | Least Concern | 26 | SAGARPA | B |
| Japanese sardine | *Etremeus teres* | FAO 77 | Least Concern | 3 | SAGARPA | D |
| Leatherjackets | *Oligoplites sp* | FAO 77 | Least Concern | 2 | SAGARPA | D |
| | | | | | | |

| Species categorisation rationale |
|---|
| *SCS Global Services Public Certification Report for the Small Pelagics Fishery in SONORA, GULF OF CALIFORNIA Jan 2018 363pp* |

[1] https://www.iucnredlist.org/

# MANAGEMENT

The two clauses in this section (M1, M2) relate to the general management regime applied to the fishery under assessment. The clauses should be completed by providing sufficient evidence to justify awarding each of the requirements a pass or fail rating. A fishery must meet all the minimum requirements in every clause before it can be recommended for approval.

| M1 | Management Framework – Minimum Requirements | | |
|---|---|---|---|
| | M1.1 | There is an organisation responsible for managing the fishery. | PASS |
| | M1.2 | There is an organisation responsible for collecting data and assessing the fishery. | PASS |
| | M1.3 | Fishery management organisations are publicly committed to sustainability. | PASS |
| | M1.4 | Fishery management organisations are legally empowered to take management actions. | PASS |
| | M1.5 | There is a consultation process through which fishery stakeholders are engaged in decision-making. | PASS |
| | M1.6 | The decision-making process is transparent, with processes and results publicly available. | PASS |
| | | **Clause outcome:** | PASS |

**M1.1 There is an organisation responsible for managing the fishery.**

The purse-seine fishery targeting small pelagics is organized and managed in four fleets, according to the regions where they operate and the location of landing ports. Two of the fleets' fish in the area west of Baja California and Baja California South; two other fleets operate inside the Gulf of California (**Figure 1**).

Fleets within the Gulf are arranged into the Southern fleet fishing off the coast of Sinaloa and Nayarit, landing into Mazatlán and the Northern fleet fishing off the coast off the State of Sonora and landing into the ports of Guaymas and Yavaros. The Sinaloa fleet (which captures mostly thread herring) received MSC certification in October 2016. The Sonora fleet, the largest of the four fleets, primarily targets Pacific sardines and secondarily targets thread herring (**Figure 1**):

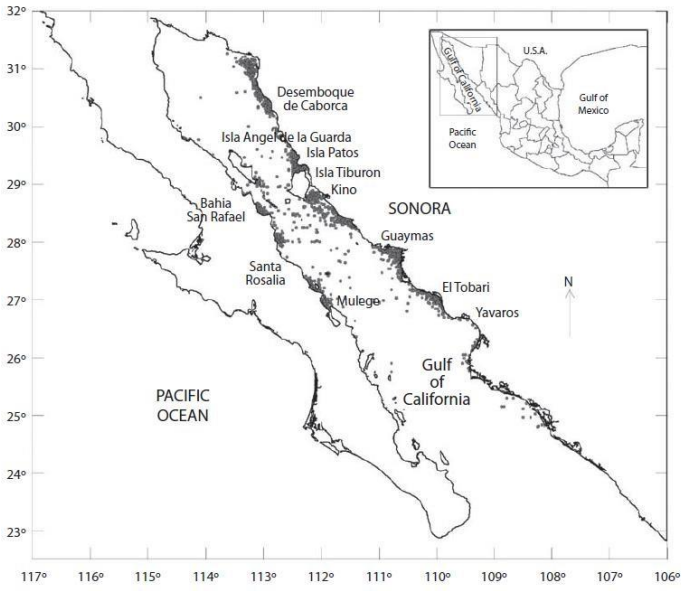


**Figure 1:** Landing distribution (dark grey points) for the small pelagic fishery inthe Gulf of California R1

The Government body with responsibility for fisheries management in Mexico is the Secretariat of Agriculture, Livestock, Rural Development, Fisheries and Food (Secretaría de Agricultura, Ganadaría, Desarrollo Rural, Pesca y Alimentación) SAGARPA. Within SAGARPA, the National Commission on Aquaculture and Fisheries (Comisión Nacional de Acuacultura y Pesca) CONAPESCA is directly responsible for management, co-ordination and policy development.

The National Fisheries Institute (INP or INAPESCA) develop the National Fisheries Charter (Carta Nacional Pesquera (CNP)). Broadly divided between Pacific and Gulf of Mexico fisheries the Charter is an annually-updated summary of the status and scientific understanding of all commercial fishery resources in federal waters. The latest version was published in 2017.

There is an organisation responsible for managing the fishery.

**M1.2 There is an organisation responsible for collecting data and assessing the fishery.**

The NOM-003-PESC-1993 was modified, renamed as NOM-003-SAG-PESC-2018, and was published in the Diario Oficial de la Federación (Official Gazette of the Federation) on March 12, 2019. The main modification of the NOM includeds a new version of the fishery's Management Plan, which states that INAPESCA is to conduct the stock assessment, monitor fishing activities, and compute the BAC based on the status of the stock. The results are communicated to stakeholders, fishers, and the management branch of the government (CONAPESCA) and procedures can be agreed to start operations on the base of the limit established with the BAC. The NOM's Section 4.6 establishes INAPESCA's technical measures to manage the fishery. More specifically, this decision-making process allows for the application of technical guidance elements as management measures.

There is an organisation responsible for collecting data and assessing the fishery.

**M1.3 Fishery management organisations are publicly committed to sustainability.**

During the MSC surveillance audit the results of and internal revision and corrections of the management plan were presented by INAPESCA. A report detailing the external review and revision of the management plan and other components of the management system was anticipated for 2020; however, the pandemic caused the suspension of various activities related to this work, though meeting minutes for the Comité and results of an internal revision and corrections of the Management plan were presented to the audit team by INAPESCA.

SAGARPA's mission statement also includes a commitment to "facilitate the competitive and sustainable development of fisheries and aquaculture sector in the country in order to increase the welfare of Mexicans''.

Fishery management organisations are publicly committed to sustainability.

**M1.4 Fishery management organisations are legally empowered to take management actions.**

The NOM's Section 4.6 establishes INAPESCA's technical measures to manage the fishery. More specifically, this decision-making process allows for the application of technical guidance elements as management measures. Regarding the need for the incorporation of procedural linkages in management measures, the new NOM003 (sections 4.13.5.1 – 4.13.5.5) sets bycatch limits for individual groups of organisms including finfish, crustaceans, mollusks, elasmobranchs, and cnidarias. The NOM also establishes the volume of the fishery's total catch that can be composed of bycatch species (1.00 – 0.20% depending on organism class), minimum size limits for Pacific sardine, thread herring, and other small pelagic species, and the % of their catch that can be under the minimum size.

The NOM's Section 4.6 establishes INAPESCA's technical measures to manage the fishery. More specifically, this decision-making process allows for the application of technical guidance elements as management measures.

Fishery management organisations are legally empowered to take management actions.

**M1.5 There is a consultation process through which fishery stakeholders are engaged in decision-making.**

Scientists have discussed and communicated to other interested parties' options to define reference points appropriate for the small pelagic fishery although caveats have been also identified and no conclusions have been reached yet. Scientists continue to investigate the best approach to stock assessments for small pelagic species and to attempt new methods.

Before updates of the CNP are published in the DOF draft updates undergo a public review process by means of publication in the DOF. This allows the public, non-governmental organisations, and the academic sector, among others, to give their opinion of fisheries status.

There is a consultation process through which fishery stakeholders are engaged in decision-making.

**M1.6 The decision-making process is transparent, with processes and results publicly available.**

Before updates of the CNP are published in the DOF draft updates undergo a public review process by means of publication in the DOF. This allows the public, non-governmental organisations, and the academic sector, among others, to give their opinion of fisheries status.

During the MSC surveillance meeting in early 2020 the results of and internal revision and corrections of the management plan were presented by INAPESCA. A report detailing the external review and revision of the management plan and other components of the management system was anticipated for 2020, however, the pandemic caused the suspension of various activities related to this work, though meeting minutes for the Comité and results of an internal revision and corrections of the Management plan were presented to the audit team by INAPESCA

The decision-making process is transparent, with processes and results publicly available.

**References**

**R1 – R10**

| **Links** | |
|---|---|
| **MARINTRUST Standard clause** | 1.3.1.1, 1.3.1.2 |
| **FAO CCRF** | 7.2, 7.3.1, 7.4.4, 12.3 |
| **GSSI** | D.1.01, D.4.01, D2.01, D1.07, D1.04, |

| **M2** | **Surveillance, Control and Enforcement - Minimum Requirements** | | |
|---|---|---|---|
| | **M2.1** | There is an organisation responsible for monitoring compliance with fishery laws and regulations. | PASS |
| | **M2.2** | There is a framework of sanctions which are applied when laws and regulations are discovered to have been broken. | PASS |
| | **M2.3** | There is no substantial evidence of widespread non-compliance in the fishery, and no substantial evidence of IUU fishing. | PASS |
| | **M2.4** | Compliance with laws and regulations is actively monitored, through a regime which may include at-sea and portside inspections, observer programmes, and VMS. | PASS |
| | | **Clause outcome:** | PASS |

**M2.1 There is an organisation responsible for monitoring compliance with fishery laws and regulations.**

The Secretariat of Environment and Natural Resources (SEMARNAT), the Federal Attorney for Environmental Protection (PROFEPA), Marina (Mexican Navy); National Defense (SEDENA); The National Commission on Security (CNS), the Federal Police, and the National Commission of Aquaculture and Fisheries (CONAPESCA) all work together under the Centro de Operaciones Interinstitutionales (COI) (San Felipe) directed by the Commandant of the Naval Sector. All entities carry out surveillance operations in the Upper Gulf by adding equipment and personnel to promote protection of marine resources and combat illegal trafficking of same.

There is an organisation responsible for monitoring compliance with fishery laws and regulations.

**M2.2 There is a framework of sanctions which are applied when laws and regulations are discovered to have been broken.**

The Fisheries Law (Ley General de Pesca y Acuacultura Sustentables 2007) lays down details of infractions (Article 132) and sanctions (Article 133) to be applied:

Sanctions include:

- A warning, reprimand
- Fine (Article 138 details how fines are determined).
- Additional fines for every day the infraction persists.
- Administrative arrest for 36 hours.
- Temporary/ permanent partial or total closure of the installations where the infractions occurred
- Confiscation of vessels or vehicles, fishery equipment and/or products obtained by aquaculture or fishing directly related to the infractions committed.
- Suspension or revocation of corresponding fishing permits, concessions or authorisations.

There is a framework of sanctions which are applied when laws and regulations are discovered to have been broken.

**M2.3 There is no substantial evidence of widespread non-compliance in the fishery, and no substantial evidence of IUU fishing.**

The COI's inter-institutional programme in 2015-2016 resulted in the following actions:

- 1,424 trainings resulting in the inspection of: 2,794 landings, 10,888 people, 2,579 vehicles, 48 installations and 252 boats.
- The provision of 3 patrol vessels, 108 boats, 77 people, 17 vehicles for control purposes.
- A total of 23 specimens and 308 hauls of Totoaba (Totoaba macdonaldi) a marine fish (member of the Drum family and endemic to the Gulf) critically endangered species on IUCN red list.
- 505 articles of fishing gear confiscated.
- 106t of fish product seized.
- 17 tonnes of coral seized.
- Rescued alive one whale, one Totoaba and 11 Turtles.
- Monitoring of a total of 196 fishing grounds, 26 landing sites, 237 fishing facilities and installing a total of 36 checkpoints and 58 air surveillance operations.

The bulk of the inspections detected illegal fishing activity in the Totoaba (Marine Drum fish) fishery and in other protected fisheries. In addition, operations recovered 1,079 fishing nets which had been 'ghost fishing' in coastal waters. From a total of 2,794 landing inspections only 106t of fish product was seized.

Non-compliance is not widespread because there are other relevant measures for enforcement and monitoring that are well established. New regulations are being reviewed to define a different approach for undersized catches. Future assessments should monitor the implementation of these regulations and their level of compliance by stakeholders.

There is no evidence of widespread IUU fishing activities.

**M2.4 Compliance with laws and regulations is actively monitored, through a regime which may include at-sea and portside inspections, observer programmes, and VMS.**

There is effective monitoring of each fishing boat's position at all times through a compulsory satellite detection system. Each and every landing operation is sampled by technical personnel from CRIP. Personnel from CONAPESCA also perform regular and frequent inspection visits to fish processing plants and boats to assert that all norms and precepts of the regulation in force are fully complied with.

Fishers in general comply with most regulatory mechanisms defined in Law. However, it was found that the small pelagic fishery systematically exceeds the allowable proportion of undersized fish in the catch. This is being addressed in the

proposal to modify the current NOM (2018). A new approach to the allowed proportion of fish under the size limit has been introduced. This revision is in its final steps.

Compliance with laws and regulations is actively monitored, through a regime which may include at-sea and portside inspections, observer programmes, and VMS. CONAPESCA and INAPESCA (CRIP) conduct monitoring, control and surveillance of the fishery to ensure compliance with current regulations. Landings are monitored; regular inspections take place at ports of landing/processing plants and on fishing vessels. An observer program was planned and implemented for 2016 but the data from this program has not been published yet.

In 2011 as part of the Client Action Plan, CANAINPES (Cámara Nacional de la Industria Pesquera) with support from INAPESCA (CRIP-Guaymas) and the Mexican NGO Community and Biodiversity (COBI), developed and implemented an observer program. Funding was secured from Producer Organisations and the Walton Family Foundation to develop a collaborative and multi-sectorial observer program for the fishery.

All fishing vessels have a permit issued by CONAPESCA based on a technical opinion issued by INAPESCA. The permits have to be renewed every 5 years; fishing vessels are required to use Vessel Monitoring System equipment (VMS system) for tracking the spatial position of fishing operations.

Compliance with laws and regulations is actively monitored, through a regime which may include at-sea and portside inspections, observer programmes, and VMS.

**References**

**R3, R6, R9. R11-R12**

| **Links** | |
|---|---|
| **MARINTRUST Standard clause** | 1.3.1.3 |
| **FAO CCRF** | 7.7.2 |
| **GSSI** | D1.09 |

# CATEGORY A SPECIES

The four clauses in this section apply to Category A species. Clauses A1 - A4 should be completed for **each** Category A species. If there are no Category A species in the fishery under assessment, this section can be deleted. A Category A species must meet the minimum requirements of all four clauses before it can be recommended for approval. The clauses should be completed by providing sufficient evidence to justify awarding each of the requirements a pass or fail rating. The species must achieve a pass rating against all requirements to be awarded a pass overall. **If the species fails any of these clauses it should be re-assessed as a Category B species.**

| **Species Name** | **Monterrey (Pacific) sardine *Sardinops sagax*** | |
|---|---|---|
| **A1** | **Data Collection - Minimum Requirements** | |
| **A1.1** | Landings data are collected such that the fishery-wide removals of this species are known. | PASS |
| **A1.2** | Sufficient additional information is collected to enable an indication of stock status to be estimated. | PASS |
| | **Clause outcome:** | PASS |

**A1.1 Landings data are collected such that the fishery-wide removals of this species are known.**

The revised NOM now named NOM-003-SAG-PESC-2018 was published in the Official Gazette on March 12th, 2019. Section 4.6 of the NOM states: "The Secretariat may establish periods and closed areas for the capture of smaller pelagics to apply dynamic management of the fishery, avoid interaction with other fisheries, as well as contribute to the conservation of other biological resources and the ecosystem. Such periods and closure zones will be announced through Regulatory Agreements that will be published in the Official Gazette of the Federation, based on the technical opinion issued by INAPESCA for such purpose, prior to the socialization of the measure".

In 2019, INAPESCA carried out a population analysis of Monterey sardine (Sardinops sagax) and thread herring (Opisthonema libertate) from the Gulf of California considering the period 1971/72 to 2018/19 (Morales Bojórquez and Hernández Rivas, 2020a,b). The Age-Structured Assessment Program (ASAP) was used in both cases which did not imply a change in the stock assessment methodology in relation to previous years. It is an updated approach and well accepted method to assess populations under commercial exploitation due to the realistic outcome of the dynamic of the population, and allows an interpretation of the stocks' status, producing biological reference points and biologically acceptable biomass.

The following fishery-independent indexes were used:

- Annual Relative Abundance Index of Evaluation Survey Data (kg of Pacific sardines/thread herring per haul hour (kg / hour), from the historical series (1990 - 2019)
- Annual relative abundance index of acoustic surveys data (Tons per year (t / year), of the cruise series (2008 - 2019)
- Relative abundance index of ichthyoplankton cruise data (number of Pacific sardine/thread herring eggs and larvae per 10 m2)
- Probability index of sardine spawning
- Index of the proportion of sardines in the diet of birds.

The indexes 1 -3 were used in both species whereas the indexes 4 and 5 were used only for Pacific sardine

Landings data are collected such that the fishery-wide removals of this species are known.

**A1.2 Sufficient additional information is collected to enable an indication of stock status to be estimated.**

INAPESCA conducts the stock assessment and computes the BAC based on the status of the stock; the results are communicated to other stakeholders including the fishers and the management branch of the government (CONAPESCA) and procedures can be agreed to start operations on the base of the limit established with the BAC.

| | Species | Year | Catch (mt) | Effort (days fishing) | N. of vessels | Source |
|---|---|---|---|---|---|---|
| TAC | *S. sagax* | 2018/19 | 292,600 | 3,294[2] | 46 | Nevarez-Martinez et al. 2020 |
| UoA share of TAC | *S. sagax* | 2018/19 | 169,500[3] | | | |
| UoC share of TAC | *S. sagax* | 2018/19 | 169,500[4] | | | |

Landings data are collected such that the fishery-wide removals of this species are known.

**References**

R2

**Links**

| | |
|---|---|
| **MARINTRUST Standard clause** | 1.3.2.1.1, 1.3.2.1.2, 1.3.2.1.4, 1.3.1.2 |
| **FAO CCRF** | 7.3.1, 12.3 |
| **GSSI** | D.4.01, D.5.01, D.6.02, D.3.14 |

| **A2** | **Stock Assessment - Minimum Requirements** | | |
|---|---|---|---|
| | **A2.1** | A stock assessment is conducted at least once every 3 years (or every 5 years if there is substantial supporting information that this is sufficient for the long-term sustainable management of the stock), and considers all fishery removals and the biological characteristics of the species. | PASS |
| | **A2.2** | The assessment provides an estimate of the status of the biological stock relative to a reference point or proxy. | PASS |
| | **A2.3** | The assessment provides an indication of the volume of fishery removals which is appropriate for the current stock status. | PASS |
| | **A2.4** | The assessment is subject to internal or external peer review. | PASS |
| | **A2.5** | The assessment is made publicly available. | PASS |
| | | **Clause outcome:** | PASS |

**A2.1 A stock assessment is conducted at least once every 3 years (or every 5 years if there is substantial supporting information that this is sufficient for the long-term sustainable management of the stock), and considers all fishery removals and the biological characteristics of the species.**

The 2016 assessment used information including a series of CPUE values from scientific cruises, the indices of abundance from acoustic surveys, an index of egg and larvae, an index representing spawning probability and the proportion of sardines in the diet of seabirds. INAPESCA staff opted for using the Age Structured Assessment Program (ASAP) model to reconstruct biomass trajectory and estimate parameters relevant to make management decisions.

Data on catch and effort is collected from the official 'Aviso de Arribo' or landing notification forms provided and collected by regional offices of CONAPESCA. Data are processed and analysed by INAPESCA and results presented in official reports of fishery catch and effort.

Annual estimates of biomass in the Gulf of California are obtained with hydroacoustic methods. Abundance is used as relative indices in stock assessments. The most recent stock assessment reports indicate that the stock has been stable in the last 3 years, spawning stock biomass (SSB) around Bmsy (533,000 tonnes)

In 2019, INAPESCA carried out a population analysis of Monterey sardine (Sardinops sagax) and thread herring (Opisthonema libertate) from the Gulf of California considering the period 1971/72 to 2018/19 (Morales Bojórquez and Hernández Rivas, 2020a,b). The Age-Structured Assessment Program (ASAP) was used in both cases which did not imply a change in the stock assessment methodology in relation to previous years. It is an updated approach and well accepted method to assess populations under commercial exploitation due to the realistic outcome of the dynamic of the population, and allows an interpretation of the stocks' status, producing biological reference points and biologically acceptable biomass.

The following fishery-independent indexes were used:

- Annual Relative Abundance Index of Evaluation Survey Data (kg of Pacific sardines/thread herring per haul hour (kg / hour), from the historical series (1990 - 2019)
- Annual relative abundance index of acoustic surveys data (Tons per year (t / year), of the cruise series (2008 - 2019)
- Relative abundance index of ichthyoplankton cruise data (number of Pacific sardine/thread herring eggs and larvae per 10 m2)
- Probability index of sardine spawning
- Index of the proportion of sardines in the diet of birds.
- The indexes 1 -3 were used in both species whereas the indexes 4 and 5 were used only for Pacific sardine.

During the recent MSC surveillance audit, a Kobe diagram being presented to the audit team, showed that the Pacific sardine population is in good condition and the fishing effort has been below the recommended maximum, so there is no overfishing

A stock assessment is conducted at least once every 3 years; annual biomass estimates are obtained

**A2.2 The assessment provides an estimate of the status of the biological stock relative to a reference point or proxy.**

The Age-Structured Assessment Program (ASAP) was used in both cases which did not imply a change in the stock assessment methodology in relation to previous years. It is an updated approach and well accepted method to assess populations under commercial exploitation due to the realistic outcome of the dynamic of the population, and allows an interpretation of the stocks' status, producing biological reference points and biologically acceptable biomass.

During the recent MSC surveillance audit, a Kobe diagram being presented to the audit team, showed that the Pacific sardine population is in good condition and the fishing effort has been below the recommended maximum, so there is no overfishing

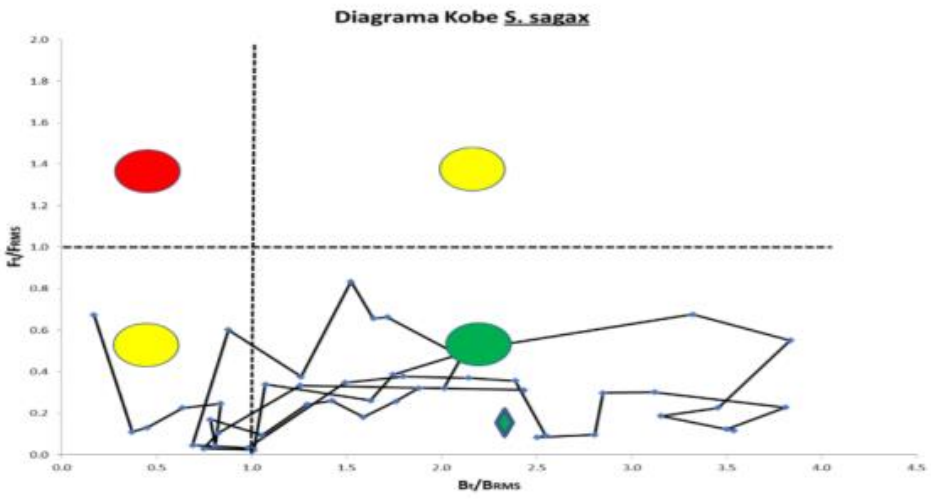

Figure 2. Kobe plot of biomass and fishing mortality rate relative to their respective levels producing MSY for the Monterrey sardine in the central/northern Gulf of California. Biomass is SSB. Reproduced from Nevarez-Martinez et al. (2019b).

The assessment provides an estimate of the status of the biological stock relative to a reference point or proxy

**A2.3 The assessment provides an indication of the volume of fishery removals which is appropriate for the current stock status.**

Between 2008/09 and 2013/14 the trend in the abundance series (in number and weight) was downward, however in recent years there was an upward trend: the spawning biomass increased from around 432,000 t in 2014 / 15 to almost 1,020 million tons in 2017 / 18-2018 / 19, while the exploitable biomass behaves the same way as the spawners, but the values in 2014/15 were almost 409,000 tons while this value increased to approximately 876,000 tons in 2016 / 17 and an average of 1,288 million tonnes in 2017 / 18-2018 / 19. The annual fishing mortality rate and the exploitation rate (E = 1-exp (-F)) show values below 0.15 / year for almost the entire time period, with some seasons where these values were between 0.16 and 0.23, with a maximum peak in 1988/89 and the second highest peak in 2008/09. A similar trend presents E = Ctotal / Bexp, although higher values are observed with respect to E = 1-exp (-F), but the peaks occur in the same stations. Fishing mortality and E in the MSY (FMSY = 0.309 and EMSY = 0.266), were much higher than the Fcurrent= 0.107 / year and Ecurrent = 0.101 year. On the other hand, the estimate of the spawning biomass in the MSY was BMSY = 557,053 t, biomass lower than that estimated for the last years. When applying the control rule (BAC = (Bexp - BMIN) * FRACTION) stipulated in the Fisheries Management Plan, considering that BMIN = 120,000 t and FRACTION = 1-exp (-FMSY), it was found that the population of Pacific the sardine it has been exploited below the estimated BAC in the period of time analysed. Considering the current trend in the biomass of the Pacific sardine, as well as an exploitation level of 0.266, the BAC for the 2019-2020 period would be 206,480 tons.

The assessment provides an indication of the volume of fishery removals which is appropriate for the current stock status.

**A2.4 The assessment is subject to internal or external peer review.**

The Carta Nacional Pesquera (CNP) is a binding instrument for the fisheries authorities' decision- making process. This Charter includes diagnosis and assessment of a fishery, fisheries and conservation indicators, and recommendations by INAPESCA for the management of fisheries included in the CNP.

Updates of CNP are prepared by INAPESCA every two or three years, but before updates are published in the Offical Gazette (Dario Oficial, DOF), the draft update undergoes a public review process by means of publication in the DOF. This allows the public, non-governmental organizations and the academic sector, among others, to give an opinion of the fisheries status.

The assessment is subject to internal or external peer review

**A2.5 The assessment is made publicly available.**

Updates of CNP are prepared by INAPESCA every two or three years, but before updates are published in the Offical Gazette (Dario Oficial, DOF), the draft update undergoes a public review process by means of publication in the DOF. This allows the public, non-governmental organizations and the academic sector, among others, to give an opinion of the fisheries status

The assessment is made publicly available.

**References**

**R2, R7, R10**

**Links**

| | |
|---|---|
| **MARINTRUST Standard clause** | 1.3.2.1.2, 1.3.2.1.4, 1.3.1.2 |
| **FAO CCRF** | 12.3 |
| **GSSI** | D.5.01, D.6.02, D.3.14 |

| **A3** | **Harvest Strategy - Minimum Requirements** | | |
|---|---|---|---|
| | **A3.1** | There is a mechanism in place by which total fishing mortality of this species is restricted. | PASS |
| | **A3.2** | Total fishery removals of this species do not regularly exceed the level indicated or stated in the stock assessment. Where a specific quantity of removals is recommended, the actual removals may exceed this by up to 10% ONLY if the stock status is above the limit reference point or proxy. | PASS |
| | **A3.3** | Commercial fishery removals are prohibited when the stock has been estimated to be below the limit reference point or proxy (small quotas for research or non-target catch of the species in other fisheries are permissible). | PASS |
| | | **Clause outcome:** | PASS |

**A3.1 There is a mechanism in place by which total fishing mortality of this species is restricted.**

During previous MSC Audits in the Mexican small pelagic fishery minutes were presented of meetings between scientists and industry that discussed management plans in the southern Gulf. Discussions were undertaken about the need to determine potential mechanisms to shut operations as real time cumulative catches approach 90% of the allowable annual catch. Minutes were presented where actual decisions were made between industry and authorities to stop fishing operations based on results of in-season monitoring of abundance and size.

The small pelagic fishery is regulated under the Norma Oficial Mexicana (NOM, 003-PESC-1993) and the current management plan published in the Diario Oficial (DOF). No quotas are set but the NOM has set a minimum landing size for important species including Monterey Sardine; fleet capacity is controlled by the DOF and is regulated by fishing area.

There is a mechanism in place by which total fishing mortality of this species is restricted.

**A3.2 Total fishery removals of this species do not regularly exceed the level indicated or stated in the stock assessment. Where a specific quantity of removals is recommended, the actual removals may exceed this by up to 10% ONLY if the stock status is above the limit reference point or proxy.**

Between 2008/09 and 2013/14 the trend in the abundance series (in number and weight) was downward, however in recent years there was an upward trend: the spawning biomass increased from around 432,000 t in 2014 / 15 to almost 1,020 million tons in 2017 / 18-2018 / 19, while the exploitable biomass behaves the same way as the spawners, but the values in 2014/15 were almost 409,000 tons while this value increased to approximately 876,000 tons in 2016 / 17 and an average of 1,288 million tonnes in 2017 / 18-2018 / 19. The annual fishing mortality rate and the exploitation rate (E = 1-exp (-F)) show values below 0.15 / year for almost the entire time period, with some seasons where these values were between 0.16 and 0.23, with a maximum peak in 1988/89 and the second highest peak in 2008/09. A similar trend presents E = Ctotal / Bexp, although higher values are observed with respect to E = 1-exp (-F), but the peaks occur in the same stations. Fishing mortality and E in the MSY (FMSY = 0.309 and EMSY = 0.266), were much higher than the Fcurrent= 0.107 / year and Ecurrent = 0.101 year. On the other hand, the estimate of the spawning biomass in the MSY was BMSY = 557,053 t, biomass lower than that estimated for the last years. When applying the control rule (BAC = (Bexp - BMIN) * FRACTION) stipulated in the Fisheries Management Plan, considering that BMIN = 120,000 t and FRACTION = 1-exp (-FMSY), it was found that the population of Pacific the sardine it has been exploited below the estimated BAC in the period of time analysed. Considering the current trend in the biomass of the Pacific sardine, as well as an exploitation level of 0.266, the BAC for the 2019-2020 period would be 206,480 tons.

A Kobe diagram presented in the last MSC Surveillance audit showed that the Pacific sardine population is in good condition and the fishing effort has been below the recommended maximum, so there is no overfishing.

Total fishery removals of this species do not regularly exceed the level indicated or stated in the stock assessment. Where a specific quantity of removals is recommended, the actual removals may exceed this by up to 10% ONLY if the stock status is above the limit reference point or proxy

**A3.3 Commercial fishery removals are prohibited when the stock has been estimated to be below the limit reference point or proxy (small quotas for research or non-target catch of the species in other fisheries are permissible).**

During the 2018 revision of the NOM it was recommended that restrictions on vessel movements between zones should be put in place in particular to avoid fleets operating in Baja California moving into the Gulf. Vessel registers that specify maximum capacity in each of the following areas will be published: 40 vessels in Sonora, 21 in Baja California (including 2 in Isla Cedros; 5 in Baja California South and 12 in Sinaloa).

Commercial fishery removals are prohibited when the stock has been estimated to be below the limit reference point or proxy.

**References**

**R2, R10, R15-R16**

*Standard clause 1.3.2.1.3*

| **Links** | |
|---|---|
| **MARINTRUST Standard clause** | 1.3.2.1.3, 1.3.2.1.4 |
| **FAO CCRF** | 7.2.1, 7.22 (e), 7.5.3 |
| **GSSI** | D3.04, D6.01 |

| **A4** | **Stock Status - Minimum Requirements** | | |
|---|---|---|---|
| | **A4.1** | The stock is at or above the target reference point, OR IF NOT:<br><br>The stock is above the limit reference point or proxy and there is evidence that a fall below the limit reference point would result in fishery closure OR IF NOT:<br><br>The stock is estimated to be below the limit reference point or proxy, but fishery removals are prohibited. | PASS |
| | | **Clause outcome:** | PASS |

**A4.1 The stock is at or above the target reference point, OR IF NOT:**

**The stock is above the limit reference point or proxy and there is evidence that a fall below the limit reference point would result in fishery closure OR IF NOT:**

**The stock is estimated to be below the limit reference point or proxy, but fishery removals are prohibited.**

Between 2008/09 and 2013/14 the trend in the abundance series (in number and weight) was downward, however in recent years there was an upward trend: the spawning biomass increased from around 432,000 t in 2014 / 15 to almost 1,020 million tons in 2017 / 18-2018 / 19, while the exploitable biomass behaves the same way as the spawners, but the values in 2014/15 were almost 409,000 tons while this value increased to approximately 876,000 tons in 2016 / 17 and an average of 1,288 million tonnes in 2017 / 18-2018 / 19. The annual fishing mortality rate and the exploitation rate (E = 1-exp (-F)) show values below 0.15 / year for almost the entire time period, with some seasons where these values were between 0.16 and 0.23, with a maximum peak in 1988/89 and the second highest peak in 2008/09. A similar trend presents E = Ctotal / Bexp, although higher values are observed with respect to E = 1-exp (-F), but the peaks occur in the same stations. Fishing mortality and E in the MSY

(FMSY = 0.309 and EMSY = 0.266), were much higher than the Fcurrent= 0.107 / year and Ecurrent = 0.101 year. On the other hand, the estimate of the spawning biomass in the MSY was BMSY = 557,053 t, biomass lower than that estimated for the last years. When applying the control rule (BAC = (Bexp - BMIN) * FRACTION) stipulated in the Fisheries Management Plan, considering that BMIN = 120,000 t and FRACTION = 1-exp (-FMSY), it was found that the population of Pacific the sardine it has been exploited below the estimated BAC in the period of time analysed. Considering the current trend in the biomass of the Pacific sardine, as well as an exploitation level of 0.266, the BAC for the 2019-2020 period would be 206,480 tons.

A Kobe diagram presented in the last MSC Surveillance audit showed that the Pacific sardine population is in good condition and the fishing effort has been below the recommended maximum, so there is no overfishing.

Evidence that stock availability has shifted rather than declined and that catch has historically remained below BAC supports the conclusion that it is highly likely that the stock is at or above target reference point.

**References**

**R2, R10, R15-R17**

| **Links** | |
|---|---|
| **MARINTRUST Standard clause** | **1.3.2.1.4** |
| **FAO CCRF** | **7.2.1, 7.2.2 (e)** |
| **GSSI** | **D6 01** |

| **Species Name** | Thread Herring (*Opisthonema* Complex) | |
|---|---|---|
| **A1** | **Data Collection - Minimum Requirements** | |
| **A1.1** | Landings data are collected such that the fishery-wide removals of this species are known. | PASS |
| **A1.2** | Sufficient additional information is collected to enable an indication of stock status to be estimated. | PASS |
| | **Clause outcome:** | PASS |

**A1.1 Landings data are collected such that the fishery-wide removals of this species are known.**

O. medirastre, O. libertate and O. bulleri (Thread Herring complex) are all actively managed as a component of the "Pelágicos menores" (small pelagic) stock.

Data on catch and effort is collected from the official 'Aviso de Arribo' or landing notification form provided and collected by the regional offices of CONAPESCA. Data are processed and analysed by INAPESCA; results presented in official reports of fishery catch and effort. Total landings in the 2014/2015 fishery (Gulf purse seine) were 120,919t; in 2016/2017 58,445t ; in 2017/2018 63,380t and in 2018/2019 81,810t

Landings data are collected such that the fishery-wide removals of this species are known.

**A1.2 Sufficient additional information is collected to enable an indication of stock status to be estimated.**

The annual fishing mortality rate (Fannual) and the exploitation rate (E = 1-exp (-Fannual)) show values below 0.12 / year during almost the entire time period, with two seasons with maximum values in 1972/73 (0.256) and 1982/83 (0.189). A similar behavior presents E = Ctotal / Bexp, although higher values are observed with respect to E = 1-exp (-Fannual)), but the peaks were observed in the same seasons. The fishing mortality and E in the MSY (FMSY = 0.534 and ERMS = 0.414), were much higher than the Fcurrent = 0.046 / year and Ecurrent = 0.045 / year. On the other hand, the estimate of the biomass of spawners in the MSY was BMSY = 491,047 t, biomass that is much lower than the biomass estimated for the last years. When applying the control rule stipulated in the Fisheries Management Plan (BAC = (Bexp - BMIN) * FRACTION), considering that BMIN = 52,700 t and FRACTION = 1-exp (-FMSY), it was found that the population of thread herring have been exploited below the estimated

BAC in the analysed time period. Taking into account the current trend in the biomass of the thread herring, as well as an exploitation level of 0.414, the BAC for the 2019-2020 period would be 408,000 tons.

A Kobe diagram presented during the previous MSC Surveillance audit indicates that the thread herring population is in a healthy condition and the fishing effort has been below the recommended maximum, therefore, overfishing does not occur.

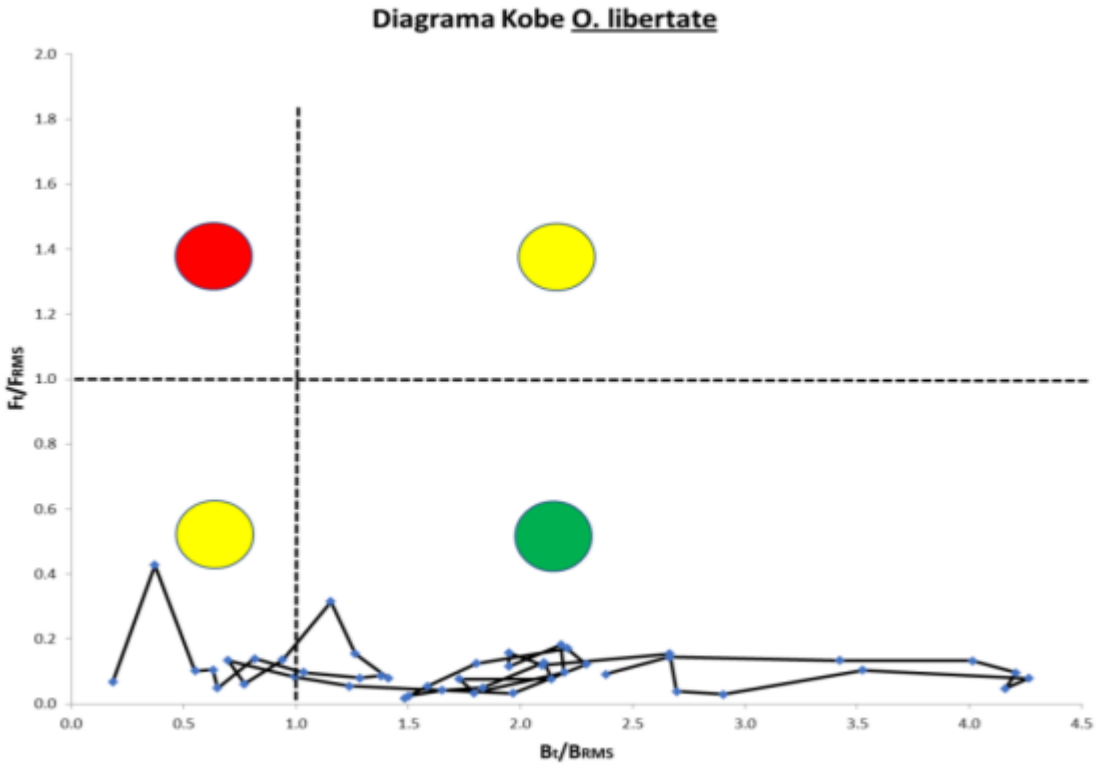


Figure 3. Kobe plot of biomass and fishing mortality rate relative to their respective levels producing MSY for the thread herring in the central/northern Gulf of California. Biomass is SSB. Reproduced from Nevarez-Martinez et al. (2019c).

Sufficient additional information is collected to enable an indication of stock status to be estimated.

**References**

**R2, R10, R17-R18**

**Links**

| | |
|---|---|
| **MARINTRUST Standard clause** | 1.3.2.1.1, 1.3.2.1.2, 1.3.2.1.4, 1.3.1.2 |
| **FAO CCRF** | 7.3.1, 12.3 |
| **GSSI** | D.4.01, D.5.01, D.6.02, D.3.14 |

| **A2** | **Stock Assessment - Minimum Requirements** | | |
|---|---|---|---|
| | **A2.1** | A stock assessment is conducted at least once every 3 years (or every 5 years if there is substantial supporting information that this is sufficient for the long-term sustainable management of the stock), and considers all fishery removals and the biological characteristics of the species. | PASS |
| | **A2.2** | The assessment provides an estimate of the status of the biological stock relative to a reference point or proxy. | PASS |
| | **A2.3** | The assessment provides an indication of the volume of fishery removals which is appropriate for the current stock status. | PASS |

| | | | |
|---|---|---|---|
| | **A2.4** | The assessment is subject to internal or external peer review. | PASS |
| | **A2.5** | The assessment is made publicly available. | PASS |
| | | **Clause outcome:** | PASS |

**A2.1 A stock assessment is conducted at least once every 3 years (or every 5 years if there is substantial supporting information that this is sufficient for the long-term sustainable management of the stock), and considers all fishery removals and the biological characteristics of the species.**

The biomass of the spawners and the total biomass show a trend similar to that observed for abundance in number, with the maximum peak of the total biomass in 2009/10. In the last twelve years, the biomass of the reproductive adults has presented values above one million tons, with its maximum value in 2010/11. In the case of exploitable biomass, the trend is very similar to that of the adults, although the values in the last ten years have been above 922,000 tons, with the maximum value in 2011/12 and 2012/13.

Morales-Bojorquez & Hernández-Rivas in 2020, as members of the Technical Committee of Small Pelagic, revised the assessment of both species and highlighted the following aspects:

- It could be useful to try short-term biomass projections
- There clear details about the nature and scope of the fishery independent data used to modelling, even when there are no tables to explicit them, and biological information related to age determination.
- There are no details about the uncertainty of the model
- The report indicates the estimation of reference point values, mainly associated with the calculation of the fishing mortality relative to the maximum sustained yield. The biologically acceptable catch (BAC) refers to the annual catch that would be sustainable for the resource
- There is consensus in the potentiality of the model used (ASAP) to obtain realistic outcomes of the population dynamic and recommended its continuity.

A stock assessment is conducted at least once every 3 years (or every 5 years if there is substantial supporting information that this is sufficient for the long-term sustainable management of the stock), and considers all fishery removals and the biological characteristics of the species.

**A2.2 The assessment provides an estimate of the status of the biological stock relative to a reference point or proxy.**

Biomass trends of the thread herring complex in the southern Gulf of California as predicted using an age structured model are available (**Figure 4**). The model predicts a stabilization of the trend around 600,000 t:

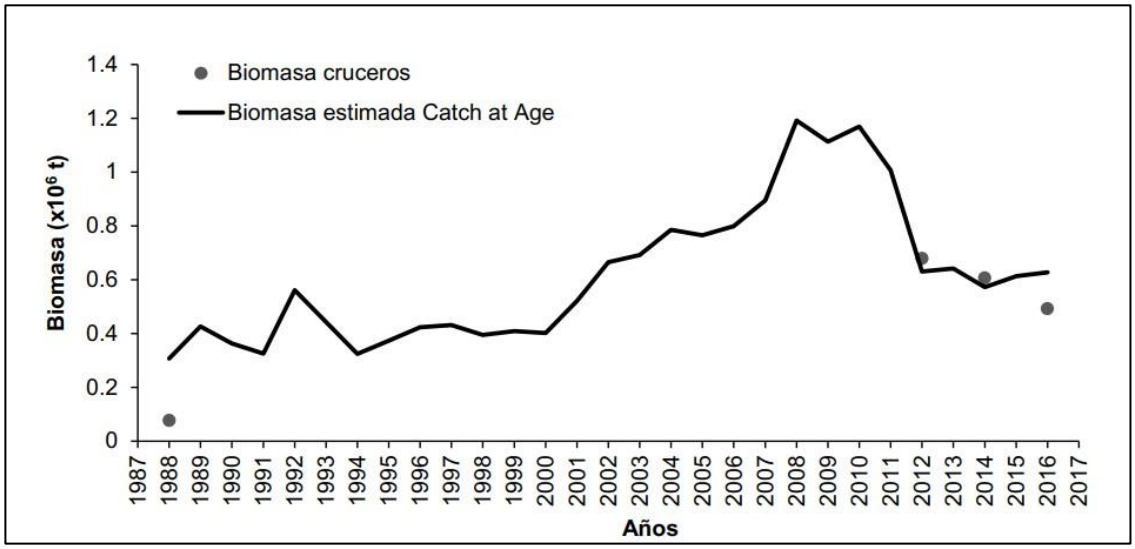

**Figure 4** Biomass trend of the thread herring complex in the southern Gulf of California as predicted using an age structured model fit to acoustic based estimates of abundance (dots). Estimation was conducted under the assumption of natural mortality M=0.6. Reproduced from Jacob-Cervantes et al. (2017a)

A Kobe diagram presented during the previous MSC Surveillance audit indicates that the thread herring population is in a healthy condition and the fishing effort has been below the recommended maximum, therefore, overfishing does not occur.

**A2.3 The assessment provides an indication of the volume of fishery removals which is appropriate for the current stock status.**

There does not appear to be a TAC set for the thread herring fishery nor for individual species, although INP make recommendations (700,000t for all small pelagic species in the 2012 National Fisheries Charter). This TAC needs to be technically justified in future assessments, and efforts are to be made to achieve accurate assessments of population abundance by species.

The latest NOM (2018) does not include restrictions in the form of allowable catch or quotas. This was confirmed in the most recent CNP, where no quota was applicable through a 'dictamen tecnico' published by INP. Effort in the NOM is restricted (no further increase in vessel numbers) North of 20ºN. This prohibition includes no addition of vessels to the fleet unless they are to replace retired active boats that are retired.

The assessment provides an indication of the volume of fishery removals which is appropriate for the current stock status.

**A2.4 The assessment is subject to internal or external peer review.**

The Carta Nacional Pesquera (CNP) is a binding instrument for the fisheries authorities' decision- making process. This Charter includes diagnosis and assessment of a fishery, fisheries and conservation indicators, and recommendations by INAPESCA for the management of fisheries included in the CNP.

Updates of CNP are prepared by INAPESCA every two or three years, but before updates are published in the Offical Gazette (Dario Oficial, DOF), the draft update undergoes a public review process by means of publication in the DOF. This allows the public, non-governmental organizations and the academic sector, among others, to give an opinion of the fisheries status.

Assessments is subject to internal or external peer review.

**A2.5 The assessment is made publicly available.**

Updates of CNP are prepared by INAPESCA every two or three years, but before updates are published in the Offical Gazette (Dario Oficial, DOF), the draft update undergoes a public review process by means of publication in the DOF. This allows the public, non-governmental organizations and the academic sector, among others, to give an opinion of the fisheries status.

The assessment is made publicly available.

**References**

**R2, R6, R9, R15-R18**

**Links**

| | |
|---|---|
| **MARINTRUST Standard clause** | 1.3.2.1.2, 1.3.2.1.4, 1.3.1.2 |
| **FAO CCRF** | 12.3 |
| **GSSI** | D.5.01, D.6.02, D.3.14 |

| A3 | Harvest Strategy - Minimum Requirements | | |
|---|---|---|---|
| | A3.1 | There is a mechanism in place by which total fishing mortality of this species is restricted. | PASS |
| | A3.2 | Total fishery removals of this species do not regularly exceed the level indicated or stated in the stock assessment. Where a specific quantity of removals is recommended, the actual removals may exceed this by up to 10% ONLY if the stock status is above the limit reference point or proxy. | PASS |
| | A3.3 | Commercial fishery removals are prohibited when the stock has been estimated to be below the limit reference point or proxy (small quotas for research or non-target catch of the species in other fisheries are permissible). | PASS |
| | | **Clause outcome:** | PASS |

**A3.1 There is a mechanism in place by which total fishing mortality of this species is restricted.**

No quotas are set but the NOM (2018) has set a minimum landing size for important species including thread herring; fleet capacity is controlled by the DOF and regulated by fishing area.

Monitoring of vessel discharges and determination of abundance indices are considered enough for managing this stock. Passively managed stocks may revert to an actively managed regime (including formal stock assessments) if the competent authority change their advice.
There is a mechanism in place by which total fishing mortality of this species is restricted.

**A3.2 Total fishery removals of this species do not regularly exceed the level indicated or stated in the stock assessment. Where a specific quantity of removals is recommended, the actual removals may exceed this by up to 10% ONLY if the stock status is above the limit reference point or proxy.**

An Improvement was reported in the calculation of the Biologically Acceptable Catch (BAC); replacing the quantity FRACTION with a harvest rate computed as HR = 1-exp (-FMSY).

For now, FMSY still is the default 0.25 suggested in the management plan but INP staff are considering substituting this value with an estimated parameter once the model operates to the satisfaction of the assessment needs. An important development included a proposal to modify the harvest control rule as currently defined in the management plan. Future assessments should note if these new proposals are been implemented and legislated.

The status of the Thread Herring complex has been evaluated using VPA and a surplus production model. Results show that each stock has either been stable for a long time or have been increasing since the late 1990s. Despite limitations in both analytical approaches (VPA and SPM), estimates of fishing mortality rates for the Thread Herring Complex are below the 0.25 reference point suggested by the FMP.

**A3.3 Commercial fishery removals are prohibited when the stock has been estimated to be below the limit reference point or proxy (small quotas for research or non-target catch of the species in other fisheries are permissible).**

The new NOM (PESC 2018) establishes a volume of capture below minimum size, determined in the same standard for Monterrey sardine (*Sardinops sagax*), Western herrings (*Opisthonema* spp.), and Northern anchovy (*Engraulis mordax*) corresponding to 20% of the volume total of the annual nominal catch. Percentages allowed below this size will be modified according to the technical opinion of INP which will be announced through regulatory agreements published in the Official Gazette of the Federation (DOF).

In addition, the FMP has added an MSY-based control rule which, based on the application of a harvest rate, requires catches to be reduced if biomass declines. Eventually, if a biomass threshold is reached, the fishery stops operating. Other types of control rules including CPUE, minimum size (referenced earlier). There are also emerging management actions that can be employed when reaching or exceeding one or more reference points. These include temporary or zone closures, establishment or change of minimum size limits and change of allowable catch levels by species and effort restrictions.

Commercial fishery removals are prohibited when the stock has been estimated to be below the limit reference point or proxy

| References |
|---|
| **R2, R10, R15-R18** |
| *Standard clause 1.3.2.1.3* |

| Links | |
|---|---|
| **MARINTRUST Standard clause** | 1.3.2.1.3, 1.3.2.1.4 |
| **FAO CCRF** | 7.2.1, 7.22 (e), 7.5.3 |
| **GSSI** | D3.04, D6.01 |

| **A4** | **Stock Status - Minimum Requirements** | | |
|---|---|---|---|
| | **A4.1** | The stock is at or above the target reference point, OR IF NOT:<br><br>The stock is above the limit reference point or proxy and there is evidence that a fall below the limit reference point would result in fishery closure OR IF NOT:<br><br>The stock is estimated to be below the limit reference point or proxy, but fishery removals are prohibited. | PASS |
| | | **Clause outcome:** | PASS |

**A4.1 The stock is at or above the target reference point, OR IF NOT:**

**The stock is above the limit reference point or proxy and there is evidence that a fall below the limit reference point would result in fishery closure OR IF NOT:**

**The stock is estimated to be below the limit reference point or proxy, but fishery removals are prohibited.**

For thread herring, according to the latest data made available by INP (no abundance estimate presented for 2018 even though a survey was conducted) Bmin (lowest estimated biomass level at which directed capture is allowed) was calculated at 52,700t; using the estimate of FMSY at 0.6, the BAC for the period 2018/2019 was determined to be 382,000 t. The current trend in the biomass of the thread herring, as well as an exploitation level of 0.414, the BAC for the 2019-2020 period would be 408,000 tons.

According to the latest assessment (2018 data, published in 2019) SSB producing the MSY was estimated to be 460,000 t. The Kobe plot indicates that the stock is not over-exploited, and no overfishing is taking place.

| References |
|---|
| R2 |

| Links | |
|---|---|
| **MARINTRUST Standard clause** | **1.3.2.1.4** |
| **FAO CCRF** | **7.2.1, 7.2.2 (e)** |
| **GSSI** | **D6 01** |

| **Species Name** | **Mackarel (Scomber japonicus)** |
|---|---|

| **A1** | **Data Collection - Minimum Requirements** | | |
|---|---|---|---|
| | **A1.1** | Landings data are collected such that the fishery-wide removals of this species are known. | PASS |
| | **A1.2** | Sufficient additional information is collected to enable an indication of stock status to be estimated. | PASS |
| | | **Clause outcome:** | PASS |

**A1.1 Landings data are collected such that the fishery-wide removals of this species are known.**

Data on catch and effort is collected from the official 'Aviso de Arribo' or landing notification form provided and collected by regional offices of **CONAPESCA**. Data are processed and analysed by INAPESCA; results presented in official reports of fishery catch and effort.

Landings data for Mackerel have been recorded since 1999. Mackerel present trends of variable abundance. Peaks appear to be on an approximate five-year cycle. Highest landings, over 40,000 mt, were recorded in 1998/99 (40,535 mt) when it accounted for 25% of catch composition of the fishery and in 2011-12 (47,600 mt) representing 10% of total catch.

Landings data are collected such that the fishery-wide removals of this species are known.

**A1.2 Sufficient additional information is collected to enable an indication of stock status to be estimated.**

Mackerel has been included in acoustic surveys, but results have not been included in stock assessments for this species. Under the Management Plan (SPFMP) mackerel is classified as an "actively" managed species; using a harvest rate constrained between 5 and 25% of estimated SSB, over a cut-off of minimum biomass.

Using a biomass dynamics model Nevarez-Martínez et al. (2016) calculated biological reference points for mackerel. The biomass dynamics model pools catch of mackerel and indicates that recorded catches are far below estimated BMSY for all of its trajectory

Sufficient additional information is collected to enable an indication of stock status to be estimated.

**References**

**R2, R4, R10, R14**

**Links**

| | |
|---|---|
| **MARINTRUST Standard clause** | 1.3.2.1.1, 1.3.2.1.2, 1.3.2.1.4, 1.3.1.2 |
| **FAO CCRF** | 7.3.1, 12.3 |
| **GSSI** | D.4.01, D.5.01, D.6.02, D.3.14 |

| **A2** | **Stock Assessment - Minimum Requirements** | | |
|---|---|---|---|
| | **A2.1** | A stock assessment is conducted at least once every 3 years (or every 5 years if there is substantial supporting information that this is sufficient for the long-term sustainable management of the stock), and considers all fishery removals and the biological characteristics of the species. | PASS |
| | **A2.2** | The assessment provides an estimate of the status of the biological stock relative to a reference point or proxy. | PASS |
| | **A2.3** | The assessment provides an indication of the volume of fishery removals which is appropriate for the current stock status. | PASS |
| | **A2.4** | The assessment is subject to internal or external peer review. | PASS |
| | **A2.5** | The assessment is made publicly available. | PASS |
| | | **Clause outcome:** | PASS |

**A2.1 A stock assessment is conducted at least once every 3 years (or every 5 years if there is substantial supporting information that this is sufficient for the long-term sustainable management of the stock), and considers all fishery removals and the biological characteristics of the species.**

The incidental catch of small pelagic fish in the Gulf of California region was evaluated during the period 2019-2020 by Matus-Hernandez et al (2020). The information was collected by the observer program aboard the small pelagic purse seine fleet in the Gulf of California. A total of 552 sets were recorded. The species composition of the bycatch included a great diversity of taxonomic groups (fish, crustaceans, molluscs and cnidarians), within which 155 species are distributed, for this analysis the

individuals that were identified at the species level were considered. The evaluation of the incidental catch was carried out on a global and monthly basis both for all the smaller pelagic catches, and specifically for the thread herring and the Pacific sardine. The estimated bycatch for all minor pelagic species was 135.69 tonnes (t) and for thread herring and Pacific sardine species 93.84 t and 0.167 t respectively, with global bycatch radius values of 0.0067, 0.0087 for thread herring and 0.00013 for the Pacific sardine. The estimated bycatch values were low (<1%), indicating that the small pelagic fishery represents a low impact on the marine ecosystem of the Gulf of California.

A stock assessment is conducted at least once every 3 years (or every 5 years if there is substantial supporting information that this is sufficient for the long-term sustainable management of the stock), and considers all fishery removals and the biological characteristics of the species

**A2.2 The assessment provides an estimate of the status of the biological stock relative to a reference point or proxy.**

Kobe plots for the assessment of mackerel show positive results in terms of exploitation and current state of the population, with all years indicating that estimated biomass is above $B_{MSY}$ and average fishing mortality rate remains below $F_{MSY}$, thus there is no risk of overfishing.

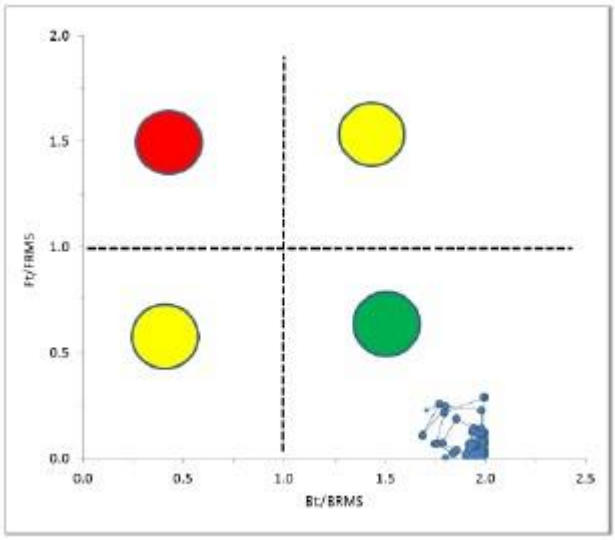


Figure 5. Kobe plots with stock status of mackerel (*Scomber japonicus*) in Gulf of California. Reproduced from Nevárez-Martínez et al. 2016e.

The assessment provides an estimate of the status of the biological stock relative to a reference point or proxy.

**A2.3 The assessment provides an indication of the volume of fishery removals which is appropriate for the current stock status.**

For actively managed species the control rule described in the management plan is used to compute the Biologically Acceptable Catch: $BAC$=($B$–$Bmin$) $*$ $Fraction$, where Fraction is defined as the proportion of biomass, above Bmin, that can be removed by the fishery.

As part of the scientific research objectives in the SPFMP, commercial fisheries landings are monitored. The status of the stock of these species are assessed every 3-4 years. For mackerel there is also a work plan for future evaluations, including: processing of biological data (growth parameters, mortality indices), processing of size distribution, application of independent abundance indices, processing of information from the acoustic data, and application of age-based methods to the stock status.

The assessment provides an indication of the volume of fishery removals which is appropriate for the current stock status.

**A2.4 The assessment is subject to internal or external peer review.**

The Carta Nacional Pesquera (CNP) is a binding instrument for the fisheries authorities' decision- making process. This Charter includes the diagnosis and assessment of a fishery, fisheries and conservation indicators, and recommendations by the National Institute of Fisheries and Aquaculture (**INAPESCA**), for the management of the fisheries that are included in the CNP.

Updates of CNP are prepared by **INAPESCA** every two or three years, but before the updates of the CNP are published in the Offical Gazette (Diario Oficial, DOF), the draft update undergoes a public review process. This allows the public, non-governmental organisations and the academic sector, among others, to give an opinion of the fisheries status.

The assessment is subject to internal or external peer review.

**A2.5 The assessment is made publicly available.**

The revised NOM (2018) includes proposed modifications to regulations related to allowable size limits on capture. Percentages allowed below this size will be modified according to the technical opinion of **INAPESCA** and announced through regulatory agreements published in the DOF.

The latest version of the **CNP** (Carta Nacional Pesquera (National Fisheries Chart) was published by **SAGARPA** though **INAPESCA** in June 2018. The CNP also includes general provisions and recommendations that must be observed by the fishing authorities when adopting and implementing instruments and measures to control fishing effort.

The assessment is made publicly available

**References**

**R2, R4, R10, R14**

**Links**

| | |
|---|---|
| **MARINTRUST Standard clause** | 1.3.2.1.2, 1.3.2.1.4, 1.3.1.2 |
| **FAO CCRF** | 12.3 |
| **GSSI** | D.5.01, D.6.02, D.3.14 |

| **A3** | **Harvest Strategy - Minimum Requirements** | | |
|---|---|---|---|
| | **A3.1** | There is a mechanism in place by which total fishing mortality of this species is restricted. | PASS |
| | **A3.2** | Total fishery removals of this species do not regularly exceed the level indicated or stated in the stock assessment. Where a specific quantity of removals is recommended, the actual removals may exceed this by up to 10% ONLY if the stock status is above the limit reference point or proxy. | PASS |
| | **A3.3** | Commercial fishery removals are prohibited when the stock has been estimated to be below the limit reference point or proxy (small quotas for research or non-target catch of the species in other fisheries are permissible). | PASS |
| | | **Clause outcome:** | PASS |

**A3.1 There is a mechanism in place by which total fishing mortality of this species is restricted.**

Fishing effort in the NOM is restricted (no further increase in vessel numbers) North of 20°N. This prohibition also includes no addition of vessels to the small pelagic fleet unless they are to replace retired active boats. The fishery is managed using a control rule based on removing a fraction of allowable biomass above a minimum threshold. The language in the Management Plan (FMP) is interpreted such that this BAC (and corresponding FRACTION) works as a Limit Reference Point

(LRP). Although no actual value has been provided, the Target Reference Point (TRP) in terms of fishing mortality will be lower than the level producing MSY.

A maximum volume of 20% (down from 30%) of annual catch limits for each small pelagic species (including *Scomber japonicus*) below the minimum landing size for that species is permitted. This amount may be revised through technical opinions provided by **INAPESCA** and published in DOF

There is a mechanism in place by which total fishing mortality of this species is restricted.

**A3.2 Total fishery removals of this species do not regularly exceed the level indicated or stated in the stock assessment. Where a specific quantity of removals is recommended, the actual removals may exceed this by up to 10% ONLY if the stock status is above the limit reference point or proxy.**

Catch and effort statistics information for mackerel come from the landing tickets (Aviso de Arribo) of the smaller pelagic catches from the Guaymas and Yavaros ports, Sonora. Informal information suggests that discards occur when the fenced school is too large to fit in the hold or when small sizes are caught. No information was provided on discards volumes for mackerel. As with other small pelagic species, mackerel present trends of variable abundance. Peaks appear to be on an approximate five-year cycle.

Total fishery removals of this species do not regularly exceed the level indicated or stated in the stock assessment. Where a specific quantity of removals is recommended, the actual removals may exceed this by up to 10% ONLY if the stock status is above the limit reference point or proxy.

**A3.3 Commercial fishery removals are prohibited when the stock has been estimated to be below the limit reference point or proxy (small quotas for research or non-target catch of the species in other fisheries are permissible).**

Mackerel is designated under the active management category. For species that are actively managed, the Management Plan (SPFMP) has added an MSY-based control rule which, based on the application of a harvest rate, requires the catch to be reduced if the biomass declines. Eventually, if a biomass threshold is reached, the fishery stops operating.

The SFPM lists other types of control rules including CPUE, minimum size. There are also emerging management actions that can be employed when reaching or exceeding one or more reference points. These include temporary or zone closures, establishment or change of minimum size limits, change of allowable catch levels by species and effort restrictions

Commercial fishery removals are prohibited when the stock has been estimated to be below the limit reference point or proxy (small quotas for research or non-target catch of the species in other fisheries are permissible).

**References**

**R2, R4, R10, R14**

*Standard clause 1.3.2.1.3*

| **Links** | |
|---|---|
| **MARINTRUST Standard clause** | 1.3.2.1.3, 1.3.2.1.4 |
| **FAO CCRF** | 7.2.1, 7.22 (e), 7.5.3 |
| **GSSI** | D3.04, D6.01 |

| A4 | Stock Status - Minimum Requirements | | |
|---|---|---|---|
| | A4.1 | The stock is at or above the target reference point, OR IF NOT:<br><br>The stock is above the limit reference point or proxy and there is evidence that a fall below the limit reference point would result in fishery closure OR IF NOT:<br><br>The stock is estimated to be below the limit reference point or proxy, but fishery removals are prohibited. | PASS |
| | | **Clause outcome:** | PASS |

**A4.1 The stock is at or above the target reference point, OR IF NOT:**

**The stock is above the limit reference point or proxy and there is evidence that a fall below the limit reference point would result in fishery closure OR IF NOT:**

**The stock is estimated to be below the limit reference point or proxy, but fishery removals are prohibited.**

Kobe plots for the assessment of mackerel show positive results in terms of exploitation and current state of the population, with all years indicating that estimated biomass is above BMSY and average fishing mortality rate remains below FMSY.

The stock is estimated to be below the limit reference point or proxy, but fishery removals are prohibited.

**References**

**R2, R4, R10, R14**

| **Links** | |
|---|---|
| **MARINTRUST Standard clause** | **1.3.2.1.4** |
| **FAO CCRF** | **7.2.1, 7.2.2 (e)** |
| **GSSI** | **D6 01** |

# CATEGORY B SPECIES

Category B species are those which make up greater than 5% of landings in the applicant raw material, but which are not subject to a species-specific research and management regime sufficient to pass all Category A clauses. If there are no Category B species in the fishery under assessment, this section can be deleted.

Category B species are assessed using a risk-based approach. The following process should be completed once for each Category B species.

## If there are estimates of biomass (B), fishing mortality (F), and reference points

It is possible for a Category B species to have some biomass and fishing mortality data available. When sufficient information is present, the assessment team should use the following risk matrix to determine whether the species should be recommended for approval.

**TABLE B(A) - F, B AND REFERENCE POINTS ARE AVAILABLE**

| | | | | | |
|---|---|---|---|---|---|
| **Biomass is above MSY / target reference point** | Pass | Pass | Pass | Fail | Fail |
| **Biomass is below MSY / target reference point, but above limit reference point** | Pass, but re-assess when fishery removals resume | Pass | Fail | Fail | Fail |
| **Biomass is below limit reference point (stock is overfished)** | Pass, but re-assess when fishery removals resume | Fail | Fail | Fail | Fail |
| **Biomass is significantly below limit reference point (Recruitment impaired)** | Fail | Fail | Fail | Fail | Fail |
| | **Fishery removals are prohibited** | **Fishing mortality is below MSY or target reference point** | **Fishing mortality is around MSY or target reference point, or below the long-term average** | **Fishing mortality is above the MSY or target reference point, or around the long-term average** | **Fishing mortality is above the limit reference point or above the long-term average (Stock is subject to overfishing)** |

## If the biomass / fishing pressure risk assessment is not possible

Initially, the resilience of each Category B species to fishing pressure should be estimated using the American Fisheries Society procedure described in Musick, J.A. (1999). This approach is used as the resilience values for many species and stocks have been estimated by FishBase and are already available online. For details of the approach, please refer to Appendix A. Determining the resilience provides a basis for estimating the risk that fishing may pose to the long-term sustainability of the stock. Table B(b) should be used to determine whether the species should be recommended for approval.

**TABLE B(B) - NO REFERENCE POINTS AVAILABLE. B = CURRENT BIOMASS; $B_{AV}$ = LONG-TERM AVERAGE BIOMASS; F = CURRENT FISHING MORTALITY; $F_{AV}$ = LONG-TERM AVERAGE FISHING MORTALITY.**

| | | | | |
|---|---|---|---|---|
| **B > $B_{av}$ and F < $F_{av}$** | Pass | Pass | Pass | Fail |
| **B > $B_{av}$ and F or $F_{av}$ unknown** | Pass | Pass | Fail | Fail |

| | | | | |
|---|---|---|---|---|
| **$B = B_{av}$ and $F < F_{av}$** | Pass | Pass | Fail | Fail |
| **$B = B_{av}$ and F or $F_{av}$ unknown** | Pass | Fail | Fail | Fail |
| **$B > B_{av}$ and $F > F_{av}$** | Pass | Fail | Fail | Fail |
| **$B < B_{av}$** | Fail | Fail | Fail | Fail |
| **B unknown** | Fail | Fail | Fail | Fail |
| **Resilience** | **High** | **Medium** | **Low** | **Very Low** |

# Assessment Results

| **Species Name** | | **Californian anchovy**, Anchoveta norteña, *Engraulis mordax* |
|---|---|---|
| **B1** | Species Name | *Engraulis mordax* |
| | Table used (Ba, Bb) | Ba |
| | Outcome | PASS: Biomass above MSY/target reference point |

For passively managed species, the control rule determines that the Biologically Acceptable Catch (BAC, equivalent to a Limit Reference Point) is computed as a fraction of the estimated Maximum Sustainable Yield (MSY). Monitoring of vessel discharges and determination of abundance indices are considered sufficient for managing passively managed stocks. At the discretion of INP passively managed stocks may revert to being actively managed.

From the 2010/2011 season until 2013/2014 the *E. mordax* fishery formed a major component of the small pelagic species landed in the assessment area.

The stock passes the Category B risk-based assessment with a medium resilience rating (reference Fishbase, accessed 07.09.21).

**References**

**R2, R14**

**Links**

| | |
|---|---|
| **MARINTRUST Standard clause** | **1.3.2.2, 4.1.4** |
| **FAO CCRF** | **7.5.1** |
| **GSSI** | **D.5.01** |

| **Species Name** | | **Bocona sardine** *Cetengraulis mysticetus* |
|---|---|---|
| **B1** | Species Name | *Cetengraulis mysticetus* |
| | Table used (Ba, Bb) | Ba |
| | Outcome | PASS: Biomass above MSY/target reference point |

Bocona sardine is also passively managed under the SPFMP (Management Plan) and NOM-003-PESC1993 (2018). There is in place a sampling program to collect landing data and surveys to gather size data. Stock assessments have been conducted for this species, but not recently. For passively managed species, the control rule determines that BAC is simply 25% of the most recent estimate of SSB.

Some biological reference points are available. Fishing mortality rate at MSY was estimated to be 0.2620 and MSY equivalent to 185,485 mt, K = 1,415,800, with BMSY is equivalent to K/2 = 707,900t.

Fishbase report an intrinsic population growth rate several times higher than that of Thread herring. Therefore, given the high productivity of the species and opportunistic nature of the catch, it is reasonable to assume the species is being harvested at levels that are highly likely to keep the stock within biologically based limits. Biomass is about twice the level producing MSY while the fishing mortality rate has been much lower than the level producing BMSY (707,900t).

The species passes the Category B risk-based assessment

**References**

**R14**

**Links**

| | |
|---|---|
| **MARINTRUST Standard clause** | **1.3.2.2, 4.1.4** |
| **FAO CCRF** | **7.5.1** |
| **GSSI** | **D.5.01** |

# CATEGORY C SPECIES

In a whole fish assessment, Category C species are those which make up less than 5% of landings, but which are subject to a species-specific management regime. In most cases this will be because they are a commercial target in a fishery other than the one under assessment.

Clause C1 should be completed for **each** Category C species. If there are no Category C species in the fishery under assessment, this section can be deleted. Where a species fails this Clause, it may be assessed as a Category D species instead, EXCEPT if there is evidence that it is currently below the limit reference point.

| **Species Name** | | | |
|---|---|---|---|
| **C1** | **Category C Stock Status - Minimum Requirements** | | |
| | **C1.1** | Fishery removals of the species in the fishery under assessment are included in the stock assessment process, OR are considered by scientific authorities to be negligible. | |
| | **C1.2** | The species is considered, in its most recent stock assessment, to have a biomass above the limit reference point (or proxy), OR removals by the fishery under assessment are considered by scientific authorities to be negligible. | |
| | | **Clause outcome:** | |

**C1.1 Fishery removals of the species in the fishery under assessment are included in the stock assessment process, OR are considered by scientific authorities to be negligible**.

**C1.2 The species is considered, in its most recent stock assessment, to have a biomass above the limit reference point (or proxy), OR removals by the fishery under assessment are considered by scientific authorities to be negligible.**

**References**

**Links**

| | |
|---|---|
| **MARINTRUST Standard clause** | 1.3.2.2 |
| **FAO CCRF** | 7.5.3 |
| **GSSI** | D.3.04, D5.01 |

# CATEGORY D SPECIES

Category D species are those which make up less than 5% of landings and are not subject to a species-specific management regime. In the case of mixed trawl fisheries, Category D species may make up the majority of landings. The comparative lack of scientific information on the status of the population of the species means that a risk-assessment style approach must be taken.

| **D1** | **Species Name** | **Japanese sardine** *Etrumeus teres* | |
|---|---|---|---|
| | **Productivity Attribute** | **Value** | **Score** |
| | Average age at maturity (years) | 2 | 2 |
| | Average maximum age (years) | 3 | 2 |
| | Fecundity (eggs/spawning) | Egg >10000 | 1 |
| | Average maximum size (cm) | 33 | 1 |
| | Average size at maturity (cm) | 16.4 | 1 |
| | Reproductive strategy | Pelagic eggs | 1 |
| | Mean trophic level | 3.6 | 3 |
| | | **Average Productivity Score** | **1.6** |
| | **Susceptibility Attribute** | **Value** | **Score** |
| | Overlap of adult species range with fishery | <25% | 1 |
| | Distribution | Not used | - |
| | Habitat | Not used | - |
| | Depth range | 0-125m | 3 |
| | Selectivity | Up to 4m length | 3 |
| | Post-capture mortality | Alive after hauling | 2 |
| | | **Average Susceptibility Score** | **2.25** |
| | | **PSA Risk Rating (From Table D3)** | **PASS** |
| | | **Compliance rating** | |

**References**

*Standard clauses 1.3.2.2*

# Table D2 - Productivity / Susceptibility attributes and scores.

| Productivity attributes | Low productivity/ High risk | Medium productivity/ Medium risk | High productivity/ Low risk |
|---|---|---|---|
| | Score 3 | Score 2 | Score 1 |
| Average age at maturity (years) | >4 | 2 to 4 | <2 |
| Average maximum age (years) | >30 | 10 to 30 | <10 |
| Fecundity (eggs/spawning) | <1 000 | 1 000 to 10 000 | >10 000 |
| Average maximum size (cm) | >150 | 60 to 150 | <60 |
| Average size at maturity (cm) | >150 | 30 to 150 | <30 |
| Reproductive strategy | Live bearer, mouth brooder or significant parental investment | Demersal spawner "berried" | Broadcast spawner |
| Mean trophic level | >3.25 | 2.5–3.25 | <2.5 |

| Susceptibility attributes | | High susceptibility/ High risk | Medium susceptibility/ Medium risk | Low susceptibility/ Low risk |
|---|---|---|---|---|
| | | Score 3 | Score 2 | Score 1 |
| Availability | 1) Overlap of adult species range with fishery | >50% of stock occurs in the area fished | Between 25% and 50% of the stock occurs in the area fished | <25% of stock occurs in the area fished |
| | 2) Distribution | Only in the country/ fishery | Limited range in the region | Throughout region/ global distribution |
| Encounterability | 1) Habitat | Habitat preference of species make it highly likely to encounter trawl gear (e.g. demersal, muddy/sandy bottom) | Habitat preference of species make it moderately likely to encounter trawl gear (e.g. rocky bottom/reefs) | Depth or distribution of species make it unlikely to encounter trawl gear (e.g. epi-pelagic or meso-pelagic) |
| | 2) Depth range | High overlap with trawl fishing gear (20 to 60 m depth) | Medium overlap with trawl fishing gear (10 to 20 m depth) | Low overlap with trawl fishing gear (0 to 10 m, >70 m depth) |
| Selectivity | | Species >2 times mesh size or up to 4 m length | Species 1 to 2 times mesh size or 4 to 5 m length | Species <mesh size or >5 m length |
| Post capture mortality | | Most dead or retained Trawl tow >3 hours | Alive after net hauled Trawl tow 0.5 to 3 hours | Released alive Trawl tow <0.5 hours |

**Note:** Availability 2 is only used when there is no information for Availability 1; the most conservative score between Encounterability 1 and 2 is used.

| D3 | | Average Susceptibility Score | | |
|---|---|---|---|---|
| | | 1 - 1.75 | 1.76 - 2.24 | 2.25 - 3 |
| Average Productivity Score | 1 - 1.75 | PASS | PASS | PASS |
| | 1.76 - 2.24 | PASS | PASS | TABLE D4 |
| | 2.25 - 3 | PASS | TABLE D4 | TABLE D4 |

| D4 | Species Name | **Japanese sardine** *Etrumeus teres* | |
|---|---|---|---|
| | Impacts On Species Categorised as Vulnerable by D1-D3 - Minimum Requirements | | |
| | D4.1 | The potential impacts of the fishery on this species are considered during the management process, and reasonable measures are taken to minimise these impacts. | PASS |
| | D4.2 | There is no substantial evidence that the fishery has a significant negative impact on the species. | PASS |
| | | **Outcome:** | **PASS** |

**Evidence**

**D4.1: The potential impacts of the fishery on this species are considered during the management process, and reasonable measures are taken to minimise these impacts.**

Japanese sardine/Red-eye herring is caught as bycatch in this pelagic fishery. No research or stock assessment activities are conducted specifically in relation to this species. There is an obligation to report all landings in the logbooks, therefore by-catch information is available. Regulations targeting other species are likely to affect the level and nature of fishing pressure on the species.

The comparative lack of scientific information on the status of the population means that a risk assessment style approach must be taken. The species is assessed as a Category D species. This species has not yet been assessed by the IUCN Red List and currently does not appear in any CITES appendices of endangered species (websites accessed 03.10.21).

**D4.2 There is no substantial evidence that the fishery has a significant negative impact on the species.**

Three species of small pelagics were categorized as *minor* retained: California anchovy *(Engraulis mordax*), red-eye round herring (*Etrumeus teres*), and leatherjacket (*Oligoplites* spp). Aside from small pelagic species, the fleet is reported to capture approximately 113 fish species, and 29 invertebrates. Eight of these fish species were designated as ETP. The remaining fish and invertebrate species were categorized as *retained*. The volume of all of these species accounts for <0.3% of the catch of the Sonora small pelagics fishery. On basis of volume all of these retained species were categorized as *minor.*

There is no substantial evidence that the fishery has a significant negative impact on the species.

**References**

| Links | |
|---|---|
| **MARINTRUST Standard clause** | 1.3.2.2, 4.1.4 |
| **FAO CCRF** | 7.5.1 |
| **GSSI** | D.5.01 |

| D1 | Species Name | **Leatherjackets** *Oligoplites sp.* | |
|---|---|---|---|
| | **Productivity Attribute** | **Value** | **Score** |
| | Average age at maturity (years) | 2.2 | 2 |
| | Average maximum age (years) | 9.5 | 1 |
| | Fecundity (eggs/spawning) | No data | - |
| | Average maximum size (cm) | 58.1 | 1 |
| | Average size at maturity (cm) | 32.1 | 2 |
| | Reproductive strategy | Egg scatterers | 1 |
| | Mean trophic level | 4.1 | 3 |
| | | **Average Productivity Score** | **1.66** |
| | **Susceptibility Attribute** | **Value** | **Score** |
| | Overlap of adult species range with fishery | | 1 |
| | Distribution | Not used | - |
| | Habitat | Trawl interaction moderately likely | 2 |
| | Depth range | Not used | - |
| | Selectivity | >2 x mesh | 3 |
| | Post-capture mortality | Most retained | 3 |
| | | **Average Susceptibility Score** | **2.25** |
| | | **PSA Risk Rating (From Table D3)** | **PASS** |
| | | **Compliance rating** | |

**References**

*Standard clauses 1.3.2.2*

# Table D2 - Productivity / Susceptibility attributes and scores.

| Productivity attributes | Low productivity/ High risk | Medium productivity/ Medium risk | High productivity/ Low risk |
|---|---|---|---|
| | Score 3 | Score 2 | Score 1 |
| Average age at maturity (years) | >4 | 2 to 4 | <2 |
| Average maximum age (years) | >30 | 10 to 30 | <10 |
| Fecundity (eggs/spawning) | <1 000 | 1 000 to 10 000 | >10 000 |
| Average maximum size (cm) | >150 | 60 to 150 | <60 |
| Average size at maturity (cm) | >150 | 30 to 150 | <30 |
| Reproductive strategy | Live bearer, mouth brooder or significant parental investment | Demersal spawner "berried" | Broadcast spawner |
| Mean trophic level | >3.25 | 2.5–3.25 | <2.5 |

| Susceptibility attributes | | High susceptibility/ High risk | Medium susceptibility/ Medium risk | Low susceptibility/ Low risk |
|---|---|---|---|---|
| | | Score 3 | Score 2 | Score 1 |
| Availability | 1) Overlap of adult species range with fishery | >50% of stock occurs in the area fished | Between 25% and 50% of the stock occurs in the area fished | <25% of stock occurs in the area fished |
| | 2) Distribution | Only in the country/ fishery | Limited range in the region | Throughout region/ global distribution |
| Encounterability | 1) Habitat | Habitat preference of species make it highly likely to encounter trawl gear (e.g. demersal, muddy/sandy bottom) | Habitat preference of species make it moderately likely to encounter trawl gear (e.g. rocky bottom/reefs) | Depth or distribution of species make it unlikely to encounter trawl gear (e.g. epi-pelagic or meso-pelagic) |
| | 2) Depth range | High overlap with trawl fishing gear (20 to 60 m depth) | Medium overlap with trawl fishing gear (10 to 20 m depth) | Low overlap with trawl fishing gear (0 to 10 m, >70 m depth) |
| Selectivity | | Species >2 times mesh size or up to 4 m length | Species 1 to 2 times mesh size or 4 to 5 m length | Species <mesh size or >5 m length |
| Post capture mortality | | Most dead or retained Trawl tow >3 hours | Alive after net hauled Trawl tow 0.5 to 3 hours | Released alive Trawl tow <0.5 hours |

**Note:** Availability 2 is only used when there is no information for Availability 1; the most conservative score between Encounterability 1 and 2 is used.

| D3 | | Average Susceptibility Score | | |
|---|---|---|---|---|
| | | 1 - 1.75 | 1.76 - 2.24 | 2.25 - 3 |
| Average Productivity Score | 1 - 1.75 | PASS | PASS | PASS |
| | 1.76 - 2.24 | PASS | PASS | TABLE D4 |
| | 2.25 - 3 | PASS | TABLE D4 | TABLE D4 |

| D4 | Species Name | **Leatherjackets** *Oligoplites sp.* | |
|---|---|---|---|
| | Impacts On Species Categorised as Vulnerable by D1-D3 - Minimum Requirements | | |
| | D4.1 | The potential impacts of the fishery on this species are considered during the management process, and reasonable measures are taken to minimise these impacts. | PASS |
| | D4.2 | There is no substantial evidence that the fishery has a significant negative impact on the species. | PASS |
| | | **Outcome:** | **PASS** |

**Evidence**

**D4.1: The potential impacts of the fishery on this species are considered during the management process, and reasonable measures are taken to minimise these impacts.**

Leather jackets Pineapple Sardine Oligoplites sp. are caught as bycatch in this pelagic fishery. No research or stock assessment activities are conducted specifically in relation to this species. There is an obligation to report all landings in the logbooks, therefore by-catch information is available. Regulations targeting other species are likely to affect the level and nature of fishing pressure on the species.

The comparative lack of scientific information on the status of the population means that a risk assessment style approach must be taken. The species is assessed as Category D species. This species has not yet been assessed by the IUCN Red List and currently does not appear in any CITES appendices of endangered species (websites accessed 03.10.21).

The potential impacts of the fishery on this species are considered during the management process, and reasonable measures are taken to minimise these impacts.

**D4.2 There is no substantial evidence that the fishery has a significant negative impact on the species.**

Three species of small pelagics were categorized as *minor* retained: California anchovy *(Engraulis mordax*), red-eye round herring (*Etrumeus teres*), and leatherjacket (*Oligoplite*s spp). Aside from small pelagic species, the fleet is reported to capture approximately 113 fish species, and 29 invertebrates. Eight of these fish species were designated as ETP. The remaining fish and invertebrate species were categorized as *retained*. The volume of all of these species accounts for <0.3% of the catch of the Sonora small pelagics fishery. On basis of volume all of these retained species were categorized as *minor.*

There is no substantial evidence that the fishery has a significant negative impact on the species.

| References<br>R14 | |
|---|---|
| **Links** | |
| **MARINTRUST Standard clause** | 1.3.2.2, 4.1.4 |
| **FAO CCRF** | 7.5.1 |
| **GSSI** | D.5.01 |

# FURTHER IMPACTS

The three clauses in this section relate to impacts the fishery may have in other areas. A fishery must meet the minimum requirements of all three clauses before it can be recommended for approval.

| **F1** | **Impacts on ETP Species - Minimum Requirements** | | |
|---|---|---|---|
| | **F1.1** | Interactions with ETP species are recorded. | PASS |
| | **F1.2** | There is no substantial evidence that the fishery has a significant negative effect on ETP species. | PASS |
| | **F1.3** | If the fishery is known to interact with ETP species, measures are in place to minimise mortality. | PASS |
| | | **Clause outcome:** | PASS |

**F1.1 Interactions with ETP species are recorded.**

The observer program has changed in relation to the first surveillance of 2019. Prior to November 2019, Global Grupo was responsible for the operational aspects of the observer program. However, beginning at the end of the 2019 season and from that point forward, the Program has been run by the non-profit Comunidad y Biodiversidad (COBI), as it was prior to Global Grupo's presence. The nonprofit's staff includes 8 onboard observers, 1 coordinator, and 3 port observers. Observers work on 40% (19) of the fleet's vessels which represent 100% of the boat owning companies involved in the fishery. Observer coverage is at 17% and COBI has implemented a rigorous observer training and logbook use program where it presented 25-30 vessel captains with the observer programs protocols and oriented them to the fishery's bycatch mitigation methods. Additionally, COBI drafted an observer manual in 2020 that, among other things, details ETP species mitigation measures.

In addition to the target catch and bycatch data that COBI's onboard observers collect, the port observers record information on volumes, species, and sizes of small pelagic and bycatch species.

The observer program is supported by the mandatory use of logbooks by all vessel captains in which they record information on the results of each set by species and size, climatic data, and data related to bycatch. The latter includes information on fish and sharks, crustaceans, birds, marine mammals, and turtles. Observer data indicate that the fishery has reduced its interactions with endangered, threatened, and protected (ETP) species and continues to demonstrate negligible amounts of catch of this organism group. The sightings made it possible to show that species in special protection status (birds, marine mammals, mantas, and turtles) are not being affected. In addition, the implementation of mitigation measures continues to be implemented by crew members.

ETP interaction data for the 2019-2020 season includes the following:

- Brown pelicans: 33,808 individuals sighted, 1,290 individuals captured, 1,151 individuals released alive, and 139 (0.25%) deaths
- Blue-footed boobies: 1,654 individuals sighted, 1 individual captured, 1 individual released alive, and 0 deaths
- Sea lions: 5,000 sealions observed and no recorded deaths
- Sea turtles: 14 sea turtle sightings (6 green and 8 olive ridley), 11 captured, and 1 death

Interactions with ETP species are recorded.

**F1.2 There is no substantial evidence that the fishery has a significant negative effect on ETP species.**

The observer program is supported by the mandatory use of logbooks by all vessel captains in which they record information on the results of each set by species and size, climatic data, and data related to bycatch. The latter includes information on fish and sharks, crustaceans, birds, marine mammals, and turtles. Observer data indicate that the fishery has reduced its interactions with endangered, threatened, and protected (ETP) species and continues to demonstrate negligible amounts of catch of this organism group. The sightings made it possible to show that species in special protection status (birds, marine mammals, mantas, and turtles) are not being affected. In addition, the implementation of mitigation measures continues to be implemented by crew members.

There is no substantial evidence that the fishery has a significant negative effect on ETP species

**F1.3 If the fishery is known to interact with ETP species, measures are in place to minimise mortality**.

The observers, in addition to having a related university career, pass a series of technical courses and controls including a psychometric test and a 15-day performance improvement training per year. In 2019 8 onboard observers, 1 coordinator, and 3 port observers took a training course as part of the program's transition from Global Grupo to COBI. The technical training was given with the participation of experts from the institutions involved in the management and research of small pelagics in the area (INPESCA, CONAPESCA, SEMARNAT, among others). The course curriculum included taxonomic identification, ETP species recognition, legal frameworks, fishery certification, logbook review, database use and maintenance, and sampling sizes. Addition training classes that COBI offered since the last surveillance audit include the following:

- Observer program challenges and opportunities
- Mexican fisheries and management tools
- Importance of islands and natural areas
- Small pelagic fishery governance

The program has also produced a draft observer manual that details bycatch mitigation and best practices for the fishery, including guidelines for the proper manipulation of rays, sharks, sea turtles, as well as the various strategies that crew members can implement to reduce seabird interactions.

The Manual for Mitigation Measures and Best Practices was published in 2015, and it includes guidelines in manipulation of rays, sharks and sea turtles.

If the fishery is known to interact with ETP species, measures are in place to minimise mortality

**References**

**R2, R10**

| **Links** | |
|---|---|
| **MARINTRUST Standard clause** | 1.3.3.1 |
| **FAO CCRF** | 7.2.2 (d) |
| **GSSI** | D4.04, D.3.08 |

| **F2** | Impacts on Habitats - Minimum Requirements | | |
|---|---|---|---|
| | **F2.1** | Potential habitat interactions are considered in the management decision-making process. | PASS |
| | **F2.2** | There is no substantial evidence that the fishery has a significant negative impact on physical habitats. | PASS |
| | **F2.3** | If the fishery is known to interact with physical habitats, there are measures in place to minimise and mitigate negative impacts. | PASS |
| | | **Clause outcome:** | PASS |

**F2.1 Potential habitat interactions are considered in the management decision-making process.**

The purse seine fleet operates in mid-water between 40-100m depths and generally avoids bottom contact. Contact is intentionally avoided as the small mesh nylon netting is easily damaged. Interviews with fishermen undertaken during the MSC site visit indicated that in the rare event when gear is lost, it is retrieved due to its high monetary value. Abandoned purse seine gear has limited capacity to continue fishing because it achieves full functionality only when used at the surface. There is no documented evidence that purse seining or purse seine fishing elsewhere, even when touching bottom, has had irreversible effects on marine habitats. Currently there is no zoning or depth regulation for the small pelagics purse seine fleet apart from protected areas.

Potential habitat interactions are considered in the management decision-making process.

**F2.2 There is no substantial evidence that the fishery has a significant negative impact on physical habitats.**

The NOM's Section 4.6 establishes INAPESCA's technical measures to manage the fishery. More specifically, this decision-making process allows for the application of technical guidance elements as management measures. Regarding the need for the incorporation of procedural linkages in management measures, the new NOM003 (sections 4.13.5.1 – 4.13.5.5) sets bycatch limits for individual groups of organisms including finfish, crustaceans, mollusks, elasmobranchs, and cnidarias. The NOM also establishes the volume of the fishery's total catch that can be composed of bycatch species (1.00 – 0.20% depending on organism class), minimum size limits for Pacific sardine, thread herring, and other small pelagic species, and the % of their catch that can be under the minimum size. Regarding the need for the fishery to develop a strategy with measures relevant to the main risk to the ecosystem, section 4.13.5.1 of the NOM now sets a bycatch limit for finfish at a maximum of 1.0% per individual trip and an overall annual fishery catch of 0.50%. Furthermore, the new legislation prohibits fishing activity to occur within a radius of 2.5 km around 28 river mouths, coastal and estuary bays, and lagoons located along the Mexican Pacific (4.13.7.1 – 4.13.7.28).

There is no substantial evidence that the fishery has a significant negative impact on physical habitats.

**F2.3 If the fishery is known to interact with physical habitats, there are measures in place to minimise and mitigate negative impacts.**

The NOM-003-PESC-1993 was modified, renamed as NOM-003-SAG-PESC-2018, and was published in the Diario Oficial de la Federación (Official Gazette of the Federation) on March 12, 2019. The main modification of the NOM includes a new version of the fishery's Management Plan, which states that INAPESCA is to conduct the stock assessment, monitor fishing activities, and compute the BAC based on the status of the stock. The results are communicated to stakeholders, fishers, and the management branch of the government (CONAPESCA) and procedures can be agreed to start operations on the base of the limit established with the BAC.

The NOM's Section 4.6 establishes INAPESCA's technical measures to manage the fishery. More specifically, this decision-making process allows for the application of technical guidance elements as management measures.

If the fishery is known to interact with physical habitats, there are measures in place to minimise and mitigate negative impacts.

**References**

**Links**

| | |
|---|---|
| **MARINTRUST Standard clause** | 1.3.3.2 |
| **FAO CCRF** | 6.8 |
| **GSSI** | D.2.07, D.6.07, D3.09 |

| **F3** | **Ecosystem Impacts - Minimum Requirements** | | |
|---|---|---|---|
| | **F3.1** | The broader ecosystem within which the fishery occurs is considered during the management decision-making process. | PASS |
| | **F3.2** | There is no substantial evidence that the fishery has a significant negative impact on the marine ecosystem. | PASS |
| | **F3.3** | If one or more of the species identified during species categorisation plays a key role in the marine ecosystem, additional precaution is included in recommendations relating to the total permissible fishery removals. | PASS |
| | | **Clause outcome:** | PASS |

**F3.1 The broader ecosystem within which the fishery occurs is considered during the management decision-making process.**

Ecosystem interactions relevant to the northern Gulf of California small pelagic fishery include the impacts of the removal of low trophic level fish biomass on the structure and function of the ecosystem. Removing of lower trophic-level species has the potential to impact dynamics and abundance of their predator populations.

Due to changes in time series of catches, different approaches to determine the role of small pelagic species in the ecosystem and information on environmental variability stocks can sometimes be a key Low Trophic Level (LTL) species and other times not. A case in point is the variability in biomass of the Californian anchovy. A stock can sometimes be a key LTL species and some other times would not.

Management systems should have a mechanism to account for these environmentally driven changes such that the status of the stock would be re-evaluated at every surveillance, particularly in terms of the contribution of each LTL species to the total small pelagics catch and prey composition in the diet of predators, particularly sea birds.

The FMP in the assessment area aims to set out actions to develop the fisheries in a sustainable manner based on current knowledge of ecological, environmental, economic, cultural, social and biological aspects of the fisheries. INP and other technical groups must support data collection programs and ecosystem modelling that continues to consider the impact of removal of target stocks on ecosystem functioning. These programs, models and their results will be examined during future assessments of the fishery.

The broader ecosystem within which the fishery occurs is considered during the management decision-making process.

**F3.2 There is no substantial evidence that the fishery has a significant negative impact on the marine ecosystem.**

Information collected by observers has allowed establish that during fishing operations the mortality of birds and marine mammals is very low and, in some seasons, null. There is no impact on the abundance of their populations. Likewise, the treatment of the data indicates that incidental catches in fishing operations are not high.

There is no substantial evidence that the fishery has a significant negative effect on ETP species.

**F3.3 If one or more of the species identified during species categorisation plays a key role in the marine ecosystem, additional precaution is included in recommendations relating to the total permissible fishery removals.**

The 2012 FMP includes short, long-term objectives and management advice associated with research plans and also contains formal consideration of the role of the resource on the maintenance of the ecosystem and requires evidence that these considerations have been incorporated into future harvest control rules.

The control rule for the small pelagic fish in Mexico is well defined in the management plan. The revised NOM (2018) now opens the possibility to communicate and implement scientific advice provided by INP INAPESCA derived from stock assessments.

The revised NOM now states: “The Secretariat may establish periods and closed areas for the capture of smaller pelagics in order to apply dynamic management of the fishery, avoid interaction with other fisheries, as well as contribute to the conservation of other biological resources and the ecosystem’’.

Mechanisms outlined in the revised NOM now allow for elements of the harvest strategy to work together monitoring the status of the stock and react if the ecosystem-based reference points are approached.

If one or more of the species identified during species categorisation plays a key role in the marine ecosystem, additional precaution is included in recommendations relating to the total permissible fishery removals.

**References**

**R2, R10, R19-R21**

| **Links** | |
|---|---|
| **MARINTRUST Standard clause** | 1.3.3.3 |
| **FAO CCRF** | 7.2.2 (d) |
| **GSSI** | D.2.09, D3.10, D.6.09 |

## SOCIAL CRITERION

In addition to the scored criteria listed above, applicants must commit to ensuring that vessels operating in the fishery adhere to internationally recognised guidance on human rights. They must also commit to ensuring there is no use of enforced or unpaid labour in the fleet(s) operating upon the resource.

## Reference


**R1 Atlas** Pesquero de México. Pesquerías Relevantes. https://www.conapesca.sagarpa.gob.mx/work/sites/cona/dgppe/anuarios/Atlas_2004.zip
**R2 MSC** Second Surveillance Audit (Southern Gulf, Thread Herring Fishery (2020) SCS Global Services 70pp https://fisheries.msc.org/en/fisheries/small-pelagics-fishery-in-sonora-gulf-of-california/@@assessments
**R3** Programas SAGARPA: http://www.sagarpa.gob.mx/
**R4** Fisheries Management Plan for the minor pelagic species 2012 (Plan de manejo pesquero para la pesquería de pelágicos menores) http://dof.gob.mx/nota_detalle_popup.php?codigo=5276945
**R5** Instituto nacional de pesca centro regional de investigación pesquera (CRIP_ de guaymas) https://www.gob.mx/inapesca/acciones-y-programas/centro-regional-de-investigacion-pesquera-en-gaymas
**R6 CONAPESCA** https://www.gob.mx/conapesca
**R7 Carta** Nacional Pesquera (2018) Acuerdo por el que se da a conocer la actualización de la Carta Nacional Pesquera. (Continúa en la Tercera Sección). https://www.gob.mx/cms/uploads/attachment/file/334832/DOF_-_CNP_2017.pdf
**R7 INAPESCA** home Page: https://www.gob.mx/inapesca
**R8 Reglamento** de la Ley de Pesca 2014 NOM-003-SAG/PESC-2014 http://dof.gob.mx/nota_detalle.php?codigo=5374148&fecha=04/12/2014

**R9** Reglamento de la Ley de Pesca 2017 https://legalzone.com.mx/reglamento-de-la-ley-de-pesca-2017-mexico/
**R10** Small Pelagics fishery in Sonora, gulf of California: MSC Fishery Assessment Report 2018 SCS Global Services pdf 363pp https://fisheries.msc.org/en/fisheries/small-pelagics-fishery-in-sonora-gulf-of-california/@@assessments
**R11** CANAINPES Cámara Nacional De La Industria Pesquera: http://solunet-infomex.com/mexbdir/company.cfm?company=1633568
**R12 Centro de Operaciones Interinstitutionales COI**
https://www.gob.mx/profepa/prensa/realiza-gobierno-federal-100-operaciones-maritimas-y-40-aereas-en-alto-golfo-de-california-coi
**R13** Fishsource Californian Anchovy Mexico and Central Pacific FAO 77
https://www.fishsource.org/stock_page/1664
**R14 Nevarez**-Martinez et al 2016 Evaluación poblacional de la sardina Monterrey (Sardinops sagax) en el Golfo de California, México, 1971/71 - 2014/2015.
https://swfsc.noaa.gov/uploadedFiles/Divisions/FRD/TriNational_Sardine_Forum/508%20Compliant-%202018%20Trinational%20Program.pd f
**R15** Informe Técnico del Programa de Pelágico Menores. Instituto Nacional de Pesca, CRIP Guaymas, Sonora, 23pp.
**R16 Reglamento** de la Ley de Pesca NOM-003-SAG/PESC-1993
http://extwprlegs1.fao.org/docs/pdf/per2920.pdf
**R17** Reglamento de la Ley de Pesca NOM-003-SAG/PESC- 2018 https://vlex.com.mx/vid/nom-003-sag-pesc-773892697
**R18** Jacob-Cervantes M.L, J. Payán-Alejo and J.R. Rendón-Martínez. 2017a. Evaluación de las poblaciones de sardina Crinuda (Opisthonema libertarte, O. medirastre y O. bulleri) al sur del Golfo de California: Avances. Reporte técnico del Programa de Pelágicos Menores del Sur del Golfo de California. INAPESCA, CRIP. Mazatlán, Sinaloa. pdf 29 pp.
**R19 Global** Grupo de Gestión e Investigación en Ciencias y Tecnologías Marinas, Ambiente, Desarrollo Social y Alimentación, A.C. Observadores técnicos a bordo de la flota mayor de sardina, en el Océano Pacífico y Golfo de California Informe Técnico sobre capturas incidentales y presencia de especies en categoría ETP en la pesquería de pelágicos menores en el Golfo de California. Mazatlán, Sinaloa, febrero de 2019 pdf
**R20** Padilla-Serrato, J.G, et al 'Programa de observadores a bordo de la flota Cerquera en el Golfo de California' INAPESCA-SARGARPA https://www.gob.mx/conapesca/prensa/concluye-capacitacion-de-observadores-a-bordo-de-la-flota-sardinera-para-fortalecer-la-sustentabilidad-de-la-actividad
**R21** Fishbase: California anchovy
https://www.fishbase.se/Summary/SpeciesSummary.php?ID=1664&AT=California
**R22.** Fishbase: Japanese Sardine Red Eye Round Herring Etrumeus teres
http://www.fishbase.org/Summary/SpeciesSummary.php?ID=1455&AT=ROUND+HERRING

# Appendix A - Determining Resilience Ratings

The assessment of Category B species described in this assessment report template utilises a resilience rating system suggested by the American Fisheries Society. This approach was chosen because it is also used by FishBase, and so the resilience ratings for many thousands of species are freely available online. As described by FishBase, the following is the process used to arrive at the resilience ratings:

"*The American Fisheries Society (AFS) has suggested values for several biological parameters that allow classification of a fish population or species into categories of high, medium, low and very low resilience or productivity (Musick 1999). If no reliable estimate of $r_m$ (see below) is available, the assignment is to the lowest category for which any of the available parameters fits. For each of these categories, AFS has suggested thresholds for decline over the longer of 10 years or three generations. If an observed decline measured in biomass or numbers of mature individuals exceeds the indicated threshold value, the population or species is considered vulnerable to extinction unless explicitly shown otherwise. If one sex strongly limits the reproductive capacity of the species or population, then only the decline in the limiting sex should be considered. We decided to restrict the automatic assignment of resilience categories in the Key Facts page to values of K, $t_m$ and $t_{max}$ and those records of fecundity estimates that referred to minimum number of eggs or pups per female per year, assuming that these were equivalent to average fecundity at first maturity (Musick 1999). Note that many small fishes may spawn several times per year (we exclude these for the time being) and large live bearers such as the coelacanth may have gestation periods of more than one year (we corrected fecundity estimates for those cases reported in the literature). Also, we excluded resilience estimates based on $r_m$ (see below) as we are not yet confident with the reliability of the current method for estimating rm. If users have independent $r_m$ or fecundity estimates, they can refer to Table 1 for using this information*."

| Parameter | High | Medium | Low | Very low |
|---|---|---|---|---|
| Threshold | 0.99 | 0.95 | 0.85 | 0.70 |
| $r_{max}$ (1/year) | > 0.5 | 0.16 - 0.50 | 0.05 - 0.15 | < 0.05 |
| K (1/year) | > 0.3 | 0.16 - 0.30 | 0.05 - 0.15 | < 0.05 |
| Fecundity (1/year) | > 10,000 | 100 - 1000 | 10 - 100 | < 10 |
| $t_m$ (years) | < 1 | 2 - 4 | 5 - 10 | > 10 |
| $t_{max}$ (years) | 1 - 3 | 4 - 10 | 11 - 30 | > 30 |

[Taken from the FishBase manual, "Estimation of Life-History Key Facts", http://www.fishbase.us/manual/English/key%20facts.htm#resilience]

# Glossary

**Non-target**: Species for which the gear is not specifically set, although they may have immediate commercial value and be a desirable component of the catch. OECD (1996), Synthesis report for the study on the economic aspects of the management of marine living resources. AGR/FI(96)12

**Target:** In the context of fishery certification, the target catch is the catch of stock under consideration by the unit of certification – i.e. the fish that are being assessed for certification and ecolabelling. (GSSI)

# Appendix

## MarinTrust Fishery Assessment Peer Review Template

This section comprises a summary of the fishery being assessed against version 2 of the MarinTrust Standard.

| | |
|---|---|
| **Fishery under assessment** | Gulf of California small pelagics |
| **Management authority (Country/State)** | Secretariat of Agriculture, Livestock, Rural Development, Fisheries and Food<br>SAGARPA, Mexico |
| **Main species** | Anchoveta *Engraulis mordax*<br>Monterrey (Pacific) sardine *S. sagax*<br>Thread Herring (*Opisthonema* spp) |
| **Fishery location** | Eastern Central Pacific FAO 77: Baja California, México |
| **Gear type(s)** | Purse Seine |
| **Overall recommendation. (Approve/ Fail)** | Approve |

| **Summary: in this section, provide any additional information about the fishery that the reviewers feel is significant to their decision.** |
|---|
| The fishery assessment provides a reasonable evaluation of the fishery following the recognised methods for the standard and gives evidence for the scorings made. Whilst further evidence could be provided to meet all the guidance points, this assessment combined with the MSC assessment gives confidence this fishery passes the criteria.<br><br>Whilst there are no quotas set for these fisheries there is a minimum landing size for important species including thread herring; and fleet capacity and fishing area are both regulated. As such it is important to ensure that |

minimum landing sizes are not exceeded. However, it is noted that stock levels have been stable or increasing, indicating the fishery is not being overfished.

The following comments are of note:

1. There are no details presented regarding the species categorisation rationale.
2. The small pelagic fishery is reported to systematically exceed the allowable proportion of undersized fish in the catch. This is documented to be being addressed through modification of the NOM (2018) – is there evidence of the percentages allowed below this size being modified according to the technical opinion of INP? Is there evidence of any management actions (eg seasonal/area closures) being implemented when increased levels of undersized fish are reported?
3. Was the observer program in 2016 only for one year? The fact this data has still not been published may be an indication of a lack of transparency. The assessment report details the Client Action Plan, CANAINPES, INAPESCA and the COBI observer program (from 2011) –the scale of this observer coverage is detailed in section F and should be referenced also in section 2 (did they report any infringements?) - is the observer data publicly available? Is data available on number of by-catch incidents (by species) and whether released alive or a mortality?
4. "Kobe diagrams presented during the previous MSC Surveillance audit indicates that the thread herring and sardine populations are in a healthy condition and the fishing effort has been below the recommended maximum, therefore, overfishing does not occur". Could these diagrams be included in this report for ease of reference?
5. Could details on the exact ETPS species which interact with this fishery be provided (and their protected status)? Any evidence of the stock status of these species and whether they are increasing or in decline?
6. Is there any evidence of vessel crew having on board, and utilising, by-catch mitigation measures – is this included as mandatory in the fishing license or in legislation?
7. Is there evidence of what data collection programs and ecosystem modelling that INP and other technical groups conduct in order to consider the impact of removal of target stocks on ecosystem functioning?

| General Comments on the Draft Report provided to the peer reviewer |
|---|
| An internal review of the assessment could be conducted in future to help validate the accuracy of the assessment decision.<br>Important evidence detailed within the MSC surveillance audit could be included in this report for ease of reference to identify clearly that the fishery meets all the criteria and points within the guidance notes. Some of the details for individual criteria is not presented as per the guidance notes for that criteria but is available in later sections in the assessment report.<br><br>Species categorisation updated, Kobe diagram added, and information on ETP as well. |

## Summary of Peer Review Outcomes

*Text in blue are responses from the peer reviewer to the CB

Peer reviewers should review the fishery assessment report with the primary objective of answering the key questions listed in the table below. Where the situation is more complicated, reviewers may instead answer "See Notes".

| | YES | NO | See Notes |
|---|---|---|---|
| **A – Fishery Assessment** | | | |
| | | | |

| | | | |
|---|---|---|---|
| 1. Has the fishery assessment been fully completed, using the recognised MarinTrust fishery assessment methodology and associated guidance? | Yes | | |
| 2. Does the Species Categorisation section of the report reflect the best current understanding of the catch composition of the fishery? | Yes | | |
| 3. Are the scores in the following sections accurate (i.e. do the scores reflect the evidence provided)? | Yes | | |
| Section M - Management | Yes | | |
| Category A Species | Yes | | |
| Category B Species | Yes | | |
| Category C Species | N/A | | |
| Category D Species | N/A | | |
| Section F – Further Impacts | Yes | | |
| | | | |

## Detailed Peer Review Justification

Peer reviewers should provide support for their answers in the boxes provided, by referring to specific scoring issues and any relevant documentation as appropriate.

Detailed justifications are only required where answers given are one of the 'No' options. In other (Yes) cases, either confirm 'scoring agreed' or identify any places where weak rationales could be strengthened (without any implications for the scores).

Boxes may be extended if more space is required.

| 1. Is the scoring of the fishery consistent with the MarinTrust standard, and clearly based on the evidence presented in the assessment report? |
|---|
| The scoring is consistent with the MT standard and the appropriate evidence is provided within the assessment report, and notwithstanding the remarks in this peer review report (see each section below and summary). |
| Certification body response |
| |

| 2. Has the fishery assessment been fully completed, using the recognised MARINTRUST fishery assessment methodology and associated guidance? |
|---|
| The fishery assessment has been completed following the MARINTRUST methodology, though some criteria (as detailed below) could have more evidence provided as per guidance notes.<br>The assessment determination section could include a statement on research, control and enforcement and the impacts of the fishery on ETP species and wider ecosystem as per the guidance.<br><br>Whilst the fishery has been MSC assessed it would provide extra transparency and confidence if it had been internally reviewed. |
| Certification body response |
| |

| |
|---|

| 3. Does the Species Categorisation section of the report reflect the best current understanding of the catch composition of the fishery? |
|---|
| The species categorisation section (see Table 4) indicates the majority of the catch composition is Monterrey (Pacific) sardine, with Thread Herring and Anchoveta landings both reaching 20%. There are no details presented regarding the species categorisation rationale.<br><br>Table 4 has been updated to include species categorisation and reference to the source of data. Thank you. |
| Certification body response |
| |

| 3M. Are the scores in "Section M – Management" clearly justified? | |
|---|---|
| The scores in this section would benefit from further evidence being provided by the assessor.<br><br>Comments:<br>Is there evidence of SAGARPA's responsibility in terms of MCS?<br>Is there evidence of the fishery management organisation (SAGARPAs) commitment to the precautionary approach?<br>The assessor provides the following statement in evidence of the fishery management organisation commitment to sustainability "SAGARPA's mission statement also includes a commitment to "facilitate the competitive and sustainable development of fisheries and aquaculture sector in the country in order to increase the welfare of Mexicans''. However, this statement implies the focus is on social and economic growth of the sector – is there any other evidence that they are committed to maintaining the health of the stocks and protecting the wider ecosystem?<br>Is there evidence (eg minutes of meetings of advisory, consultation groups) of documented formal communication with fishery stakeholders?<br><br>The assessor provides good details on the total infringements. Are there any reports of repeat offences within this?<br>Was the observer program in 2016 only for one year? The fact this data has still not been published may indicate a lack of transparency. The Client Action Plan, CANAINPES, INAPESCA and the COBI observer program referred to in the report (from 2011) – the scale of this observer coverage is detailed in section F and should be referenced also here under section M2 (did they report any infringements?) - is the observer data publicly available?<br><br>CB Comments accepted based on evidence available the recent MSC surveillance report. | |
| Certification body response | |
| The small pelagics management plan is consistent with the concept of the precautionary approach (DOF, 8th November 2012, page 12), with agreement with the FAO Code of Conduct for the Responsible Fisheries which Mexico promoted and signed.<br><br>Most of the information generated from the MSC Public Certification Report and the Surveillance reports. Hence all the rationale and the justification provided assumed already check by the previous auditors | |

| 3A. Are the "Category A Species" scores clearly justified? |
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| The scores in this section are accurate with additional evidence available in the MSC certification which justifies the final scores.<br><br>Comments:<br><br>For sardine criteria A1.1 the assessor does not document the fishery or fishery-independent data collected (presented in A2.1).<br><br>The assessor provides evidence of fishery dependent data for threadfin herring – evidence of fishery independent data and other research on the fishery is provided in sardine section A2 (and the MSC assessment) and could be detailed here for ease of reference.<br><br>The assessor could present the Kobe diagrams here to demonstrate the fishery is not being overfished.<br><br>The assessor states relating to sardine "Total fishery removals of this species do not regularly exceed the level indicated" – is there evidence how regularly this does occur and management actions then implemented when it does?<br><br>Is there evidence that restrictions on vessel movements between zones have been implemented previously or other management actions enacted if stock levels fall below reference point?<br><br>CB comments accepted and supported by the review of Conditions documented in the MSC Surveillance Audit Report, for 'SMALL PELAGICS FISHERY IN SONORA, GULF OF CALIFORNIA Second Surveillance Audit Report, SCS October 5th 2020. |
| Certification body response |
| In the Small Pelagics Management Plan (not yet published), INAPESCA will notify CONAPESCA and the Client, in case the BAC of the corresponding year has been reached, through a Technical Opinion that Management actions should be taken to limit, reduce or cease fishing for bocona and/or mackerel, thus ensuring that the fishery does not pose a risk to the population of these two species. |

| 3B. Are the "Category B Species" scores clearly justified? |
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| The scores in this section are accurate if biomass is above MSY/target reference point as assessor states – can evidence of this be provided?<br><br>Comments:<br>Could the assessor provide an explanation of the table used and the evidence applied?<br>CB additions into the report accepted. Updated for Bocona sardine *Cetengraulis mysticetus* |
| Certification body response |
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| 3C. Are the "Category C Species" scores clearly justified? |
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| No Category C species were identified. |

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| Certification body response |
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| 3D. Are the "Category D Species" scores clearly justified? |
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| No Category D species were identified.<br>CB additions accepted. Based on species categorisation; Japanese sardine and Leatherjackets assessed under Cat. D |
| Certification body response |
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| 3F. Are the scores in "Section F – Further Impacts" clearly justified? |
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| The scores in this section are justified by the assessor with details on the scale of the observer program – is there more evidence of their findings?<br><br>Comments:<br>Is data available on number of by-catch incidents (by species) and mortality rates available?<br>Could details on the exact ETPS species which interact with this fishery be provided (and their protected status)?<br>Is there any evidence of stock status of ETP species over time (increase/decrease)?<br>Is there any evidence of vessel crew having on board and utilising by-catch mitigation measures – is this included as mandatory in the fishing licence or in legislation? E.G is there and evidence of mitigation measures e.g. seal scaring devices, escape panels, bird scaring lines and net cleaning between hauls to reduce bycatch?<br><br>Is there evidence of what data collection programs and ecosystem modelling that INP and other technical groups conduct in order to consider the impact of removal of target stocks on ecosystem functioning?<br><br>Is there any evidence of closed areas or seasons being implemented for the conservation benefit of other biological resources or the ecosystem?<br><br>CB additions in the report accepted. Summary of ETP interaction data for the 2019-2020 season now included. Statement that observer data demonstrates negligible amount of catch. Also, citing of the The Manual for Mitigation Measures and Best Practices. Also referring to information on the revised NOM regarding If one or more of the species identified during species categorisation plays a key role in the marine ecosystem, additional precaution is included in recommendations relating to the total permissible fishery removals. |
| Certification body response |
| ETP information being update |

| Optional: General comments on the Peer Review Draft Report |
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The fishery meets the standards and has been correctly reviewed by the assessor, although additional evidence could be provided in some sections, or repeated for clarity where it has been mentioned in other sections. Good references provided including the MSC assessment. The overall target stock status are stable or increasing, indicating the fishery is not being overfished. Whilst improved management in the fishery regarding undersized fish catches, ETP and the broader ecosystem could be implemented, there is confidence in the assessment report evidence and outcome.

The peer review and CB response process could be facilitated by either track changes of colour coding of amendments and additions or a summary in each case on the Peer Review Template 'Certification body response' section of this report. Where the CB makes no additions or amendments a statement of 'no amendments/additions considered necessary' and short summary to confirm the reason why no additions are considered necessary could also be considered.

| Certification body response |
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