Marine Stewardship Council (MSC) Pre-assessment Report

Mexico Gulf of California Sinaloa clam (diving & hand gathered) fishery

On behalf of

Chocolata and chirla clam FIP stakeholders
Del Pacifico Seafood
Environmental Defense Fund de México
Pronatura Noroeste A.C.

Prepared by

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Glossary

Acronym	Definition
CONAPESCA	Comisión Nacional de Acuacultura y Pesca
DOF	Diario Oficial de la Federación
EDF	Environmental Defense Fund
EEZ	Exclusive Economic Zone
ETP	Endangered, Threatened, or Protected (species)
FCP	Fisheries Certification Process
HCR	Harvest Control Rule
INAPESCA	Instituto Nacional de la Pesca
IUU	Illegal, Unreported, and Unregulated (fishing)
LGPAS	Ley General de Pesca y Acuacultura Sustentables
MSC	Marine Stewardship Council
PSA	Productivity Susceptibility Analysis
RBF	Risk Based Framework
SADER	Secretaria de Agricultura y Desarrollo Rural
SAGARPA	Secretaria de Agricultura, Ganadería, Desarrollo Rural, Pesca y Alimentación
SEMARNAT	Secretaria de Medio Ambiente y Recursos Naturales
SG	Scoring Guidepost
SI	Scoring Indicator
UNCLOS	United Nations Convention on the Law of the Seas
UoA	Unit of Assessment
VME	Vulnerable Marine Ecosystem

1 Executive Summary

This report outlines the Marine Stewardship Council (MSC) Pre-assessment conducted for the chocolata and chirla clam FIP stakeholders on the hand gathered chocolata clam (*Magapitaria squalida)* and chirla clam (*Chione californiensis)* fishery in the Altata-Ensenada del Pabellon lagoon system.

This pre-assessment was undertaken against the default MSC Assessment tree, with the Risk-Based Framework (RBF) being used to score the "Stock Status" Performance Indicator, as there is no formal stock assessment for either target stock, and neither of the target species stocks are managed against reference points. No site visit was undertaken for this pre-assessment, so the findings reflect the documentation sent to the assessment team by the Environmental Defense Fund team, and a review of the publicly available literature online. This pre-assessment serves as an update from a previous pre-assessment conducted by SCS Global Services (Anhalzer et al., 2018). With the application of the precautionary approach, and the new information available to the team, some changes to the scoring of this fishery were required, as detailed in the scoring tables.

The fishery currently failing against all three Principles of the MSC Standard. For Principle 1, the stock status of the target stocks has not yet been analytically determined against reference points. The chocolata clam stock is believed to be in an overfished state by the local authorities, as the fishery has been closed. While the status of the chirla is likely to be more favourable (demonstrated by a higher RBF output score), the chocolata clam UoA currently fails PI1.1.1 (Stock Status). Another Principle 1 issue identified is the lack of standardized data collection down to species level, meaning that tailored harvest control rules cannot be set.

For Principle 2, the UoAs perform generally well across most outcome PIs (due to the fact that the fishery is conducted by hand and as a result is highly selective), but also would fail the principle with the average score likely being under the required score of 80. While the UoAs are believed to be low impact, the limited information base on the impact of the fishery on wider ecosystem elements is a weakness in Principle 2.

For Principle 3, a key strength is the formalised and detailed national fisheries management framework, as well as the inclination of local stakeholders, especially fishers to continually improve the management of fisheries in the region. A major weakness is the insufficient monitoring, control, and enforcement in the areas fished. While evidence of an inspection is available, there is no indication that this represents a deterrent to illegal fishing practices. Aside from this, the team has seen no indication that there is a regular review of the management strategy in place for these fisheries.

Despite this, the fishery is showing signs of improving, with the newly formalised Consultative Management Committee for the Altata-Ensenada del Pabellon lagoon system indicating that fisheries management is being strengthened.

2 Report Details

2.1 Aims and constraints of the pre-assessment

A pre-assessment does not attempt to duplicate a full assessment against the MSC Fisheries Standard. A full assessment involves a group of assessment team members and public consultations stages that are not included in a pre-assessment. A pre-assessment provides a provisional assessment based on a limited set of information provided by the client.

The aims of this pre-assessment are to provide an indication of the performance of the UoAs against the MSC Standard, and to update the previous pre-assessment conducted in 2018 by SCS Global Services. Constraints include the inability to conduct a site visit due to the ongoing COVID-19 pandemic, and the relative scarcity of information on the target species in publicly available literature.

2.2 Version details

Table 1. Fisheries programme documents versions

Document	Version number
MSC Fisheries Certification Process	Version 2.2
MSC Fisheries Standard	Version 2.01
MSC General Certification Requirements	Version 2.4.1
MSC Pre-Assessment Reporting Template	Version 3.2

2.3 Full Assessment Process

The full MSC assessment is a multiple-step process to determine whether a fishery meets the MSC standard. CU UK and its expert assessment team would lead the process. It involves consulting with stakeholders, scoring the fishery against a set of performance indicators and scoring guideposts, identifying ways that the fishery can strengthen its performance (if needed), peer review and making a final determination about whether the fishery meets the MSC standard. This is an intensive process that calls for a high level of information to be provided by the fishery and others and also calls for a significant level of involvement by the fishery client.

Please note as of 28th September 2020 the MSC Fisheries Certification Process (FCP 2.2) comes into force. The following steps form the MSC full assessment process (as per Version 2.2 of the Fisheries Certification Process):

Confirmation of scope (determining the fishery is eligible for MSC assessment and confirming the units of assessment (UoA) and units of certification (UoC) to be put forward for assessment).

- Agreement of contract
- A client signed copy of 'Certificate Holder Forced and Child Labour Policies, Practices and Measures'.
- Return of the Client Document Checklist, as completed by the client
- Assessment team write and present to client the Announcement Comment Draft Report (ACDR).

- Client decides whether to proceed with MSC full assessment
- Announcement of Fishery Assessment. Here the fishery is announced as going forward for assessment. At the same time the CAB is required to:
    - Publish the Announcement Comment Draft Report (ACDR)
    - Provide the names and CVs of the assessment team
    - Announce the use of the default assessment tree (if to be used) and application of Risk-Based Framework (RBF), where necessary and identify inseparable or practicably inseparable catches (IPI).
    - Inform stakeholders
    - Indicative timeline of the assessment
    - Announce the date and location of the proposed site visit(s)
    - Submit to the MSC, the MSC Notification Report Form (outlining the fishery details)
    - Submit to the MSC the returned Client Document Checklist
    - Allow for a period of at least sixty (60) days before the site visit for stakeholder responses.
    - Notify the MSC Peer Review college.
    - Send Pre-assessment Report to MSC
- Site visit, to include stakeholder meetings and data confirmation.
- Scoring of the performance indicators and drafting of the Client and Peer Review Draft Report
- Selection and approval of peer reviewers from the MSC Peer Review College
- Peer Review Draft Report sent to Peer Reviewers and Client Draft Report sent to client
- Review of Client Draft Report and Peer Review Draft Report (maximum 60 calendar days) including:
    - Preparation of Client Action Plan by client, if required
- Incorporation of Peer review comments, as required, and subsequent production of Public Comment Draft Report
- Publication of Public Comment Draft Report on MSC website and its review by stakeholders and MSC (30 calendar days)
- Response to stakeholder comments; revision of report as required
- Peer Reviewers notified for additional review
- Certification determination and publication of the Final Report
- Stakeholders given opportunity to object to the certification determination (15 working days)
- Objection procedure and consultation with stakeholders, if necessary

- Certification and publication of Public Certification Report – assuming a successful certification outcome

A certificate lasts for 5 years from date of issuance, during which time it is subject to annual surveillance audits to ensure continuing compliance with all MSC Certification Requirements and to evaluate progress against any conditions of certification. These annual surveillance audits will vary between the requirement for a full on-site audit, off-site audit or review of information, dependent on the risk as assessed during the previous audit by the CAB.

When the certificate is due to expire, a reassessment against the MSC Certification Requirements is required to ensure on-going certification beyond the original certificate expiry date. This reassessment may constitute a full reassessment (same process as followed for initial certification) or a reduced reassessment. The reduced reassessment allows for fisheries which meet set criteria to have a 'reduced' audit with only one team member required to go on-site during the process and only one peer reviewer required to review the reassessment peer review report.

Prior to applying for full assessment for any of the UoAs within this assessment, the client should:

- Inform CU UK of any actions undertaken following this pre-assessment to address the conclusion of this report.
- Report on any new issues that may be a barrier to certification.
- Report on any communications that may need to take place with management agencies, environment groups, post-harvest sectors, relevant commercial and non- commercial fishing groups to explain the MSC assessment process and the implications (including costs and benefits) of certification.
- Ensure the completion of the Client Document Checklist, identifying the type and extent of data and information available for a full assessment.
- Be willing to signed a copy of 'Certificate Holder Forced and Child Labour Policies, Practices and Measures'.
- Indicate whether the client would like to receive the optional MSC training material on the fishery assessment process for clients.

3 Unit(s) of Assessment and Certification

3.1 Unit(s) of Assessment (UoA)

CU UK confirms that the fishery under assessment is within the scope of the MSC Fisheries Standard (7.4 of the MSC Fisheries Certification Process v2.2):

- The target species is not an amphibian, reptile, bird or mammal;
- The fishery does not use poisons or explosives;
- The fishery is not conducted under a controversial unilateral exemption to an international agreement;
- The client or client group does not include an entity that has been successfully prosecuted for a forced or child labour violation in the last 2 years;
- Has the client or client group been successfully prosecuted for shark finning in the last 2 years;
- The fishery has in place a mechanism for resolving disputes, and disputes do not overwhelm the fishery;
- The fishery is not an enhanced fishery as per the MSC FCP 7.4.6; and
- The fishery is not an introduced species-based fishery as per the MSC FCP 7.4.7.

The proposed Units of Assessment (UoA) is given in Table 2.

Table 2. Unit of Assessment (UoA) 1

Species	Chocolata clam (*Magapitaria squalida*)
Stock	Sinaloa chocolata clam stock
Fishing gear type(s) and if relevant, vessel type(s)	Hand gathered (freediving and on foot)
Client group	Permit holders/cooperatives with permits to capture chocolata clam located in the port of Altata, Sinaloa.
Other eligible fishers	None at the time of writing
Geographical area	Altata-Ensenada del Pabellon coastal lagoon system
Justification for choosing the Unit of Assessment	Client request

Table 3. Unit of Assessment (UoA) 2

Species	Chirla clam (*Chione californiensis*)
Stock	Sinaloa chirla clam stock
Fishing gear type(s) and if relevant, vessel type(s)	Hand gathered (freediving and on foot)

Client group	Permit holders/cooperatives with permits to capture chirla clam located in the port of Altata, Sinaloa.
Other eligible fishers	None at the time of writing
Geographical area	Altata-Ensenada del Pabellon coastal lagoon system
Justification for choosing the Unit of Assessment	Client request

4 Pre-assessment results

4.1 Pre-assessment results overview

Overall, the fishery fails to meet the MSC Standard across all three principles. In Principle 1, one of the target stocks is deemed to be in a poor state, as the fishery has been shut down, however, the stock has not been assessed in recent years and its status is currently unknown. Another critical issue is the general lack of standardized data collection in the fishery, which prohibits tailored harvest control rules and strategies with a quantitative basis for the target stocks.

For Principle 2, the fishery performs well against certain criteria, namely the Primary, Secondary and ETP species PIs due to the extreme selectivity of the fishery, which is owed to the collection method. Though the general lack of information on the wider ecosystem components are a significant barrier to attaining higher scores.

For Principle 3, the strengths lie in the strong national fisheries management framework, and the apparent willingness of local stakeholders, including fishers, to strengthen the management of their fisheries resources. The key weaknesses are the lack of monitoring, control, and enforcement in the region, which has been cited as a potential reason for the proliferation of fishing effort and subsequent decrease of the chocolata clam stock. Beyond this, the team was not able to find any evidence of regular management strategy evaluation of the fishery specific management framework, though recent work in the form of a Consultative Management Committee that improvements are being made here.

4.2 Summary of potential conditions by Principle

Table 4. Summary of potential conditions by Principle

Principle	Number of PIs with draft scoring ranges <60
Principle 1 – Target Species	2
Principle 2 – Ecosystem Impacts	1
Principle 3 – Management System	3

4.3 Summary of Performance Indicator level score

Table 5. Summary of performance Indicator level scores

Performance Indicator	Draft scoring range	Data deficient?
1.1.1 – Stock status	**<60 – Chocolata clam**	**Yes**
	≥80 – Chirla clam	**Yes**
Rationale or key points		
RBF used to derive the score for the two target species – the chocolata clam outputs indicate a high risk. With additional input from the client group, the PSA-derived score for chirla clam yielded a low risk score.		
1.1.2 – Stock rebuilding	**N/A – RBF used in 1.1.1**	
Rationale or key points		
RBF was used to score P1.1.1		
1.2.1 – Harvest Strategy	**60-79**	**No**
Rationale or key points		
There is a harvest strategy, but it is not responsive to the state of the stock. There are several management measures including quotas, minimum sizes and closed seasons to regulate the fishery and some data collection.		

1.2.2 – Harvest control rules and tools	**60-79**	Yes
Rationale or key points		
There is a generally understood harvest control rule (HCR) and some evidence that exploitation is being limited.		
1.2.3 – Information and monitoring	**<60**	Yes
Rationale or key points		
Although there is one stock abundance index, regular monitoring of the stocks is unclear.		
1.2.4 – Assessment of stock status	**≥80**	Yes
Rationale or key points		
Default score as RBF was used to score PI 1.1.1.		
2.1.1 – Primary Outcome	**≥80**	**Yes**
Rationale or key points		
Due to the selectivity of the UoAs, there are no primary species in the catch.		
2.1.2 – Primary Management	**≥80**	**Yes**
Rationale or key points		

The fishing strategy itself provides for no primary species in the catch.		
2.1.3 – Primary Information	**≥80**	**Yes**
Rationale or key points		
The fishing strategy itself provides for no primary species in the catch.		
2.2.1 – Secondary Outcome	**≥80**	**Yes**
Rationale or key points		
Due to the nature of the UoAs, there are no main secondary species in the catch.		
2.2.2 – Secondary Management	**≥80**	**Yes**
Rationale or key points		
The fishing strategy itself provides for no main secondary species in the catch.		
2.2.3 – Secondary Information	**≥80**	**Yes**
Rationale or key points		
Available research provides information on interactions with secondary species.		
2.3.1 – ETP Outcome	**60 – 79**	**Yes**

Rationale or key points		
Indirect effects of the UoAs are unknown. For example, there are no studies of the impact of reduced clam availability for the migratory waterbirds community of the area that may prey on them.		
2.3.2 – ETP Management	**≥80**	**Yes**
Rationale or key points		
The fishery is managed by several measures such as closed areas, specific licences, minimum sizes but also trough catch limits. These measures constitute a strategy, and all contribute to limit its exploitation. The fishery also does not directly affect ETP species.		
2.3.3 – ETP Information	**60 – 79**	**Yes**
Rationale or key points		
Catch information is not available at species level and thus not adequate to measure trends, while there is uncertainty of what species may be encountered at chocolata clam beds.		
2.4.1 – Habitats Outcome	**≥80**	**Yes**
Rationale or key points		
The light nature of the gear does not create irreversible impacts on benthic habitats.		
2.4.2 – Habitats Management	**≥80**	**Yes**

Rationale or key points		
Fishing by handpicking either on foot or by diving is confined to specific authorized beds. The nature of the fishing practice serves to justify that the UoA achieve the Habitat Outcome 80 level of performance or above. There is also a general management plan for the ecosystem in the Altata y Ensenada del Pabellòn lagoon system.		
2.4.3 – Habitats Information	**60-79**	**Yes**
Rationale or key points		
Information provided by the habitat maps and recent research are enough to broadly understand the nature of the main impacts of the gear on main habitats, including spatial overlap of habitat with fishing activity. However, the level of interaction is uncertain as there is no information of habitats at a finer scale comparable to the fishery.		
2.5.1 – Ecosystems Outcome	**60-79**	**Yes**
Rationale or key points		
The low impact nature of the fishing practice and the limited interaction with non-targeted species seems to support that the UoAs unlikely to disrupt the key elements underlying ecosystem structure and function.		
2.5.2 – Ecosystems Management	**≥80**	**Yes**
Rationale or key points		
The fact that the UoAs do not interact with primary, secondary or ETP species, constitutes some objective basis for confidence that the management strategy measures will work and are implemented. There is also no ecosystem function study available that provides details for example of the food web and predator-prey interactions in the Altata y Ensenada del Pabellòn lagoon system.		
2.5.3 – Ecosystems Information	**60-79**	**Yes**

Rationale or key points		
There is information available regarding the main key elements of the Altata y Ensenada del Pabellòn lagoon system but not how they interact. The UoAs impacts on primary, secondary and ETP species can be inferred based on existing information. However there is no information on the impact of the UoAs on the food web and on VMEs.		
3.1.1 – Legal and customary framework	**≥80**	**No**
Rationale or key points		
Since the previous pre-assessment there have been no changes to this Performance Indicator.		
3.1.2 – Consultation, roles and responsibilities	**60 – 79**	**No**
Rationale or key points		
The role and responsibilities of key components of the management framework are well understood and are defined in the LGPAS for bodies such as CONAPESCA, INAPESCA, SEMARNAT, and SAGARPA (amongst others). It is likely that the COVID-19 pandemic has been a significant barrier to the effective progress of these committees, but nevertheless, the team has not been presented with a consultation progress that regularly seeks and obtains relevant information, so SG80 is not met.		
3.1.3 – Long term objectives	**≥80**	**No**
Rationale or key points		
The scoring and rationale of the original pre-assessment still stands. The objectives set out in the LGPAS clearly are in line with the MSC Principles and Criteria and the precautionary approach. These objectives are explicit and meet the SG100 requirements. SG60, SG80, and SG100 are met.		
3.2.1 – Fishery specific objectives	**≥80**	**No**

Rationale or key points		
These objectives are embedded in the fishery specific management system and cover many topics, from social equity, to security, and the outcomes expressed in Principle 1 and Principle 2 of the MSC Standard. Beyond these objectives, a workplan has been developed for molluscs, including both UoA target species. This plan lists clear actions, to achieve well defined objectives across a period of three years.		
3.2.2 – Decision making processes	**60 – 79**	**Yes**
Rationale or key points		
As for the approach to disputes, there is no evidence indicating that the fishery or management authority is acting in defiance of any laws pertaining to the sustainability of the fishery. SG60 is met. The team is not aware of how the fishery/management authority responds to judicial decisions – further information should be sought on this. SG80 not met.		
3.2.3 – Compliance and enforcement	**<60**	**No**
Rationale or key points		
Though there are thought to be checks on whether or not fishers carry the appropriate licence, this alone cannot be considered "mechanisms" as stated in the SG60 guidepost, further, this measure in isolation cannot be considered effective in ensuring the conditions of the licence are met. SG60 not met. The team has also not seen any evidence that sanctions are applied in cases of non-compliance.		
3.2.4 – Management performance evaluation	**<60**	**No**
Rationale or key points		

No active mechanisms to evaluate the fishery specific management system can be discerned. An official management Committee was recently installed by CONAPESCA, whose purpose is (amongst others) the review of management strategies for resources of the lagoon system. There is no current evidence of any reviews being undertaken at the time of writing however, so a higher score cannot be awarded until there is evidence of these reviews taking place.

5 Fishery Overview

This pre-assessment report serves as an update of the previous pre-assessment (Anhalzer et al., 2018). The main difference in this pre-assessment, aside from the update, is the addition of the chirla clam (*Chione californiensis*) as one of the target species. The chirla clam has become a commercially important species in the Altata-Ensenada del Pabellon lagoon system in part due to increased fishing pressure on this species after the decline of the chocolata clam stock.

Fishing is carried out by hand (see figure below), occasionally with the use of a metal tool in waters ranging from 0-30m deep. This fishing method is used for targeting both clam species, though different banks are fished, though it is noted that chirla clams are often found in the same banks as chocolata clams.

Figure 1. From left to right: chocolata clams; fishers gathering clams (source: Figueroa et al., 2016).

5.1.1 Catch profiles and data availability

See Section 6.1.2.

6 Traceability and eligibility

6.1 Traceability within the fishery

Traceability considerations have not been included in this Pre-assessment.

7 Principle 1

7.1.1 Biology and ecology

Chocolata clam (*Megapitaria squalida*)

Chocolata clam is a sediment-burrowing filter-feeder distributed in the Eastern Pacific: from the Ojo de Liebre lagoon, Baja California, Mexico to Mancora, Peru (SeaLifeBase, 2021) including in the Bay of Zihuatanejo, the adjacent coasts, and Ixtapa Island, Guerrero, Mexico (Stuardo et al., 1974). Individuals are located near the coastline on sandy or muddy bottoms, at depths of 1 m to 20 m and offshore up to 120 m.

The following text is based on Anhalzer et al. (2018). *The reproductive cycle varies with the geographic location, according to the species' specific phenotypic response to the particular environmental conditions in each location (mainly water temperature and food availability (Arellano et al, 2006). In the Altata lagoon there is spawning activity throughout the year, with two peaks: a first one in October and a second one in February with a resting period in December. The most important spawning period (maximum amount of released gametes) was October-November (Álvarez-Dagnino et al., 2017). However, the reproductive activity of the chocolata clam was not significantly correlated with water temperature. Fecundity is high, an adult individual can produce up to 8 million of eggs (Tirado et al 2016).*

Table 6. Species biological attributes for chocolata clam (Schweers et al., 2006; Anhalzer et al., 2018; SeaLifeBase, 2021).

Species biological attributes			
Species	*Megapitaria squalida*	**Average age maturity**	1.2-2.2 years
Reproductive strategy	Broadcast spawner	**Average maximum age**	10 years
Length of larvae phase		**Fecundity (No of eggs)**	8 million eggs/ind
Movement of adults	Shore to deeper waters	**Average size at maturity**	64.5-92 mm
Sediment type	Muddy-sandy	**Average maximum size**	130 mm
Depth	0-160 m	**Trophic level**	

Chirla clam (*Chione californiensis*)

The chirla clam (or Californian venus) is also a sediment-burrowing filter-feeder distributed in the Eastern Pacific: from Strait of Georgia, Canada to Bahia Magdalena, Baja California, Mexico and to Mancora, Peru (Licona-Chávez et al., 2007, SeaLifeBase, 2021). It is found on muddy-sandy bottoms, however, it may be more abundant on sandy-silt and sandy bottoms (Ortiz-Arellano, 2005). They can reach their first maturity at 32.7 mm, however, there are records of mature organisms from 20.2 mm (Camacho-Evans, 2011; Romero-Leyva, 2015).

Table 7. Species biological attributes for chirla clam (SeaLifeBase, 2021).

Species biological attributes			
Species	*Chione californiensis*	**Average age maturity**	**1-2 yr**
Reproductive strategy	Broadcast spawner	**Average maximum age**	**3-4 yr**
Length of larvae phase		**Fecundity (No of eggs)**	**2 million**
Movement of adults		**Average size at maturity**	32.7 mm
Sediment type	Muddy-sandy	**Average maximum size**	74 mm
Depth	0-69 m	**Trophic level**	

7.1.2 Catch and landings

Catches for chocolata clam have decreased considerably since its peak in 2005 (around 225 t) to 3 tons in 2014, following what was considered a significant decrease in stock abundance and consequent restocking (Anhalzer et al. 2018). While the decrease in landings was attributed to a decrease in stock abundance, it is likely that the voluntary ban on targeting chocolata clam would also influence the landings figures. It is worth noting that the fishing ban was only partially enforced. Total catches for clams however show a peak in 2009 and again in 2017 reaching around 1600 tons, but have decreased significantly in 2018 to around 500 tons.

Figure 2 – Reported landings (tonnes) of chocolata clam in Altata-Pabellones lagoon between 2000-2016 (mean of the time series in line; Anhalzer et al. 2018).

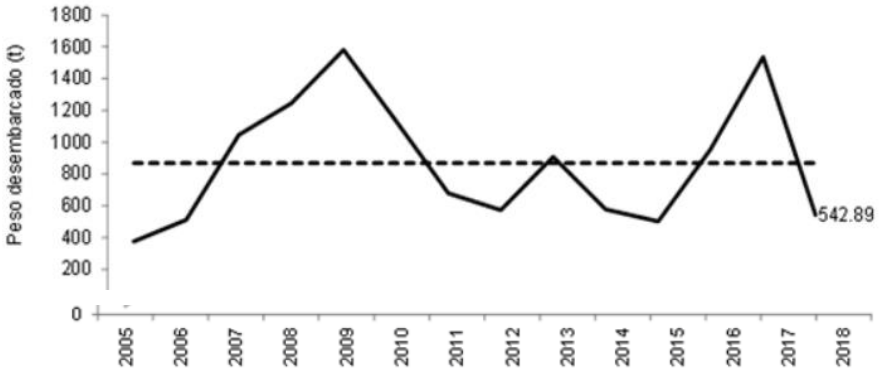

Figure 3 – Total reported landings of clams (tonnes) in Altata-Ensenada del Pabellón between 2005-2018 (mean of the time series in broken line) (DOF: 24/9/2019).

7.1.3 Stock identification

There is no information available regarding stock structure of both species in the Altata y Ensenada del Pabellòn lagoon system. According to Anhalzer et al. (2018) several authors consider that it is probable that the chocolata clam population inside the Altata-Pabellones lagoon can be considered as one subpopulation with relevant migration within a broader metapopulation, although the connectivity between populations is unknown. The authors also refer to a genetic study where there was indication for a single population in the coasts of Sinaloa. Without clear information the assessment team decided, for the purpose of this pre-assessment and following Anhalzer et al. (2018), to consider the Altata y Ensenada del Pabellòn lagoon system as each species stock unit. However, this stock unit division needs to be investigated further in a full assessment.

7.1.4 Stock Status and Assessment

A first attempt to estimate exploitation rates for both species in the Altata y Ensenada del Pabellòn lagoon system was carried out by Camacho-Evans (2011) and Madrid-Vera (2015) for chocolata clam and chirla clams respectively. For chocolata clam, natural mortality was estimated between 0.405 and 0.974 depending on the model used, while exploitation rate was estimated around 0.85. Therefore, the chocolata clam is estimated to be fully or overexploited. The chocolata clam population in the Altata-Pabellones lagoon system has suffered a significant decrease in 2014 and the stock in 2018 was mainly based on juveniles below 64 mm (Anhalzer et al., 2018). In contrast, total mortality for chirla clam was estimated to be 0.38 $year^{-1}$, which is equivalent to between 50% and 60% exploitation, being therefore an underexploited stock.

However, since there are no reference points estimated for both species, a Risk-Based Framework Assessment was carried out to score PI 1.1.1 assuming a priori a high risk in the Consequence Analysis (see appendix 2.3.1 for further detail), and therefore moving directly to the Productivity Susceptibility Analysis. A PSA is designed to show the likely risk posed by the fishery to the population based on the biological characteristics of the stock and the likely susceptibility to capture. However, the results of this pre-assessment are provisional as in an MSC assessment PSA is a participatory analysis achieved by contributions by all stakeholders.

When undertaking a PSA in MSC Principle 1, it is important to consider the combined contributions of all fishing gears fishing the target species over the range of the stocks. The species are handpicked by fishermen wading and also by divers in marine lagoons. Productivity and susceptibility scores are 1 for high productivity, low risk stocks, to 3 for low productivity, high risk stocks. Different biological attributes are considered for the productivity evaluation while fishery traits and interactions with the target species are included in evaluating susceptibility.

Table 8. Chocolata clam PSA Productivity reasoning and scores.

Productivity	Rationale	Score
Average age at maturity	1.2-2.2 years	1
Average maximum age	10 years	2
Fecundity	8 million eggs/ind	1
Reproductive strategy	Broadcast spawner	1
Trophic level	Assumed <2.75	1
Density dependance	Assumed no depensatory or compensatory dynamics demonstrated or likely	2
Total Productivity (average)		1.33

Table 9. Chirla clam PSA Productivity reasoning and scores.

Productivity	Rationale	Score
Average age at maturity	3-4 years	1
Average maximum age	Assumed 2-3 years	1
Fecundity	According to other small clam species, 2-3 million eggs. Highly likely to be above 20 000 eggs.	1
Reproductive strategy	Broadcast spawner	1
Trophic level	Assumed <2.75	1

Density dependance	Assumed no depensatory or compensatory dynamics demonstrated or likely	2
Total Productivity (average)		1.17

The productivity scores are fixed for the species, regardless of how the species is caught. By contrast the susceptibility scores will be different for each gear type catching the species within the stock area, in this there is only a single geartype – hand collection. In scoring the susceptibility attributes for index species rationale for the area overlap was that fishing occurs in more than 30% of the stocks area. As for encounterability and post capture mortality, these were evaluated considering the default score for target species. Selectivity was based on information gathered in bibliographic research that individuals smaller than average size of maturity are frequently caught and retained by all fisheries for chocolate clams. According to communications with the client, this is uncommon for chirla clam as buyers will not pay for small clams.

Table 10. PSA Susceptibility reasoning and scores (precautionary approach combined with information on the fishery)

Susceptibility	Rationale	Score
Area Overlap	The hand picked fishery operate in an area corresponding to more than 30% of the stock area.	3
Encounterability	High overlap with fishing method - default score for target species.	3
Selectivity	Individuals < size at maturity are frequently caught and individuals < half the size at maturity are retained by gear.	3 for chocolata clam, 1 for chirla clam
Post capture mortality	Retained species default score.	3

The RBF analysis resulted in the following overall score for the PSA, with the corresponding MSC score.

Table 11. Overall PSA and corresponding MSC scores for the two species.

Species	PSA score	MSC Score
Chocolata clam (Megapitaria squalida)	3.22	58
Chirla clam (Chione californiensis)	2.12	93

7.1.5 Stock management

Mexican fisheries are managed through the General Sustainable Fisheries and Aquaculture Law (Ley General de Pesca y Acuacultura Sustentables LGPAS, DOF: 24-07-2007) where precautionary principles

for managing fisheries and aquaculture are referred to. This general law contemplates specific management plans to be agreed and implemented in consultation with all stakeholders (art. 39).

There is a general management plan for the ecosystem in the Altata y Ensenada del Pabellòn lagoon system (DOF: 24/9/2019) but most of the management measures specific for each groups of species (ex. shrimps, molluscs, etc) are detailed in specific legislation.

The clam fisheries operating in the Altata y Ensenada del Pabellòn lagoon system are in practice managed through a general licensing scheme that is in place, quotas, minimum sizes and closed areas, although it is unclear if the number of fishing licenses is restricted. There is a 64 mm and an 80 mm minimum total length for the chocolata clam in the eastern and western state of Baja California Sur, respectively; and a 40 mm minimum total length for Baja California Sur, with exception of the Ojo de Liebre Lagoon, Guerrero Negro that is 30 mm (DOF: 11/06/2018). There are also variable catch limits by zone and fishing bank based on the 20% of the population size of *M. squalida*, and between 30-40% for *C. californiensis* greater than the minimum catch size (DOF: 11/06/2018). The quota is given by CONAPESCA to each permit holder for a designated fishing bed based of INAPESCA fishery-independent surveys (Anhalzer et al., 2018). There was a closed area for fisheries in 2018 and 2019 (DOF: 24/04/2018) and currently there is a temporary fishing ban in the Altata y Ensenada del Pabellòn lagoon system between 2020 and 2021 (DOF: 30/04/2020). In summary, there is a harvest strategy for the two species and a generally understood harvest control rules for both species.

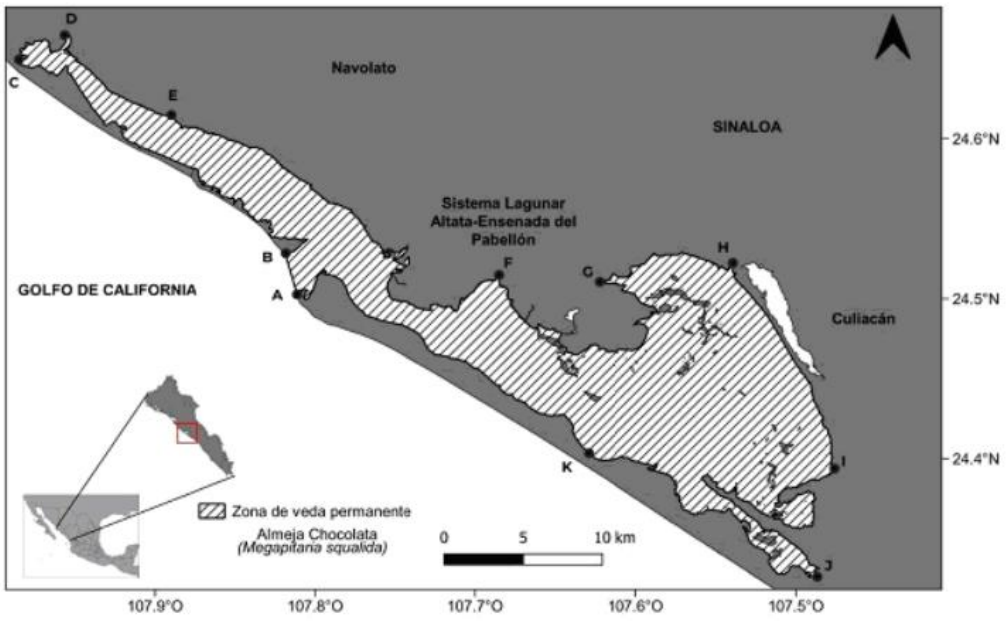

Figure 4 - Map of the closed area for the exploitation of the chocolata clam (*Megapitaria squalida*) in the Altata-Ensenada del Pabellón lagoon system (DOF: 30/04/2020).

7.1.6 Principle 1 Performance Indicator scores and rationales

Scoring table 1. PI 1.1.1 – Stock status

PI 1.1.1		The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing		
Scoring Issue		SG 60	SG 80	SG 100
a	Stock status relative to recruitment impairment			
	Guide post	It is likely that the stock is above the point where recruitment would be impaired (PRI).	It is highly likely that the stock is above the PRI.	There is a high degree of certainty that the stock is above the PRI.
	Met?	RBF chocolata clam – 58 chirla clam – 93	RBF chocolata clam – 58 chirla clam – 93	RBF chocolata clam – 58 chirla clam – 93

Rationale

Risk Based Framework was used to score this PI. Total score was for chocolata clam 58 and for chirla clam 93.

b	Stock status in relation to achievement of Maximum Sustainable Yield (MSY)			
	Guide post		The stock is at or fluctuating around a level consistent with MSY.	There is a high degree of certainty that the stock has been fluctuating around a level consistent with MSY or has been above this level over recent years.
	Met?		RBF chocolata clam – 58 chirla clam – 93	RBF chocolata clam – 58 chirla clam – 93

Rationale

See SIa

Stock status relative to reference points			
	Type of reference point	Value of reference point	Current stock status relative to reference point
Reference point used in scoring stock relative to PRI (SIa)	NA	NA	NA
Reference point used in scoring stock relative to MSY (SIb)	NA	NA	NA
References			

-

Draft scoring range	<60
Information gap indicator	More information sought on the biology of both clam species, and the selectivity of the fisheries.
Data-deficient? (RBF needed)	Yes

Scoring table 3. PI 1.1.2 – Stock rebuilding – chocolata clam

PI 1.1.2		Where the stock is reduced, there is evidence of stock rebuilding within a specified timeframe		
Scoring Issue		SG 60	SG 80	SG 100
a	Rebuilding timeframes			
	Guide post	A rebuilding timeframe is specified for the stock that is the shorter of 20 years or 2 times its generation time. For cases where 2 generations is less than 5 years, the rebuilding timeframe is up to 5 years.		The shortest practicable rebuilding timeframe is specified which does not exceed one generation time for the stock.
	Met?	No		No

Rationale

While measures have been put in place to rebuild the chocolata clam stock, such as No Take Zones, and the closure of the targeted fishery on this species, no rebuilding timeframe has been explicitly specified for the stock. SG60 is not met.

b	Rebuilding evaluation			
	Guide post	Monitoring is in place to determine whether the rebuilding strategies are effective in rebuilding the stock within the specified timeframe.	There is evidence that the rebuilding strategies are rebuilding stocks, or it is likely based on simulation modelling, exploitation rates or previous performance that they will be able to rebuild the stock within the specified timeframe.	There is strong evidence that the rebuilding strategies are rebuilding stocks, or it is highly likely based on simulation modelling, exploitation rates or previous performance that they will be able to rebuild the stock within the specified timeframe.
	Met?	No	No	No

Rationale

Some monitoring is in place, through surveillance and control programmes in the Altata Ensenada del Pabellon lagoon system, and the tracking of landings figures. As cited by a member of the client group, yield alone may not provide enough information on stock status (and in this case, the effectiveness of the rebuilding plan) without temporal trends in effort. For this reason, and because there is no specified rebuilding timeframe, SG60 cannot be met.

References

-

Draft scoring range	<60
Information gap indicator	More information sought on the biology of both clam, and the selectivity of the fisheries.

Scoring table 4. PI 1.2.1 – Harvest strategy

PI 1.2.1		There is a robust and precautionary harvest strategy in place		
Scoring Issue		SG 60	SG 80	SG 100
a	Harvest strategy design			
	Guide post	The harvest strategy is expected to achieve stock management objectives reflected in PI 1.1.1 SG80.	The harvest strategy is responsive to the state of the stock and the elements of the harvest strategy work together towards achieving stock management objectives reflected in PI 1.1.1 SG80.	The harvest strategy is responsive to the state of the stock and is designed to achieve stock management objectives reflected in PI 1.1.1 SG80.
	Met?	Both UoAs: Yes	Both UoAs: No	Both UoAs: No

Rationale

Mexican fisheries are managed through the General Sustainable Fisheries and Aquaculture Law (DOF: 24-07-2007) where precautionary principles for managing fisheries and aquaculture are referred to. There is also a general management plan for the ecosystem in the Altata y Ensenada del Pabellòn lagoon system (DOF: 24/9/2019). There is a national licencing scheme, gear restrictions, closed areas, minimum sizes, quotas and data collection. Therefore, there is a harvest strategy that may achieve stock management objectives and thus SG60 is reached. However, the strategy is not responsive to the state of both stocks and thus SG80 is not reached.

b	Harvest strategy evaluation			
	Guide post	The harvest strategy is likely to work based on prior experience or plausible argument.	The harvest strategy may not have been fully tested but evidence exists that it is achieving its objectives.	The performance of the harvest strategy has been fully evaluated and evidence exists to show that it is achieving its objectives including being clearly able to maintain stocks at target levels.
	Met?	Both UoAs: Yes	Both UoAs: No	Both UoAs: No

Rationale

The licencing scheme, gear restrictions, closed areas, minimum sizes and quotas can limit fishing mortality if effectively implemented and thus SG60 is reached. There are however indications that both species are not at productive levels and thus the harvest strategy is not reaching its objectives. So SG80 is not reached.

c	Harvest strategy monitoring		
	Guide post	Monitoring is in place that is expected to determine whether the harvest strategy is working.	
	Met?	Both UoAs: Yes	

Rationale

There is data collection at species level, gathering information on catches, fisheries behaviour, and species biology and thus SG60 is reached.

d	Harvest strategy review		
	Guide post		The harvest strategy is periodically reviewed and improved as necessary.
	Met?		Both UoAs: Yes

Rationale

The management plan specifies a 3 year period where the actions proposed should be implemented by the responsible entities. The fisheries management plan establishes that management strategies must be reviewed every 5 years or earlier if necessary. Beyond this, the consultative committee is responsible for reviewing the different aspects of the management strategy on a regular basis (at least annual). As a result, SG100 is met.

e	Shark finning			
	Guide post	It is likely that shark finning is not taking place.	It is highly likely that shark finning is not taking place.	There is a high degree of certainty that shark finning is not taking place.
	Met?	NA	NA	NA

Rationale

Not applicable to this pre-assessment as shark is not a target species. Therefore, this SI is not relevant.

f	Review of alternative measures			
	Guide post	There has been a review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock.	There is a regular review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock and they are implemented as appropriate.	There is a biennial review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock, and they are implemented, as appropriate.
	Met?	Both UoAs: NA	Both UoAs: NA	Both UoAs: NA

Rationale

The fishery by hand picking the specimens is extremely selective. The discards of individuals under minimum size are negligible due to the high economic value of clams, while clams have almost 100% survival rate after being discarded. Therefore, this SI is not relevant.

References

DOF: 24-07-2007, https://www.dof.gob.mx/nota_detalle.php?codigo=4994242&fecha=24/07/2007

DOF: 24/09/2019, http://dof.gob.mx/nota_detalle.php?codigo=5573429&fecha=24/09/2019

DOF: 11/06/2018, https://www.dof.gob.mx/index_113.php?year=2018&month=06&day=11

DOF: 30/04/2020, http://www.dof.gob.mx/nota_detalle.php?codigo=5592707&fecha=30/04/2020

Draft scoring range	60-79
Information gap indicator	More information sought on sampling monitoring programmes and on catches per species.

Scoring table 5. PI 1.2.2 – Harvest control rules and tools

PI 1.2.2		There are well defined and effective harvest control rules (HCRs) in place		
Scoring Issue		SG 60	SG 80	SG 100
a	HCRs design and application			
	Guide post	Generally understood HCRs are in place or available that are expected to reduce the exploitation rate as the point of recruitment impairment (PRI) is approached.	Well defined HCRs are in place that ensure that the exploitation rate is reduced as the PRI is approached, are expected to keep the stock fluctuating around a target level consistent with (or above) MSY, or for key LTL species a level consistent with ecosystem needs.	The HCRs are expected to keep the stock fluctuating at or above a target level consistent with MSY, or another more appropriate level taking into account the ecological role of the stock, most of the time.
	Met?	Both UoAs: Yes	Both UoAs: No	Both UoAs: No

Rationale

There is a catch limit for each species based on the recommendations from scientists with a specific percentage, as such, a generally understood HCR is in place and available, thus SG60 is reached. While the exploitation rate is expected to be reduced, this is not explicitly defined in the HCR, and so SG80 is not reached.

b	HCRs robustness to uncertainty			
	Guide post		The HCRs are likely to be robust to the main uncertainties.	The HCRs take account of a wide range of uncertainties including the ecological role of the stock, and there is evidence that the HCRs are robust to the main uncertainties.
	Met?		Both UoAs: No	Both UoAs: No

Rationale

There is little information on how the HCR was calculated and if uncertainties, for example in sampling or in mortality estimates, were taken into account. Thus, SG80 is not reached.

c	HCRs evaluation			
	Guide post	There is some evidence that tools used or available to implement HCRs are appropriate and effective in controlling exploitation.	Available evidence indicates that the tools in use are appropriate and effective in achieving the exploitation levels required under the HCRs.	Evidence clearly shows that the tools in use are effective in achieving the exploitation levels required under the HCRs.
	Met?	Both UoAs: Yes	Chocolata clam - No Chirla clam - Yes	Both UoAs: No

Rationale

The licencing scheme, gear restrictions, closed areas, minimum sizes and catch limits can together limit exploitation and therefore SG60 is reached by both species. As there is indications that chirla clam may be under-exploited, SG80 is reached, but there is uncertainty over this estimation and thus SG100 is not met. However, for chocolata clam, the stock may be suffering from overexploitation and thus SG80 is not reached.

References

DOF: 24/09/2019, http://dof.gob.mx/nota_detalle.php?codigo=5573429&fecha=24/09/2019

DOF: 11/06/2018, https://www.dof.gob.mx/index_113.php?year=2018&month=06&day=11

DOF: 30/04/2020, http://www.dof.gob.mx/nota_detalle.php?codigo=5592707&fecha=30/04/2020

Draft scoring range	60-79
Information gap indicator	More information sought on how the HCRs were estimated and agreed.

Scoring table 6. PI 1.2.3 – Information and monitoring

PI 1.2.3		Relevant information is collected to support the harvest strategy		
Scoring Issue		SG 60	SG 80	SG 100
a	Range of information			
	Guide post	Some relevant information related to stock structure, stock productivity and fleet composition is available to support the harvest strategy.	Sufficient relevant information related to stock structure, stock productivity, fleet composition and other data are available to support the harvest strategy.	A comprehensive range of information (on stock structure, stock productivity, fleet composition, stock abundance, UoA removals and other information such as environmental information), including some that may not be directly related to the current harvest strategy, is available.
	Met?	Both UoAs: Yes	Both UoAs: No	Both UoAs: No

Rationale

There is information on catch and biological data at species level that allowed for preliminary estimation of stock status and SG60 is met. However, several aspects of the biology of both species, for example stock structure, are not known accurately, while catches are not reported at species level and thus SG80 is not reached.

b	Monitoring			
	Guide post	Stock abundance and UoA removals are monitored and at least one indicator is available and monitored with sufficient frequency to support the harvest control rule.	Stock abundance and UoA removals are regularly monitored at a level of accuracy and coverage consistent with the harvest control rule, and one or more indicators are available and monitored with sufficient frequency to support the harvest control rule.	All information required by the harvest control rule is monitored with high frequency and a high degree of certainty, and there is a good understanding of inherent uncertainties in the information [data] and the robustness of assessment and management to this uncertainty.
	Met?	Both UoAs: No	Both UoAs: No	Both UoAs: No

Rationale

UoA removals are monitored and there is at least one indicator of stock abundance estimated. However, it is unclear how frequent the stock abundance studies and estimates are. There is a scientific research plan detailed in DOF: 24/9/2019 and by Félix (2020) but it is unclear how and if it has been fully implemented and thus SG60 is not met.

c	Comprehensiveness of information	
	Guide post	There is good information on all other fishery removals from the stock.
	Met?	Both UoAs: No

Rationale

The clams in the Altata y Ensenada del Pabellòn lagoon system are only handpicked and there are no other fisheries, however there is little to no information on any IUU fishing, SG80 is not met.

References

DOF: 24/9/2019, Félix (2020)

Draft scoring range	<60
Information gap indicator	More information sought on species biology, stock structure and catch composition.

Scoring table 7. PI 1.2.4 – Assessment of stock status

PI 1.2.4		There is an adequate assessment of the stock status		
Scoring Issue		SG 60	SG 80	SG 100
a	Appropriateness of assessment to stock under consideration			
	Guide post		The assessment is appropriate for the stock and for the harvest control rule.	The assessment takes into account the major features relevant to the biology of the species and the nature of the UoA.
	Met?		RBF	RBF

Rationale

Default score of 80 as RBF was used to score PI1.1.1.

b	Assessment approach			
	Guide post	The assessment estimates stock status relative to generic reference points appropriate to the species category.	The assessment estimates stock status relative to reference points that are appropriate to the stock and can be estimated.	
	Met?	RBF	RBF	

Rationale

Default score of 80 as RBF was used to score PI1.1.1.

c	Uncertainty in the assessment			
	Guide post	The assessment identifies major sources of uncertainty.	The assessment takes uncertainty into account.	The assessment takes into account uncertainty and is evaluating stock status relative to reference points in a probabilistic way.

	Met?	RBF	RBF	RBF

Rationale

Default score of 80 as RBF was used to score PI1.1.1.

d	Evaluation of assessment			
	Guide post			The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored.
	Met?			RBF

Rationale

Default score of 80 as RBF was used to score PI1.1.1.

e	Peer review of assessment			
	Guide post		The assessment of stock status is subject to peer review.	The assessment has been internally and externally peer reviewed.
	Met?		RBF	RBF

Rationale

Default score of 80 as RBF was used to score PI1.1.1.

References

-

Draft scoring range	≥80
Information gap indicator	Information sufficient to score PI

7.2 Principle 2

7.2.1 Designation of species under Principle 2

Primary species (MSC Component 2.1) are defined as follows:

- Species in the catch that are not covered under P1;
- Species that are within scope of the MSC program, i.e. no amphibians, reptiles, birds or mammals;
- Species where management tools and measures are in place, intended to achieve stock management objectives reflected in either limit (LRP) or target reference points (TRP). Primary species can therefore also be referred to as 'managed species'.

Secondary species (MSC Component 2.2) are defined as follows:

- Species in the catch that are not covered under P1;
- Species that are not managed in accordance with limit or target reference points, i.e. do not meet the primary species criteria;
- Species that are out of scope of the programme, but where the definition of ETP species is not applicable (see below)

ETP (Endangered, Threatened or Protected) species (MSC Component 2.3) are assigned as follows:

- Species that are recognised by national ETP legislation
- Species listed in binding international agreements (e.g. CITES, Convention on Migratory Species (CMS), ACAP, etc.)
- Species classified as 'out-of scope' (amphibians, reptiles, birds and mammals) that are listed in the IUCN Redlist as vulnerable (VU), endangered (EN) or critically endangered (CE).

Both primary and secondary species are defined as '**main'** if they meet the following criteria:

- The catch comprises 5% or more by weight of the total catch of all species by the UoC;
- The species is classified as 'Less resilient' and comprises 2% or more by weight of the total catch of all species by the UoC. Less resilient is defined here as having low to medium productivity, or species for which resilience has been lowered due to anthropogenic or natural changes to its life-history
- The species is out of scope but is not considered an ETP species (secondary species only)
- Exceptions to the rule may apply in the case of exceptionally large catches of bycatch species

The following sections are taken from Anhalzer et al. (2018) and updated as appropriate.

7.2.2 Primary & secondary & ETP species

Clams are collected by hand on foot, and therefore the fishery is very selective with likely minimum catch of non-target species.

Chocolata clams and chirla clams are found in the sediment associated with other bivalves (*Chione undatella, C. subrugosa, C. gnidia, Laevicardium elatum, Dosinia ponderosa, Anadara tuberculosa, A.*

grandes, A. perlabiata, Atrina maura) and gastropods (*Terebra armillata, Eupleura muriciformis* and *Cerithium stercusmuscarum*) (Beltrán Pimienta et al., 2006; Figuero et al. 2016; INAPESCA, 2017; all from Anhalzer et al., 2018).

According to the catch provided by Zamora- Garcia (2021) it may seem that all species reported are secondary as they are not managed in accordance with limit or target reference points. Regarding if they are main or minor, i.e. if catches are at least 5% of total catch of all species in the UoA, ark clam and cortez oyster could be considered secondary main species. However, the classification of main species may change if chocolata clam catches are included. Furthermore, according to Garcia (2021), in the banks where chirla clam is found there are no other bivalves. Based on this information, and the lack of additional specific catch information per trip from the UoAs, the assessment team concludes that there are no primary or secondary species. Because if the fishers are in the banks handpicking chirla clam, they do not pick other clams. This means that the fishers collecting in other banks for other species would be considered to be outside the UoAs. The assessment team takes the same approach for the chocolata clam targeted fishery, concluding that there are no primary or secondary species. This conclusion, needs further investigation in a full assessment and when the fishery is open.

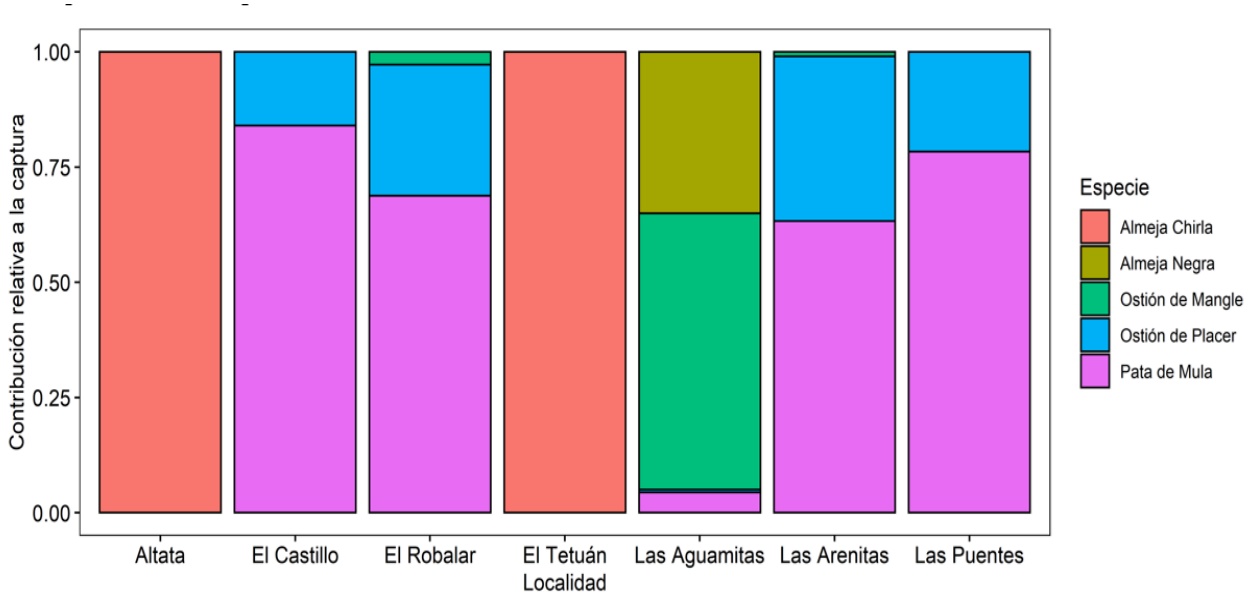

Figure 5 - Relative contribution of each species to the catch by area (Zamora-Garcia, 2021). Almeja chirla – chirla clam, almeja negra – black clam, ostion de mangle – mangrove oyster, ostion de placer – cortez oyster, pata de mula – ark clam.

Other species of fishing interest are also found in the area or close by chocolata clam and chirla clam beds, like shrimps (*Litopenaeus stylirostris, L. vannamei* and *Farfantepenaeus californiensis*), swimming crabs (*Callinectes arcuatus* and *C. bellicosus*), sharks (*Sphyrna lewini, S. mokarran, S. tiburo, Carcharhinus leucas* and *Galeocerdo cuvier*), bullseye puffer (*Sphoeroides annulatus* and *S. lobatus*) and mullets (*Mugil cephalus, M. curema* and *M. hospes*) (INAPESCA, 2017 in Anhalzer et al., 2018).

7.2.3 Habitats

The region under consideration in this assessment is Altata-Ensenada Pabellón lagoon system, located in the Gulf of California.

The Gulf of California is a semi closed, highly productive body of water characterized as having abundant biological resources and a high level of endemism and has been widely recognized as a marine biodiversity hotspot (Enríquez-Andrade et al., 2005). Strong tidal mixing and wind-driven coastal upwelling result in high year-round primary productivity (Lavin & Marinone, 2003). Major habitat types include rocky reefs, wetlands, mangrove forests, *Sargassum* spp. forests, seagrass beds, rhodolith beds and seamounts (Anhalzer et al., 2018).

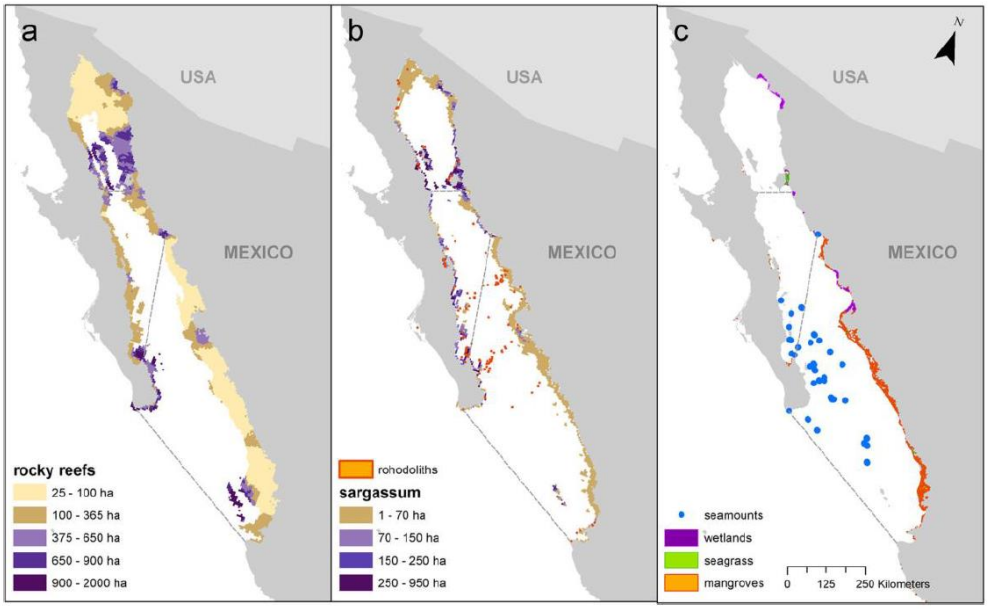

Figure 6 - Major habitats in the Gulf of California. a) rocky reef (including pebbles, shallow and deep reefs; b) seaweed forests including *Sargassum* spp. and rhodoliths; c) seamounts, wetlands, seagrass beds and mangrove forests (Munguia-Vega et al., 2018 in Anhalzer et al., 2018).

The Altata-Ensenada Pabellón lagoon system is in the center of the state of Sinaloa on the northwest coast of Mexico. Is defined as an estuary and lagoon system of the deltaic front of the Culiacán River. Altata bay have an average depth of 5 m and an extension of 27,400 km connected with the Gulf of California through two narrow mouths and protected by sandy bars (Bátiz, 2008 in Anhalzer et al., 2018). The sediments pattern shows a predominance of fine-grained particles. Sandy bottoms are more represented in Altata and west of Pabellones due to the influence of the tidal current and extend to the main mouth of the Tonina (Ayala-Castañares et al., 1994 in Anhalzer et al., 2018).

The fishery zones usually used by fishers include the following fishing beds: La Tracalosa, El Tetuán, Tetuán Viejo, Las Pelonas, Las Águilas, JC Chávez, Punta arena, Los Jabueyes, La islita, Bola Monte, El Moroco, Lagunilla, Santa Cruz, Ostionera de Toñera, La Palmita, Las Barritas, El Gavilan and Los Mojotitos (Anhalzer et al., 2018). The 'commonly-encountered' habitat by the chocolata clam and chirla clam fishery is therefore sandy-muddy banks.

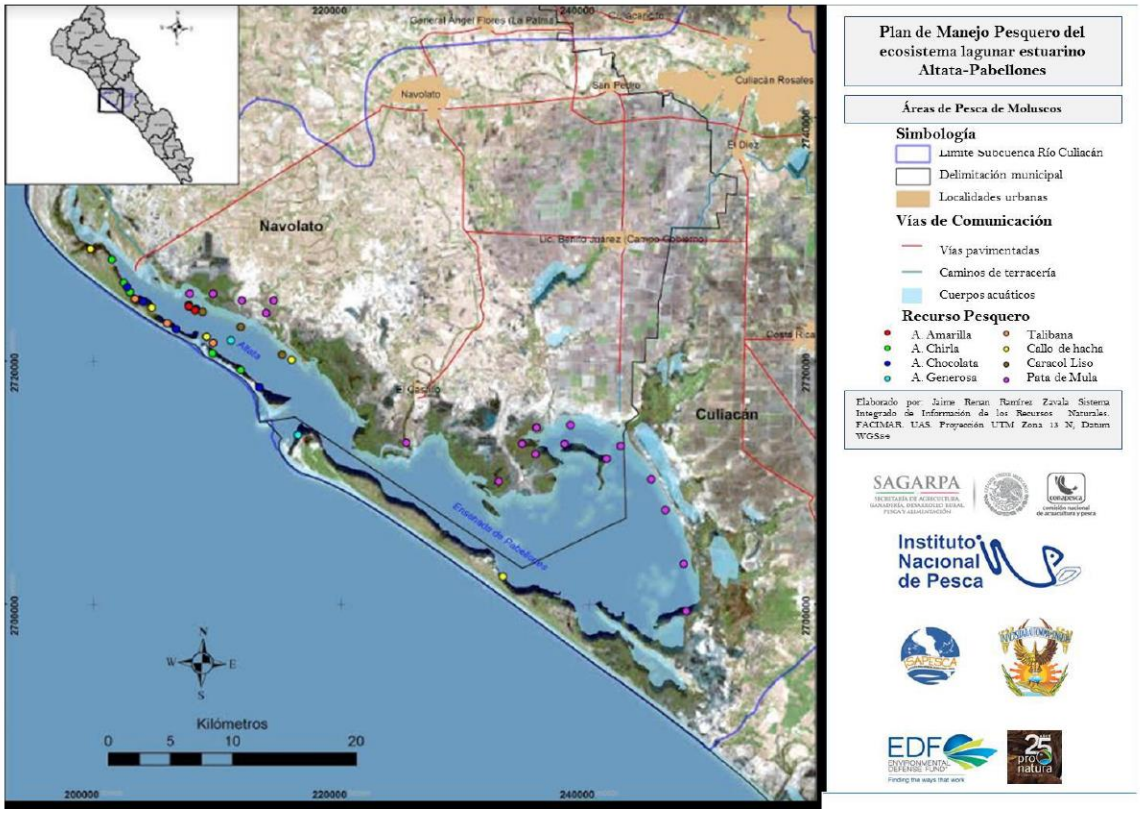

Figure 7 - Map of presence of several bivalves in the Altata – Pabellones lagoon system. Source: INAPESCA, 2017 in Anhalzer et al., 2018.

The MSC Fisheries Certification Requirements v2.01 requires habitats interacting with the fishery to be defined as 'commonly-encountered', 'VME' or 'minor', with definitions as given in Table 15.

Table 13. Habitat definitions as per the MSC Fisheries Certification Requirements v2.01.

FCR reference	Definition
SA3.13.3.1	A commonly encountered habitat shall be defined as a habitat that regularly comes into contact with a gear used by the UoA, considering the spatial (geographical) overlap of fishing effort with the habitat's range within the management area(s) covered by the governance body(s) relevant to the UoA.
SA3.13.3.2	A Vulnerable Marine Ecosystem (VME) shall be defined as is done in paragraph 42 subparagraphs (i)-(v) of the FAO Guidelines (definition provided in GSA3.13.3.2). This definition shall be applied both inside and outside EEZs and irrespective of depth.
GSA3.13.3.2	VMEs have one or more of the following characteristics, as defined in paragraph 42 of the FAO Guidelines: Uniqueness or rarity – an area or ecosystem that is unique or that contains rare species whose loss could not be compensated for by similar areas or ecosystems Functional significance of the habitat – discrete areas or habitats that are necessary for survival, function, spawning/ reproduction, or recovery of fish stocks; for particular life-history stages (e.g., nursery grounds, rearing areas); or for ETP species Fragility – an ecosystem that is highly susceptible to degradation by anthropogenic activities Life-history traits of component species that make recovery difficult – ecosystems that are characterised by populations or assemblages of species that are slow growing, are slow maturing, have low or unpredictable recruitment, and/or are long lived Structural complexity – an ecosystem that is characterised by complex physical structures created by significant concentrations of biotic and abiotic features

FCR reference	Definition
N/a	Minor habitats are those that do not meet the above definitions.

Regarding VMEs, mangrove forests meet the Vulnerable Marine Ecosystem (VME) definition of GSA3.13.3.2 above for their rarity, functional significance, fragility, and structural complexity. Mangrove forests are protected in Mexico by NOM 059 SEMARNAT-2010, and by the variety of Ramsar sites[1] that have been created across the country to protect these ecosystems. The extent of the interaction of the UoA with mangrove forests is unclear. Nevertheless, the possible impact of a handpicking clam fishery on mangrove is likely related to short term substrate disturbance and increase turbidity. These effects are deemed by the assessment team to be very low and UoA interactions with VMEs are scored accordingly.

7.2.4 Ecosystem

The Altata – Pabellones lagoon system is one of the eight Sinaloa RAMSAR zones and it is considered a transition zone of great biodiversity richness and biological abundance. This system of coastal lagoons is one of the priority wetlands of Mexico due to its high diversity of fauna, particularly waterfowl, since it is home to more than 40% of the country's wintering migratory waterbirds (Berlanga-Robles et al., 2008).

The mangrove forests offer a favourable nursery environment for a wide range of marine and estuarine species. Beyond acting as a nursery ground, mangrove forests offer a wide variety of ecosystem services, including shoreline protection, land-building and sediment stabilization, and carbon drawdown, mineralization, and export (which may have, until recently, been underestimated – Lee et al., 2014). Beyond the aforementioned study, a wide range of literature covers the value of mangrove forests as ecosystems (Whitfield, 2017; Paillon et al., 2014; Primavera, 1998; Robertson & Duke, 1987) in the life history of marine and estuarine species.

In this assessment, the analysis will focus on the impacts of the UoAs on the Altata – Pabellones lagoon system ecosystem. The impacts under assessment will be the removal of the target species on the trophic structure of the ecosystem. There is however no information regarding the foodweb and the trophic prey-predators relationships present in this ecosystem.

7.2.5 Scoring elements

Table 14. Principle 2 scoring elements

Component	Scoring elements	Designation	Data-deficient
Primary species	NA	NA	NA
Secondary species	NA	NA	NA
ETP species	NA	NA	NA
Habitats	Sand/mud	Commonly encountered	No
	Mangrove forests	VMEs	No

[1] https://www.profepa.gob.mx/innovaportal/v/5117/1/mx/mexico_protege_sus_manglares.html

Ecosystems	Altata – Pabellones lagoon system – removal of target species.	NA	No

7.2.6 Principle 2 Performance Indicator scores and rationales

Scoring table 8. PI 2.1.1 – Primary species outcome

PI 2.1.1		The UoA aims to maintain primary species above the point where recruitment would be impaired (PRI) and does not hinder recovery of primary species if they are below the PRI		
Scoring Issue		SG 60	SG 80	SG 100
a	Main primary species stock status			
	Guide post	Main primary species are likely to be above the PRI. OR If the species is below the PRI, the UoA has measures in place that are expected to ensure that the UoA does not hinder recovery and rebuilding.	Main primary species are highly likely to be above the PRI. OR If the species is below the PRI, there is either evidence of recovery or a demonstrably effective strategy in place between all MSC UoAs which categorise this species as main, to ensure that they collectively do not hinder recovery and rebuilding.	There is a high degree of certainty that main primary species are above the PRI and are fluctuating around a level consistent with MSY.
	Met?	Both UoAs: Yes	Both UoAs: Yes	Both UoAs: Yes

Rationale

There are no main primary species to consider. SG60, SG80 and SG100 are met by default.

b	Minor primary species stock status			
	Guide post			Minor primary species are highly likely to be above the PRI. OR If below the PRI, there is evidence that the UoA does not hinder the recovery and rebuilding of minor primary species.

	Met?	Both UoAs: Yes

Rationale

There are no minor primary species to consider. SG100 is met by default.

References

Zamora-Garcia (2021)

Draft scoring range	≥80
Information gap indicator	More information sought on UoAs catches
Data-deficient? (RBF needed)	Yes

Scoring table 9. PI 2.1.2 – Primary species management strategy

PI 2.1.2		There is a strategy in place that is designed to maintain or to not hinder rebuilding of primary species, and the UoA regularly reviews and implements measures, as appropriate, to minimise the mortality of unwanted catch		
Scoring Issue		SG 60	SG 80	SG 100
a	Management strategy in place			
	Guide post	There are measures in place for the UoA, if necessary, that are expected to maintain or to not hinder rebuilding of the main primary species at/to levels which are likely to be above the PRI.	There is a partial strategy in place for the UoA, if necessary, that is expected to maintain or to not hinder rebuilding of the main primary species at/to levels which are highly likely to be above the PRI.	There is a strategy in place for the UoA for managing main and minor primary species.
	Met?	Both UoAs: Yes	Both UoAs: Yes	Both UoAs: No

Rationale

As the fishery does not impact main or minor primary species there is no need for measures or partial strategy to manage impacts. SG60 and SG80 are met by default. As the nature of the fishery does not constitute a full strategy SG100 is not met.

b	Management strategy evaluation			
	Guide post	The measures are considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/species).	There is some objective basis for confidence that the measures/partial strategy will work, based on some information directly about the fishery and/or species involved.	Testing supports high confidence that the partial strategy/strategy will work, based on information directly about the fishery and/or species involved.
	Met?	Both UoAs: Yes	Both UoAs: Yes	Chirla clam: Yes chocolata clam: No

Rationale

The fishery does not impact primary species and thus a partial strategy is not considered necessary. SG60 and SG80 are met by default. The fishing strategy of handpicking can be considered as a partial strategy itself which works effectively in avoiding the catch of primary species. Garcia (2021) results showing that when chirla clam is encountered

there are no other species are considered as a test that the partial strategy of avoiding the catch of main primary species is working. SG100 is met for chirla fishery. However, the information is not sufficient to support high confidence and SG100 is not met for the chocolata clam fishery.

c	Management strategy implementation			
	Guide post		There is some evidence that the measures/partial strategy is being implemented successfully.	There is clear evidence that the partial strategy/strategy is being implemented successfully and is achieving its overall objective as set out in scoring issue (a).
	Met?		Both UoAs: Yes	Chirla clam: Yes chocolata clam: No

Rationale

Zamora-Garcia (2021) results, show that when chirla clam is encountered there are no other species present. This could be considered as a test that the partial strategy of avoiding the catch of main primary species is working. SG80 is met. SG100 is also met because the Zamora-Garcia study provides objective, fishery-independent evidence that no other species are caught and retained during chirla clam fishing activities. For chocolata clam however, the same information base does not exist, as such, while there is some empirical evidence from the client that only chocolata clams are retained during chocolata clam fishing activities (SG80 is met), the team cannot ascertain any clear evidence that the fishing activity does not interact with other species. As such, there is no clear evidence that the partial strategy is being implemented successfully and SG 100 is not met.

d	Shark finning			
	Guide post	It is likely that shark finning is not taking place.	It is highly likely that shark finning is not taking place.	There is a high degree of certainty that shark finning is not taking place.
	Met?	Both UoAs: NA	Both UoAs: NA	Both UoAs: NA

Rationale

There are no sharks in the catch composition by the UoA. This SI is not applicable.

e	Review of alternative measures			
	Guide	There is a review of the potential effectiveness and practicality of alternative measures to	There is a regular review of the potential effectiveness and practicality of alternative	There is a biennial review of the potential effectiveness and practicality of alternative

	post	minimise UoA-related mortality of unwanted catch of main primary species.	measures to minimise UoA-related mortality of unwanted catch of main primary species and they are implemented as appropriate.	measures to minimise UoA-related mortality of unwanted catch of all primary species, and they are implemented, as appropriate.
	Met?	Both UoAs: NA	Both UoAs: NA	Both UoAs: NA

Rationale

There is no unwanted catch of main or minor primary species, as there are no primary species for these UoAs, NA.

References

Zamora-Garcia (2021)

Draft scoring range	≥80
Information gap indicator	More information sought on the catch composition of the UoAs.

Scoring table 10. PI 2.1.3 – Primary species information

PI 2.1.3		Information on the nature and extent of primary species is adequate to determine the risk posed by the UoA and the effectiveness of the strategy to manage primary species		
Scoring Issue		SG 60	SG 80	SG 100
a	Information adequacy for assessment of impact on main primary species			
	Guide post	Qualitative information is adequate to estimate the impact of the UoA on the main primary species with respect to status. OR If RBF is used to score PI 2.1.1 for the UoA: Qualitative information is adequate to estimate productivity and susceptibility attributes for main primary species.	Some quantitative information is available and is adequate to assess the impact of the UoA on the main primary species with respect to status. OR If RBF is used to score PI 2.1.1 for the UoA: Some quantitative information is adequate to assess productivity and susceptibility attributes for main primary species.	Quantitative information is available and is adequate to assess with a high degree of certainty the impact of the UoA on main primary species with respect to status.
	Met?	Both UoAs: Yes	Both UoAs: Yes	Chirla clam: Yes chocolata clam: No

Rationale

Zamora-Garcia (2021) study results showing that in chirla clam banks, no other species are found which constitute some quantitative information to assess the impact of the UoAs on primary species and therefore SG80 is met. For chirla fishery this information is considered adequate to assess to a high degree of certainty and SG100 is met. For chocolata clam however, as there is uncertainty if when fishing for chocolata clam the banks do not include other species, SG100 is not considered met.

b	Information adequacy for assessment of impact on minor primary species		
	Guide post		Some quantitative information is adequate to estimate the impact of the UoA on minor primary species with respect to status.
	Met?		Chirla clam: Yes

				chocolata clam: No

Rationale

As described in SIa, there is some quantitative information on possible bycatch impacts of the UoA. Zamora-Garcia (2021) study constitutes some quantitative information to estimate the impact of possible minor primary species, and shows that there are no interactions with minor primary species. SG100 is met. This is not the case for the chocolata clam UoA, where SG100 is not met.

c	Information adequacy for management strategy			
	Guide post	Information is adequate to support measures to manage main primary species.	Information is adequate to support a partial strategy to manage main primary species.	Information is adequate to support a strategy to manage all primary species, and evaluate with a high degree of certainty whether the strategy is achieving its objective.
	Met?	Both UoAs: Yes	Both UoAs: Yes	Both UoAs: No

Rationale

Garcia (2021) study results showing that in chirla clam banks, no other species are found, which constitute adequate information to support a partial strategy and SG60 and SG80 are met. However, the information is not adequate to support a strategy and SG100 is not met.

References

Zamora-Garcia (2021)

Draft scoring range	≥80
Information gap indicator	More information sought on the catch composition of the UoAs.

Scoring table 11. PI 2.2.1 – Secondary species outcome

PI 2.2.1		The UoA aims to maintain secondary species above a biologically based limit and does not hinder recovery of secondary species if they are below a biological based limit		
Scoring Issue		SG 60	SG 80	SG 100
a	Main secondary species stock status			
	Guide post	Main secondary species are likely to be above biologically based limits. OR If below biologically based limits, there are measures in place expected to ensure that the UoA does not hinder recovery and rebuilding.	Main secondary species are highly likely to be above biologically based limits. OR If below biologically based limits, there is either evidence of recovery or a demonstrably effective partial strategy in place such that the UoA does not hinder recovery and rebuilding. AND Where catches of a main secondary species outside of biological limits are considerable, there is either evidence of recovery or a, demonstrably effective strategy in place between those MSC UoAs that have considerable catches of the species, to ensure that they collectively do not hinder recovery and rebuilding.	There is a high degree of certainty that main secondary species are above biologically based limits.
	Met?	Both UoAs: Yes	Both UoAs: Yes	Both UoAs: Yes

Rationale

There are no main secondary species to consider. SG60, SG80 and SG100 is met by default.

b	Minor secondary species stock status

	Guide post	Minor secondary species are highly likely to be above biologically based limits. OR If below biologically based limits', there is evidence that the UoA does not hinder the recovery and rebuilding of secondary species
	Met?	Both UoAs: Yes

Rationale

There are no minor secondary species to consider. SG100 is met by default.

References

Zamora-Garcia (2021)

Draft scoring range	≥80
Information gap indicator	More information sought on the UoAs catch composition.
Data-deficient? (RBF needed)	Yes

Scoring table 12. PI 2.2.2 – Secondary species management strategy

PI 2.2.2		There is a strategy in place for managing secondary species that is designed to maintain or to not hinder rebuilding of secondary species and the UoA regularly reviews and implements measures, as appropriate, to minimise the mortality of unwanted catch		
Scoring Issue		SG 60	SG 80	SG 100
a	Management strategy in place			
	Guide post	There are measures in place, if necessary, which are expected to maintain or not hinder rebuilding of main secondary species at/to levels which are highly likely to be above biologically based limits or to ensure that the UoA does not hinder their recovery.	There is a partial strategy in place, if necessary, for the UoA that is expected to maintain or not hinder rebuilding of main secondary species at/to levels which are highly likely to be above biologically based limits or to ensure that the UoA does not hinder their recovery.	There is a strategy in place for the UoA for managing main and minor secondary species.
	Met?	Both UoAs: Yes	Both UoAs: Yes	Both UoAs: No

Rationale

As the fishery does not impact main or minor secondary species there is no need for measures or partial strategy to manage impacts. SG60 and SG80 are met by default. However, the nature of the fishery does not constitute a full strategy and for that reason SG100 is not met.

b	Management strategy evaluation			
	Guide post	The measures are considered likely to work, based on plausible argument (e.g. general experience, theory or comparison with similar UoAs/species).	There is some objective basis for confidence that the measures/partial strategy will work, based on some information directly about the UoA and/or species involved.	Testing supports high confidence that the partial strategy/strategy will work, based on information directly about the UoA and/or species involved.
	Met?	Both UoAs: Yes	Both UoAs: Yes	Both UoAs: Yes

Rationale

The fishery does not impact secondary species and thus a partial strategy is not considered necessary. SG60 and SG80 are met by default. The fishing strategy of handpicking can be considered as a partial strategy itself which works effectively in avoiding the catch of secondary species. Garcia (2021) results, showing that when chirla clam is

encountered there are no other species, are considered as a test that the partial strategy of avoiding the catch of main secondary species is working. SG100 is met. As the same banks are fished for chocolata and chirla clams, SG100 can also be justified for the chocolata clam UoA.

c	Management strategy implementation			
	Guide post		There is some evidence that the measures/partial strategy is being implemented successfully.	There is clear evidence that the partial strategy/strategy is being implemented successfully and is achieving its objective as set out in scoring issue (a).
	Met?		Both UoAs: Yes	Chirla clam: Yes chocolata clam: No

Rationale

Zamora-Garcia (2021) results, show that when chirla clam is encountered there are no other species present. This could be considered as a test that the partial strategy of avoiding the catch of main primary species is working. SG80 is met. SG100 is also met because the Zamora-Garcia study provides objective, fishery-independent evidence that no other species are caught and retained during chirla clam fishing activities. For chocolata clam however, the same information base does not exist, as such, while there is some empirical evidence from the client that only chocolata clams are retained during chocolata clam fishing activities (SG80 is met), the team cannot ascertain any clear evidence that the fishing activity does not interact with other species. As such, there is no clear evidence that the partial strategy is being implemented successfully and SG 100 is not met.

d	Shark finning			
	Guide post	It is likely that shark finning is not taking place.	It is highly likely that shark finning is not taking place.	There is a high degree of certainty that shark finning is not taking place.
	Met?	NA	NA	NA

Rationale

There are no sharks in the catch composition by the UoA. This SI is not applicable.

e	Review of alternative measures to minimise mortality of unwanted catch

	Guide post	There is a review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of main secondary species.	There is a regular review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of main secondary species and they are implemented as appropriate.	There is a biennial review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of all secondary species, and they are implemented, as appropriate.
	Met?	NA	NA	NA

Rationale

There is no unwanted catch of main or minor secondary species.

References

Zamora-Garcia (2021)

Draft scoring range	≥80
Information gap indicator	More information sought on the UoAs catch composition.

Scoring table 13. PI 2.2.3 – Secondary species information

PI 2.2.3		Information on the nature and amount of secondary species taken is adequate to determine the risk posed by the UoA and the effectiveness of the strategy to manage secondary species		
Scoring Issue		SG 60	SG 80	SG 100
a	Information adequacy for assessment of impacts on main secondary species			
	Guide post	Qualitative information is adequate to estimate the impact of the UoA on the main secondary species with respect to status. OR If RBF is used to score PI 2.2.1 for the UoA: Qualitative information is adequate to estimate productivity and susceptibility attributes for main secondary species.	Some quantitative information is available and adequate to assess the impact of the UoA on main secondary species with respect to status. OR If RBF is used to score PI 2.2.1 for the UoA: Some quantitative information is adequate to assess productivity and susceptibility attributes for main secondary species.	Quantitative information is available and adequate to assess with a high degree of certainty the impact of the UoA on main secondary species with respect to status.
	Met?	Both UoAs: Yes	Both UoAs: Yes	Chirla clam: Yes chocolata clam: No

Rationale

Zamora-Garcia (2021) results, show that when chirla clam is encountered there are no other species present. This could be considered as a test that the partial strategy of avoiding the catch of main primary species is working. SG60 and SG80 are met. SG100 is also met because the Zamora-Garcia study provides objective, fishery-independent evidence that no other species are caught and retained during chirla clam fishing activities. For chocolata clam however, the same information base does not exist, as such, while there is some empirical evidence from the client that only chocolata clams are retained during chocolata clam fishing activities (SG80 is met), the team cannot ascertain any clear evidence that the fishing activity does not interact with other species. As such, there is no clear evidence that the partial strategy is being implemented successfully and SG 100 is not met. .

b	Information adequacy for assessment of impacts on minor secondary species

	Guide post			Some quantitative information is adequate to estimate the impact of the UoA on minor secondary species with respect to status.
	Met?			Chirla clam: Yes chocolata clam: No

Rationale

As described in SIa, there is some quantitative information on possible bycatch impacts of the chirla clam UoA. Garcia (2021) study constitutes quantitative information to estimate the impact of possible minor secondary species, and shows that there are no interactions with minor secondary species for the chirla clam fishery. SG100 is met. However, the information is not sufficient for the chocolata clam and therefore SG100 is not met.

c	Information adequacy for management strategy			
	Guide post	Information is adequate to support measures to manage main secondary species.	Information is adequate to support a partial strategy to manage main secondary species.	Information is adequate to support a strategy to manage all secondary species, and evaluate with a high degree of certainty whether the strategy is achieving its objective.
	Met?	Both UoAs: Yes	Chirla clam: Yes chocolata clam: No	Both UoAs: No

Rationale

Zamora-Garcia (2021) study results, showing that in chirla clam banks no other species are found, constitute adequate information to support a partial strategy and SG60 and SG80 are met for the chirla clam UoA. While the information in the Garcia (2021) study applies to the chocolata clam fishery, it is not directly related to it, so SG80 is not met for that UoA. Furthermore, the information available is not sufficient to support a strategy and therefore SG100 is not met.

References
Zamora-Garcia (2021)

Draft scoring range	≥80

Information gap indicator	More information sought on the UoAs catch composition.

Scoring table 14. PI 2.3.1 – ETP species outcome

PI 2.3.1		The UoA meets national and international requirements for the protection of ETP species The UoA does not hinder recovery of ETP species		
Scoring Issue		SG 60	SG 80	SG 100
a	Effects of the UoA on population/stock within national or international limits, where applicable			
	Guide post	Where national and/or international requirements set limits for ETP species, the effects of the UoA on the population/ stock are known and likely to be within these limits.	Where national and/or international requirements set limits for ETP species, the combined effects of the MSC UoAs on the population /stock are known and highly likely to be within these limits.	Where national and/or international requirements set limits for ETP species, there is a high degree of certainty that the combined effects of the MSC UoAs are within these limits.
	Met?	NA	NA	NA

Rationale

To the teams best knowledge, there are no national or international requirements that set limits for ETP species. This SI is NA.

b	Direct effects			
	Guide post	Known direct effects of the UoA are likely to not hinder recovery of ETP species.	Direct effects of the UoA are highly likely to not hinder recovery of ETP species.	There is a high degree of confidence that there are no significant detrimental direct effects of the UoA on ETP species.
	Met?	Both UoAs: Yes	Both UoAs: Yes	Both UoAs: No

Rationale

Zamora-Garcia (2021) study shows that there are no ETP species directly impacted by the UoA. Therefore, SG60 and SG80 are met. However, the only source of fishery independent information, the Zamora-Garcia (2021) study, is still in the process of completion and so the team determines that “a high degree of confidence” and SG100 is not met.

c	Indirect effects			
	Guide post		Indirect effects have been considered for the UoA and are thought to be highly likely to not create unacceptable impacts.	There is a high degree of confidence that there are no significant detrimental indirect effects of the UoA on ETP species.
	Met?		Both UoAs: No	Both UoAs: No

Rationale

Indirect effects would be those related to the trophic chain and prey availability or seabed disturbance. Although seabed disturbance is likely to be low and short term, there are no study of the impact of reduced clam availability for the migratory waterbirds community of the area that may prey on them. As the area is known for its biodiversity, particularly of wintering migratory waterbirds, SG80 is not met.

References

Zamora-Garcia (2021), Anhalzer et al. (2018)

Draft scoring range	60-79
Information gap indicator	More information sought on the UoAs catch composition and on the ecosystem trophic relationships.
Data-deficient? (RBF needed)	Yes

Scoring table 15. PI 2.3.2 – ETP species management strategy

PI 2.3.2		The UoA has in place precautionary management strategies designed to: meet national and international requirements; ensure the UoA does not hinder recovery of ETP species. Also, the UoA regularly reviews and implements measures, as appropriate, to minimise the mortality of ETP species		
Scoring Issue		SG 60	SG 80	SG 100
a	Management strategy in place (national and international requirements)			
	Guide post	There are measures in place that minimise the UoA-related mortality of ETP species, and are expected to be highly likely to achieve national and international requirements for the protection of ETP species.	There is a strategy in place for managing the UoA's impact on ETP species, including measures to minimise mortality, which is designed to be highly likely to achieve national and international requirements for the protection of ETP species.	There is a comprehensive strategy in place for managing the UoA's impact on ETP species, including measures to minimise mortality, which is designed to achieve above national and international requirements for the protection of ETP species.
	Met?	NA	NA	NA

Rationale

Since there are no national or international requirements for the protection of ETP species this SI is NA. See SIb.

b	Management strategy in place (alternative)			
	Guide post	There are measures in place that are expected to ensure the UoA does not hinder the recovery of ETP species.	There is a strategy in place that is expected to ensure the UoA does not hinder the recovery of ETP species.	There is a comprehensive strategy in place for managing ETP species, to ensure the UoA does not hinder the recovery of ETP species.
	Met?	Both UoAs: Yes	Both UoAs: Yes	Both UoAs: No

Rationale

The fishery is managed by several measures such as closed areas, specific licences, minimum sizes but also trough catch limits. These measures constitute a strategy and all contribute to limiting its exploitation, and thus providing for a certain amount of clams being available for prey to other species. This, in combination with the fact that the fishery does not directly affect ETP species, lead to SG60 and SG80 being met. However, the strategy is not comprehensive to ensure the UoA does not hinder the recovery of ETP species and thus SG100 is not met.

c	Management strategy evaluation			
	Guide post	The measures are considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/species).	There is an objective basis for confidence that the measures/strategy will work, based on information directly about the fishery and/or the species involved.	The strategy/comprehensive strategy is mainly based on information directly about the fishery and/or species involved, and a quantitative analysis supports high confidence that the strategy will work.
	Met?	Both UoAs: Yes	Both UoAs: Yes	Both UoAs: No

Rationale

The management strategy using closed areas, specific licences, minimum sizes and catch limits, is likely to work in limiting exploitation and SG60 is met. As the fishery has no direct impact on ETP species, there is an objective basis for confidence that the measures (including the fishing method used) work in limiting UoA impacts on ETP species, and SG80 is also met. However, as there is no quantitative analysis SG100 is not met.

d	Management strategy implementation			
	Guide post		There is some evidence that the measures/strategy is being implemented successfully.	There is clear evidence that the strategy/comprehensive strategy is being implemented successfully and is achieving its objective as set out in scoring issue (a) or (b).
	Met?		Both UoAs: Yes	Both UoAs: No

Rationale

There is evidence that the closed fishing season was adhered to, and that licences are also implemented and thus SG80 is reached. There is however no clear evidence, such as inspection reports or assessment of stock status of the target species, that all measures that constitute the strategy, such as minimum sizes and catch limits, are being implemented successfully and SG100 is not reached.

e	Review of alternative measures to minimize mortality of ETP species			
	Guide post	There is a review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of ETP species.	There is a regular review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of ETP species and they are implemented as appropriate.	There is a biennial review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality ETP species, and they are implemented, as appropriate.
	Met?	Both UoAs: Yes	Both UoAs: Yes	Both UoAs: Yes

Rationale

There is no catch or contact by the handpicking fishery on ETP species. SG60, SG80 and SG100 are met by default.

References

DOF: 24/9/2019, http://dof.gob.mx/nota_detalle.php?codigo=5573429&fecha=24/09/2019

DOF: 11/06/2018, https://www.dof.gob.mx/index_113.php?year=2018&month=06&day=11

DOF: 30/04/2020 http://www.dof.gob.mx/nota_detalle.php?codigo=5592707&fecha=30/04/2020

Draft scoring range	≥80
Information gap indicator	More information sought on UoAs catch composition.

Scoring table 16. PI 2.3.3 – ETP species information

PI 2.3.3		Relevant information is collected to support the management of UoA impacts on ETP species, including: Information for the development of the management strategy; Information to assess the effectiveness of the management strategy; and Information to determine the outcome status of ETP species		
Scoring Issue		SG 60	SG 80	SG 100
a	Information adequacy for assessment of impacts			
	Guide post	Qualitative information is adequate to estimate the UoA related mortality on ETP species. OR If RBF is used to score PI 2.3.1 for the UoA: Qualitative information is adequate to estimate productivity and susceptibility attributes for ETP species.	Some quantitative information is adequate to assess the UoA related mortality and impact and to determine whether the UoA may be a threat to protection and recovery of the ETP species. OR If RBF is used to score PI 2.3.1 for the UoA: Some quantitative information is adequate to assess productivity and susceptibility attributes for ETP species.	Quantitative information is available to assess with a high degree of certainty the magnitude of UoA-related impacts, mortalities and injuries and the consequences for the status of ETP species.
	Met?	Both UoAs: Yes	Both UoAs: Yes	Both UoAs: No

Rationale

The nature of the fishery (highly selective hand collection), combined with the Zamora-Garcia (2021) study results, showing that in Chocolata and chirla clam beds no other species are found, this constitutes some quantitative information to assess the impact of the UoAs on possible ETP species and SG60 and SG80 are met. However, as there is uncertainty if the reduction of clams' abundance may impact migratory waterbirds SG100 is not met.

b	Information adequacy for management strategy

	Guide post	Information is adequate to support measures to manage the impacts on ETP species.	Information is adequate to measure trends and support a strategy to manage impacts on ETP species.	Information is adequate to support a comprehensive strategy to manage impacts, minimize mortality and injury of ETP species, and evaluate with a high degree of certainty whether a strategy is achieving its objectives.
	Met?	Both UoAs: Yes	Both UoAs: No	Both UoAs: No

Rationale

The nature of the fishery (highly selective hand collection), combined Zamora-Garcia (2021) study results, showing that in chocolata and chirla clam banks no other species is found, constitute adequate information to support management measures and SG60 is met. However, this information is currently not sufficient to measure trends and support a strategy to manage impacts on ETP species. SG80 is not met.

References

Zamora-Garcia (2021), Anhalzer et al. (2018),

DOF: 24/9/2019, http://dof.gob.mx/nota_detalle.php?codigo=5573429&fecha=24/09/2019

Draft scoring range	60-79
Information gap indicator	More information sought on UoAs catch composition.

Scoring table 17. PI 2.4.1 – Habitats outcome

PI 2.4.1		The UoA does not cause serious or irreversible harm to habitat structure and function, considered on the basis of the area covered by the governance body(s) responsible for fisheries management in the area(s) where the UoA operates		
Scoring Issue		SG 60	SG 80	SG 100
a	Commonly encountered habitat status			
	Guide post	The UoA is unlikely to reduce structure and function of the commonly encountered habitats to a point where there would be serious or irreversible harm.	The UoA is highly unlikely to reduce structure and function of the commonly encountered habitats to a point where there would be serious or irreversible harm.	There is evidence that the UoA is highly unlikely to reduce structure and function of the commonly encountered habitats to a point where there would be serious or irreversible harm.
	Met?	Both UoAs: Yes	Both UoAs: Yes	Both UoAs: No

Rationale

The handpicking fishery has a low impact on the sand/mud banks and it is likely to be short term. Thus, the team considers that it is highly unlikely that the UoA would reduce the structure and function of common encountered habitats (sand/mud banks) to a point where there would be serious or irreversible harm. SG60 and SG80 are met. Further information on the clam banks would be needed in order to achieve a higher score. SG100 is not met.

b	VME habitat status			
	Guide post	The UoA is unlikely to reduce structure and function of the VME habitats to a point where there would be serious or irreversible harm.	The UoA is highly unlikely to reduce structure and function of the VME habitats to a point where there would be serious or irreversible harm.	There is evidence that the UoA is highly unlikely to reduce structure and function of the VME habitats to a point where there would be serious or irreversible harm.
	Met?	Both UoAs: Yes	Both UoAs: Yes	Both UoAs: No

Rationale

Although it is unclear if the handpicking clam fishery occurs in or in the vicinity of mangrove forests, the assessment considered its likely impact of seabed disturbance and increase water turbidity to be very low and thus SG60 and SG80 are reached. There is however no quantitative evidence that the fishery does not affect mangrove forests SG100 is not reached.

c	Minor habitat status	
	Guide post	There is evidence that the UoA is highly unlikely to reduce structure and function of the minor habitats to a point where there would be serious or irreversible harm.
	Met?	Both UoAs: No

Rationale

Minor habitats are possibly sargassum beds. As above, evidence in form of research would be needed to support a SG100 score. While it is highly unlikely that the UoA would reduce structure and function of minor habitats to a point of serious or irreversible harm due to the nature of the fishing strategy, evidence is needed in order to meet the SG100 requirements. At present SG100 is not met.

References

Anhalzer et al. (2018)

Draft scoring range	≥80
Information gap indicator	More information sought on the UoAs interactions with mangrove forests.
Data-deficient? (RBF needed)	No

Scoring table 18. PI 2.4.2 – Habitats management strategy

PI 2.4.2		There is a strategy in place that is designed to ensure the UoA does not pose a risk of serious or irreversible harm to the habitats		
Scoring Issue		SG 60	SG 80	SG 100
a	Management strategy in place			
	Guide post	There are measures in place, if necessary, that are expected to achieve the Habitat Outcome 80 level of performance.	There is a partial strategy in place, if necessary, that is expected to achieve the Habitat Outcome 80 level of performance or above.	There is a strategy in place for managing the impact of all MSC UoAs/non-MSC fisheries on habitats.
	Met?	Both UoAs: Yes	Both UoAs: Yes	Both UoAs: No

Rationale

Fishing by handpicking either on foot or by free diving is confined to specific authorized bed. The nature of the fishing practice serves to justify that the UoAs achieve the Habitat Outcome 80 level of performance or above. SG60 and SG80 are both met. There is a general management plan for the ecosystem in the Altata y Ensenada del Pabellòn lagoon system (DOF: 24/9/2019) which constitutes a strategy to manage the impact of all fisheries, but it is unclear if the strategy has been implemented and thus SG100 is not met.

b	Management strategy evaluation			
	Guide post	The measures are considered likely to work, based on plausible argument (e.g. general experience, theory or comparison with similar UoAs/habitats).	There is some objective basis for confidence that the measures/partial strategy will work, based on information directly about the UoA and/or habitats involved.	Testing supports high confidence that the partial strategy/strategy will work, based on information directly about the UoA and/or habitats involved.
	Met?	Both UoAs: Yes	Both UoAs: Yes	Both UoAs: No

Rationale

The measures (the nature of the fishing practice and the banks restrictions) are considered likely to work and there is some objective basis for confidence to support this statement, and both SG60 and SG80 are met. The lack of specific research on the impact of the UoAs on habitats prevents the achievement of SG100.

c	Management strategy implementation			
	Guide post		There is some quantitative evidence that the measures/partial strategy is being implemented successfully.	There is clear quantitative evidence that the partial strategy/strategy is being implemented successfully and is achieving its objective, as outlined in scoring issue (a).
	Met?		Both UoAs: Yes	Both UoAs: No

Rationale

There is some quantitative evidence that the measures, such as the gears used in the fishery, are being implemented successfully. SG80 is met. However, this evidence cannot be considered "clear quantitative evidence" and so SG100 is not met for either UoAs. Also, until there is further evidence of the area closures being successfully implemented, the team cannot determine that there is clear quantitative evidence that the strategy implemented and achieving its objective.

d	Compliance with management requirements and other MSC UoAs'/non-MSC fisheries' measures to protect VMEs			
	Guide post	There is qualitative evidence that the UoA complies with its management requirements to protect VMEs.	There is some quantitative evidence that the UoA complies with both its management requirements and with protection measures afforded to VMEs by other MSC UoAs/non-MSC fisheries, where relevant.	There is clear quantitative evidence that the UoA complies with both its management requirements and with protection measures afforded to VMEs by other MSC UoAs/non-MSC fisheries, where relevant.
	Met?	Both UoAs: Yes	Both UoAs: Yes	Both UoAs: No

Rationale

The nature of this handpicking clam fishery and its deemed very low impact on mangrove forests constitutes some quantitative evidence that the UoAs comply with the protection of VMEs and SG80 is met. However, as there is uncertainty of the level of interaction of the UoA with mangroves, SG100 is not met.

References

Garcia (2021), DOF: 24/9/2019, http://dof.gob.mx/nota_detalle.php?codigo=5573429&fecha=24/09/2019

Anhalzer et al. (2018)

Draft scoring range	≥80
Information gap indicator	More information sought on the UoAs interactions with mangrove forests.

Scoring table 19. PI 2.4.3 – Habitats information

PI 2.4.3		Information is adequate to determine the risk posed to the habitat by the UoA and the effectiveness of the strategy to manage impacts on the habitat		
Scoring Issue		SG 60	SG 80	SG 100
a	Information quality			
	Guide post	The types and distribution of the main habitats are broadly understood. OR If CSA is used to score PI 2.4.1 for the UoA: Qualitative information is adequate to estimate the types and distribution of the main habitats.	The nature, distribution and vulnerability of the main habitats in the UoA area are known at a level of detail relevant to the scale and intensity of the UoA. OR If CSA is used to score PI 2.4.1 for the UoA: Some quantitative information is available and is adequate to estimate the types and distribution of the main habitats.	The distribution of all habitats is known over their range, with particular attention to the occurrence of vulnerable habitats.
	Met?	Yes	No	No

Rationale

The habitat maps available provide information on the types and distribution of main habitats. SG60 is met. However, the maps lack the necessary detail at the UoAs area, namely at the Altata-Ensenada Pabellón lagoon system, relevant to the scale and intensity of the UoAs. SG80 is not reached.

b	Information adequacy for assessment of impacts			
	Guide post	Information is adequate to broadly understand the nature of the main impacts of gear use on the main habitats, including spatial overlap of habitat with fishing gear. OR If CSA is used to score PI 2.4.1 for the UoA:	Information is adequate to allow for identification of the main impacts of the UoA on the main habitats, and there is reliable information on the spatial extent of interaction and on the timing and location of use of the fishing gear. OR	The physical impacts of the gear on all habitats have been quantified fully.

		Qualitative information is adequate to estimate the consequence and spatial attributes of the main habitats.	If CSA is used to score PI 2.4.1 for the UoA: Some quantitative information is available and is adequate to estimate the consequence and spatial attributes of the main habitats.	
	Met?	Yes	No	No

Rationale

Information provided by the habitat maps, as well as research by Zamora-Garcia (2021) are enough to broadly understand the nature of the main impacts of the gear on main habitats, including spatial overlap of habitat with fishing activity. SG60 is met. The number of licences together with the location of each bank provide information on the spatial extent, the timing and location of fishing. However, the level of interaction is uncertain as there is no information of habitats at a finer scale comparable to the fishery. SG80 is not met. Furthermore, there is no quantification of the physical impacts of the fishery and SG100 is also not met.

c	Monitoring			
	Guide post		Adequate information continues to be collected to detect any increase in risk to the main habitats.	Changes in all habitat distributions over time are measured.
	Met?		Yes	No

Rationale

The UoAs are likely to continue to be monitored through a study that has been proposed and that seems to be implemented (Zamora-Garcia 2021) and SG80 is reached. However, there is uncertainty if the habitat maps will continue to be updated and thus SG100 is not met.

References

Zamora-Garcia (2021), Anhalzer et al. (2018),

Draft scoring range	60-79
Information gap indicator	More information sought on the habitat fine scale distribution and on the frequency of habitats monitoring.

Scoring table 20. PI 2.5.1 – Ecosystem outcome

PI 2.5.1		The UoA does not cause serious or irreversible harm to the key elements of ecosystem structure and function		
Scoring Issue		SG 60	SG 80	SG 100
a	Ecosystem status			
	Guide post	The UoA is unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm.	The UoA is highly unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm.	There is evidence that the UoA is highly unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm.
	Met?	Yes	No	No

Rationale

The low impact nature of the fishing practice and the limited interactions with non-target species seems to support that the UoAs are unlikely to disrupt the key elements underlying ecosystem structure and function. Furthermore, the reduced scale and operation of the of the UoAs in recent years (noting that the UoAs are not the only entities targeting chocolata and chirla clams in the lagoon system) provides the team with confidence that the UoAs are unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be serious or irreversible harm. SG60 is met. SG80 is not met, because in recent years the chocolata clam fishery was shut down due to overfishing, and the wider ecosystem effects of this are not fully understood – and while the UoA is not solely to blame for this, the team considers that, following the precautionary approach, the “highly unlikely” wording is not met.

References

Garcia (2021), Anhalzer et al. (2018)

Draft scoring range	60-79
Information gap indicator	More information sought on the functioning and structure of the ecosystem.
Data-deficient? (RBF needed)	No

Scoring table 21. PI 2.5.2 – Ecosystem management strategy

PI 2.5.2		There are measures in place to ensure the UoA does not pose a risk of serious or irreversible harm to ecosystem structure and function		
Scoring Issue		SG 60	SG 80	SG 100
a	Management strategy in place			
	Guide post	There are measures in place, if necessary, which take into account the potential impacts of the UoA on key elements of the ecosystem.	There is a partial strategy in place, if necessary, which takes into account available information and is expected to restrain impacts of the UoA on the ecosystem so as to achieve the Ecosystem Outcome 80 level of performance.	There is a strategy that consists of a plan, in place which contains measures to address all main impacts of the UoA on the ecosystem, and at least some of these measures are in place.
	Met?	Yes	Yes	No

Rationale

The UoAs selective nature and its management through licences, gear and fishing ground restrictions and catch limits, all take into account the potential impact of the UoAs on key elements of the ecosystem by restricting fishing activity and having low impact. SG60 is met. There is also a general management plan for the ecosystem in the Altata y Ensenada del Pabellòn managing several aspects of the lagoon system. All these measures are expected to restrain impacts of the UoAs on the ecosystem namely trough the lack of interaction with primary, secondary or ETP species and VMEs so as to achieve the Ecosystem Outcome 80 level of performance. SG80 is also met. However, as the impact of reduced availability of clams to its predators is not addressed specifically, SG100 is not met.

b	Management strategy evaluation			
	Guide post	The measures are considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar UoAs/ ecosystems).	There is some objective basis for confidence that the measures/ partial strategy will work, based on some information directly about the UoA and/or the ecosystem involved.	Testing supports high confidence that the partial strategy/ strategy will work, based on information directly about the UoA and/or ecosystem involved.
	Met?	Yes	Yes	No

Rationale

The fact that the UoA does not interact with primary, secondary or ETP species, constitutes some objective basis for confidence that the management measures described above will work and both SG60 and SG80 are met. However, as there is no information on the impact of UoAs removals on higher trophic level species and its interactions with VMEs, SG100 is not met.

c	Management strategy implementation			
	Guide post		There is some evidence that the measures/partial strategy is being implemented successfully.	There is clear evidence that the partial strategy/strategy is being implemented successfully and is achieving its objective as set out in scoring issue (a).
	Met?		Yes	No

Rationale

There is evidence that the fishing licences, gear and fishing ground restrictions are being implemented successfully, while there is no catch of primary, secondary and ETP species and thus SG80 is met. However, there is no information regarding the implementation of the fishery catch limits, neither of the general ecosystem plan and thus SG100 is not met.

References

Garcia (2021), Anhalzer et al. (2018), DOF: 24/9/2019 http://dof.gob.mx/nota_detalle.php?codigo=5573429&fecha=24/09/2019

Draft scoring range	≥80
Information gap indicator	More information sought on the functioning and structure of the ecosystem.

Scoring table 22. PI 2.5.3 – Ecosystem information

PI 2.5.3		There is adequate knowledge of the impacts of the UoA on the ecosystem		
Scoring Issue		SG 60	SG 80	SG 100
a	Information quality			
	Guide post	Information is adequate to identify the key elements of the ecosystem.	Information is adequate to broadly understand the key elements of the ecosystem.	
	Met?	Yes	No	

Rationale

There is information available regarding the main key elements of the Altata y Ensenada del Pabellòn lagoon system, namely on possible primary, secondary, ETP, habitat types and VMEs and thus SG60 is reached. But there is no information how these elements interact and thus SG80 is not met.

b	Investigation of UoA impacts			
	Guide post	Main impacts of the UoA on these key ecosystem elements can be inferred from existing information, but have not been investigated in detail.	Main impacts of the UoA on these key ecosystem elements can be inferred from existing information, and some have been investigated in detail.	Main interactions between the UoA and these ecosystem elements can be inferred from existing information, and have been investigated in detail.
	Met?	Yes	No	No

Rationale

The UoAs impacts on primary, secondary and ETP species can be inferred based on existing information. However, while there is no information on the impact of the UoAs in the foodweb and on VMEs the requirements at SG60 are met, but not at SG80 and SG100.

c	Understanding of component functions			
	Guide		The main functions of the components (i.e., P1 target species, primary, secondary and	The impacts of the UoA on P1 target species, primary, secondary and ETP species and Habitats

	post	ETP species and Habitats) in the ecosystem are known.	are identified and the main functions of these components in the ecosystem are understood.
	Met?	No	No

Rationale

There is no ecosystem function study available that provides details for example of the foodweb and predator-prey interactions in the Altata y Ensenada del Pabellòn lagoon system to the best knowledge of the assessment team. There is also uncertainty of the level of interaction of the UoAs with VMEs. SG80 is not met.

d	Information relevance		
	Guide post	Adequate information is available on the impacts of the UoA on these components to allow some of the main consequences for the ecosystem to be inferred.	Adequate information is available on the impacts of the UoA on the components and elements to allow the main consequences for the ecosystem to be inferred.
	Met?	No	No

Rationale

As noted above, the impact of the UoAs on the various key components (primary, secondary, ETP species, VMEs) can be inferred from the information available. However the UoAs impact has not been investigated to any detail, and there are uncertainties in relation to which would be the main consequences for the ecosystem. SG80 is not reached.

e	Monitoring		
	Guide post	Adequate data continue to be collected to detect any increase in risk level.	Information is adequate to support the development of strategies to manage ecosystem impacts.
	Met?	No	No

Rationale

Some of the key elements of the ecosystem likely to be impacted by the UoAs continue to be monitored, such as UoAs catch composition. However, catch is not reported to species level, while the lack of stock assessment for the target species prevents the fishery from meeting the requirements at SG80, since it is not possible to determine

increases in the risk level associated to overfishing of both clam species. Furthermore, the uncertainties in relation to species present in the catch composition particularly when targeting chocolata clam and on interactions with ETP species prevent the UoA from meeting the requirements at SG80.

References

Garcia (2021), Anhalzer et al. (2018), DOF: 24/9/2019 http://dof.gob.mx/nota_detalle.php?codigo=5573429&fecha=24/09/2019

Draft scoring range	60-79
Information gap indicator	More information sought on the structure and functioning of the ecosystem.

7.3 Principle 3

As outlined in the proposal accepted by Pronatura Noroeste, Principle 3 will predominantly reflect where changes have taken place since the previous pre-assessment (Anhalzer et al., 2018). This analysis is based on a previous preassessment conducted by SCS Global Services, client submissions, and a review of publicly available information on the management framework. Additional background sections are presented here to complement the previous pre-assessment. Certain key documentation such as the *Carta Nacional Pesquera* and the *Implementacion de una zone de refugio pesquero en la bahía de Altata-Ensenada del Pabellon* have already been covered in the previous pre-assessment, they will not be reported on in the background section here but will be taken into account as appropriate in the scoring.

7.3.1 Legal and customary framework, and decision-making processes

This fishery takes place in the Altata-Ensenada del Pabellon lagoon system, in the state of Sinaloa. As such the fishing activities are found entirely within the Mexican EEZ, making the highest management division for the UoAs the Mexican National Government.

In Mexico, three agencies are in charge of the management of fisheries. The main science and research body is the Instituto Nacional de la Pesca (INAPESCA). This body is independent of the federal government, and issues recommendations for management. The decision-making for permits and general management of fishing effort is carried out by the Compision Nacional de Acuacultura y Pesca (CONAPESCA). This body is part of the Government of Mexico, as it is nested in the Secretaria de Agricultura, Ganaderia, Desarollo Rural, Pesca Y Alimentacion (SAGARPA). The third key entity is the Ministry of the Environment and Natural Resources (SEMARNAT), which is the government body in charge of protecting and conserving ecosystems and natural resources.

Another key component of the legal and customary framework is the "*Normas Oficiales Mexicanas*" (NOMs) – these define the specific management measures such as fishing gear requirements, closed areas or fishing seasons. These can be modified following the process outlined in Section 7.3.2 below. Decisions are made by committees composed of stakeholders, NGOs, and other interest groups. These stakeholders are mobilized through the *Comité Consultivo Nacional de Normalización de Pesca Responsable.*

The next echelon of fisheries management would be the regional governments. In this case, the relevant regional government is the Sinaloa State Government. The state government sets out, by decree, the laws and conditions in which fisheries must operate. A key document pertaining to this assessment is the "*Ley de pesca y acuacultura sustentables para el estado de Sinaloa*" (Mexico, 2021). This piece of legislation is nested within the wider "*Ley General de Pesca y Acuacultura Sustentables*" (LGPAS) of July 2007 (latest version is April 2018). The LGPAS sets out the general requirements and regulations for fisheries in the territory of Mexico, as well as the general roles and responsibilities of fisheries management in Mexico.

7.3.2 Consultation, roles and responsibilities

A 2019 report published in the Diario Oficial de la Federacion on the ecosystem-based fisheries management plan in the Altata-Ensenada del Pabellon lagoon (DOF, 2019) has identified several key stakeholder groups, operating across the various jurisdictions of the fisheries management framework of Mexico. In the part of the report describing the clam fishery (most pertinent to the UoA), there is a brief description of the fishing effort, which is mostly carried out by members of cooperatives, but

also by private fishers, and also potentially poachers. CONAPESCA and INAPESCA are cited as key management bodies (as they are for all fisheries in Mexico), as is the Ministry of Agriculture and Rural Development (SADER). Beyond these national level stakeholders, municipal governments were also cited as key components to the management of this fishery. Other key stakeholders include the Center for Food Research and Development, the Autonomous University of Sinaloa, the Institute of Marine Sciences and Limnology of the National Autonomous University of Mexico, and private companies like Pronatura Noroeste.

Since the previous pre-assessment, there have been efforts to put in place a committee for the management of fisheries in the Altata-Ensenada del Pabellon lagoon system. The following tables are transcribed from meeting notes of the "Comité Consultivo de Ordenamiento y Manejo Pesquero del Sistema Lagunar Altata-Ensenada del Pabellon" meeting, held on the 10th December 2020.

Table 15. Members of the Committee for the management of fisheries in the Altata-Ensenada del Pabellon lagoon system

Committee position	Held by representative of
Executive Secretary	General Directorate of fisheries and aquaculture management of CONAPESCA
Assistant Executive Secretary	General Directorate of Inspection and Surveillance of CONAPESCA
	Secretary of the Navy
Coordination Executive	Government of the State of Sinaloa Secretariat of Fisheries and Aquaculture
Technical Secretary	Deputy Director General of Pacific fisheries research of INAPESCA
Aquaculture production sector	Aquaculture operators
Fishing sector	The president of the Federation of Cooperatives in the Bay of Altata-Ensenada del Pabellon
	President of the Federation of Fishing Cooperatives
	President of the Federation of Societies and Cooperatives of First-Generation Touristic Services
	Representatives of Non-Federated Cooperatives: Lobas del Manglar and Almejeras de Santa Cruz
Special invitees	Navolato City Council
	Culiacan City council
	Project Coordinator of the Sinaloa Oceans Program, Environmental Defense Fund Mexico A.C.
	Pronatura Noroeste A.C.

As evidenced by the members of the Committee, and by the special invitees, a wide range of stakeholders are organised in a formal way to contribute to the management of fisheries in the Altata-Ensenada del Pabellon lagoon. The main outcome of this initial meeting was a unanimous agreement to formalise the abovementioned committee, other outcomes included administrative checks of the Operating Regulations of the committee, and the preparation of the next session in which the workplan for 2021 would be set out. The subsequent actions of this committee are not clear to the team.

7.3.3 Long term objectives

Long term objectives have been covered in the previous pre-assessment (Anhalzer et al., 2018), and there is no evidence indicating any significant changes have taken place regarding the long-term fisheries management policy and strategy in Mexico. The LGPAS and the National Fisheries Charter (Carta Nacional Pesquera) are still the central legislation governing fisheries management.

7.3.4 Fishery specific objectives

A key document in the setting of objectives for the UoA fisheries is the "Informe final para la implementación de una zona de refugio pesquero en la Bahía de Altata-Ensenada del Pabellón, Navolato, Sinaloa" (hereinafter referred to as Figueroa et al., 2016), and this has been covered in the previous pre-assessment report (Anhalzer et al., 2018).

After the self-imposed moratorium on exploiting the chocolate clam stock in 2014, the measure was first published for a period of two years by the Agreement of the 11th June 2018 (DOF, 11/06/2018) in the Fisheries Management plan and then was formalised on the 22nd of April 2020, where the chocolate clam fishery was closed through the Plan de Manejo Pesquero It was decided it would be closed for a further period of 2 years. On top of this, a closed area of 1.6ha has been in place since 2018 (scheduled duration of the closed area is 5 years, after which its effectiveness will be evaluated).

The management plan for the Altata-Ensenada del Pabellon lagoon system directly references the target species of the UoA in its Mollusc section (DOF, 2019). The tables below are a transcription and translation of the management measures in place as set out in this management plan.

Table 16. Management measures currently in effect for the chocolate clam (DOF, 2019)

Management action	Yes/No	Provisions	Basis for the provisions
Mexican Official Standard	No	-	-
Fisheries Management Plan	No	Being developed	-
Access type	Yes	Specific chocolate clam fishing license	Technical report of INAPESCA
Minimum size	Yes	Research in development for the lagoon system Altata-Ensenada del Pabellon, located in the municipalities of Navolato and Culiacan, in the state of Sinaloa. As a reference, on the east coast of the state of Baja California Sur, there is a 64 mm shell length limit for *M. squalida*, while an 80 mm shell length limit is in	Technical report of INAPESCA

		place on the west coast of Baja California Sur for the same species	
Gear type and fishing method	Yes	Hand collection only	Technical report of INAPESCA
Closure	Yes	Research is ongoing*	
Quota	Yes	Variable catch quota by zone and bank, with, as a base 20% of the population of *M. squalida* greater than the minimum catch size. *	Technical report of INAPESCA

*the team notes that other sources of information indicate that a closure was already in place when this document was published. The reason for the difference is that the closure was still just a community-level ban which was partially enforced. For this reason, the quotas were still in place as the ban was not yet a formal management measure.

Table 17. Management measures currently in effect for the chirla clam (DOF, 2019)

Management action	Yes/No	Provisions	Basis for the provisions
Mexican Official Standard	No	-	-
Fisheries Management Plan	No	Being developed	
Access type	Yes	Commercial fishing license	Technical report of INAPESCA
Minimum size	Yes	Research in development for the lagoon system Altata-Ensenada del Pabellon, located in the municipalities of Nacolato and Culiacan, in the state of Sinaloa. As a reference the limit, in Laguna Ojo de Liebre, Guerrero Negro is 30 mm in length and 45 mm in length in the rest of Baja California Sur.	Technical report of INAPESCA
Gear type and fishing method	Yes	Hand collection only	Commercial fishing license
Closure	No	Research is ongoing	
Quota	Yes	30 to 40% of the population above the minimum size	Technical report of INAPESCA
Effort limitation	Yes	Sinaloa: 11 permits with a total of 23 vessels*	Sub-delegation of fisheries by state

* different numbers are given for vessel numbers across the management plan so it is unclear exactly how many vessels in total target this species. In other parts of the management plan, it is stated that 24 vessels are covered by the 11 permits, it is also stated that there are 9 permits made available for 26 vessels. Yet another number was stated by CONAPESCA in 2019, where it was stated that 17 permits covering 37 vessels were issued.

These summaries are now two years old, but it is believed that the abovementioned measures are still in place for both fisheries. These measures are guided by a set of objectives also listed in the management plan: (1) target stocks are recovered, well managed, and protected; (2) increased profitability of fishing activities in the lagoon system; (3) more balanced and supportive social environment; (4) purified environmental conditions of the lagoon system; (5) inspection and surveillance system refined and updated. These are management objectives that apply directly to the UoA fisheries as it covers the Altata-Ensenada del Pabellon lagoon fisheries.

In this same management plan, several recommendations for the future have been set out, and these can be considered as informal objectives. They are: (1) to develop and publish the necessary legislation

to regulate the exploitation of molluscs, (2) to develop and publish management plans to structure the exploitation of molluscs, (3) to not increase fishing effort, (4) implement monitoring and enforcement programs to evaluate the impact of the fishery under the coordination and supervision of INAPESCA, (5) limit all diving activities to less than 30m in order to ensure the safety of the fishers, (6) establishing management based on the designation of quotas and closed periods (work on this last point has already begun).

7.3.5 Compliance and enforcement

While there are clear objectives to implement a monitoring, control, and surveillance system which would cover the UoA fisheries, this is currently not in place. As a result, there is no clear indication of the degree of compliance with the measures set out in the license. Some are likely to be met, such as the gear type and fishing method, but other measures such as catch limits are likely to be more difficult to determine. There is also an acknowledgement that a degree of IUU fishing is taking place, with an unknown number of fishers targeting clams without a licence.

7.3.6 Principle 3 Performance Indicator scores and rationales –

NOTE: given that this P3 section is an update of the previous SCS Global Services pre-assessment, and the team is simply adding to the work of the SCS team, the format of the scoring tables has been modified to match their scoring table for consistency.

Scoring table 23. PI 3.1.1 – Legal and/or customary framework

PI 3.1.1		The management system exists within an appropriate legal and/or customary framework which ensures that it: Is capable of delivering sustainability in the UoA(s); Observes the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood; and Incorporates an appropriate dispute resolution framework		
Scoring Issue		SG 60	SG 80	SG 100
a	Compatibility of laws or standards with effective management			
	Guide post	There is an effective national legal system and a framework for cooperation with other parties, where necessary, to deliver management outcomes consistent with MSC Principles 1 and 2	There is an effective national legal system and organised and effective cooperation with other parties, where necessary, to deliver management outcomes consistent with MSC Principles 1 and 2.	There is an effective national legal system and binding procedures governing cooperation with other parties which delivers management outcomes consistent with MSC Principles 1 and 2.
	Met?	Both UoAs: Yes	Both UoAs: Yes	Both UoAs: Yes
b	Resolution of disputes			
	Guide post	The management system incorporates or is subject by law to a mechanism for the resolution of legal disputes arising within the system.	The management system incorporates or is subject by law to a transparent mechanism for the resolution of legal disputes which is considered to be effective in dealing with most issues and that is appropriate to the context of the UoA.	The management system incorporates or is subject by law to a transparent mechanism for the resolution of legal disputes that is appropriate to the context of the fishery and has been tested and proven to be effective.
	Met?	Both UoAs: Yes	Both UoAs: Yes	Both UoAs: No

c	Respect for rights			
	Guide post	The management system has a mechanism to generally respect the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.	The management system has a mechanism to observe the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.	The management system has a mechanism to formally commit to the legal rights created explicitly or established by custom of people dependent on fishing for food and livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.
	Met?	Both UoAs: Yes	Both UoAs: Yes	Both UoAs: Yes

Overall Performance Indicator (PI) Rationale

Since the previous PA there have been no changes to this Performance Indicator. The modifications to the LGPAS are not directly relevant to this MSC pre-assessment, and they remain in line with the Principles of the MSC. Modifications include a specific provision to implement actions to mitigate the effect of climate change, the conditions in which stakeholders are eligible to meet to coordinate management efforts, a provision indicating that state-level management must be linked to national level management, articles on improving integration of producers to the *Consejo de Pesca y Acuacultura* with an aim to enhance communication channels between decision makers and producers and also improve data collection. As such, the effective national legal system described in the previous pre-assessment is still in place, and has strengthened in certain areas, particularly in improving the inclusivity of the decision-making processes.

On a national level, the *Ley Federal de Procedimiento Administrativo* provides a dispute resolution process for any non-compliance with the law. Further, Mexico is a signatory to UNCLOS, which provides mechanisms for dispute resolution in an effective and transparent way.

There is an objective in Article 2 of the LGPAS which states (translated from the original piece of legislation): Obtain rights of access, preferential use and benefits of fishery resources and aquaculture by communities and indigenous people. This represents a formal commitment to the legal rights created explicitly or established by custom of people dependent on fishing for food and livelihood in a manner consistent with the objectives of MSC Principles 1 and 2. **Minimum SG80 is achieved for all SIs.**

References

NA

Draft scoring range	≥80
Information gap indicator	Information sufficient to score PI

Scoring table 24. PI 3.1.2 – Consultation, roles and responsibilities

PI 3.1.2		The management system has effective consultation processes that are open to interested and affected parties The roles and responsibilities of organisations and individuals who are involved in the management process are clear and understood by all relevant parties		
Scoring Issue		SG 60	SG 80	SG 100
a	Roles and responsibilities			
	Guide post	Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are generally understood.	Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are explicitly defined and well understood for key areas of responsibility and interaction.	Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are explicitly defined and well understood for all areas of responsibility and interaction.
	Met?	Both UoAs: Yes	Both UoAs: Yes	Both UoAs: No
b	Consultation processes			
	Guide post	The management system includes consultation processes that obtain relevant information from the main affected parties, including local knowledge, to inform the management system.	The management system includes consultation processes that regularly seek and accept relevant information, including local knowledge. The management system demonstrates consideration of the information obtained.	The management system includes consultation processes that regularly seek and accept relevant information, including local knowledge. The management system demonstrates consideration of the information and explains how it is used or not used.
	Met?	Both UoAs: Yes	Both UoAs: No	Both UoAs: No
c	Participation			
	Guide post		The consultation process provides opportunity for all interested and affected parties to be involved.	The consultation process provides opportunity and encouragement for all interested and affected parties to be involved, and facilitates their effective engagement.

	Met?	Both UoAs: Yes	Both UoAs: No

Overall Performance Indicator (PI) Rationale

The role and responsibilities of key components of the management framework are well understood and are defined in the LGPAS for bodies such as CONAPESCA, INAPESCA, SEMARNAT, and SAGARPA (amongst others).

Formalized consultation processes are well established on the national level, and appear to be becoming more inclusive with the latest suite of modifications to the LGPAS. The consultation processes are set out in Article 44 of the Federal Law on Metrology and Normalization. It is clear that the approach to decision making involves many stakeholders, from government, to gear manufacturers, to academia, NGOs, and producers. On the state level, there are also defined consultation processes such as the *Consejos Estatales de Pesca y Acuacultura* which explicitly define their consultation processes, a specific strength of this piece of legislation is the consideration given to academia.

The UoAs of this preassessment have another layer of management, that which covers the Altata-Ensenada del Pabellon lagoon system through the Plan de Manejo Pesquero. In order to facilitate the implementation of this plan and to coordinate activities, the *Comité Consultivo de Ordenamiento y Manjeo pesquero del Sistema Lagunar Altata-Ensenada del Pabellon* was established in 2020. The assessment team was able to review the minutes and participants of the inaugural meeting of this committee. The previous pre-assessment concluded that, due to the apparent inactivity of the Sinaloa State Committee for Fisheries and Aquaculture (established in 2013), SG80 could not be considered to be met.

There has been no update on the activity of the Sinaloa State Committee for Fisheries and Aquaculture, though a new committee specifically for the Altata-Ensenada del Pabellon lagoon system has been developed. The founding meeting took place nearly two years prior to the time of writing, and the team has not been able to find any evidence of further meetings of further work conducted via this committee. It is likely that the COVID-19 pandemic has been a significant barrier to the effective progress of these committees, but nevertheless, the team has not been presented with a consultation progress that **regularly** seeks and obtains relevant information. As such, while some consultation processes are in place, and these consultation processes seek to involve representatives from a range of professional backgrounds, there is currently no evidence demonstrating that these consultation processes are regularly deployed. As such, SG60 is met, but SG80 is not met for this PI.

References

NA

Draft scoring range	60-79
Information gap indicator	More information sought on the operation of the local and regional consultation processes

Scoring table 25. PI 3.1.3 – Long term objectives

PI 3.1.3		The management policy has clear long-term objectives to guide decision-making that are consistent with MSC Fisheries Standard, and incorporates the precautionary approach		
Scoring Issue		SG 60	SG 80	SG 100
a	Objectives			
	Guide post	Long-term objectives to guide decision-making, consistent with the MSC Fisheries Standard and the precautionary approach, are implicit within management policy.	Clear long-term objectives that guide decision-making, consistent with MSC Fisheries Standard and the precautionary approach are explicit within management policy.	Clear long-term objectives that guide decision-making, consistent with MSC Fisheries Standard and the precautionary approach, are explicit within and required by management policy.
	Met?	Both UoAs: Yes	Both UoAs: Yes	Both UoAs: Yes
Overall Performance Indicator (PI) Rationale				

The scoring and rationale of the original pre-assessment still stands. The objectives set out in the LGPAS and outlined in the background clearly are in line with the MSC Principles and Criteria and the precautionary approach. These objectives are explicit and meet the SG100 requirements. **SG60, SG80, and SG100 are met**.

References

NA

Draft scoring range	≥80
Information gap indicator	Information sufficient to score PI

Scoring table 26. PI 3.2.1 – Fishery-specific objectives

PI 3.2.1		The fishery-specific management system has clear, specific objectives designed to achieve the outcomes expressed by MSC's Principles 1 and 2		
Scoring Issue		SG 60	SG 80	SG 100
a	Objectives			
	Guide post	Objectives, which are broadly consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are implicit within the fishery-specific management system.	Short and long-term objectives, which are consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are explicit within the fishery-specific management system.	Well defined and measurable short and long-term objectives, which are demonstrably consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are explicit within the fishery-specific management system.
	Met?	Both UoAs: Yes	Both UoAs: Yes	Both UoAs: Yes
Overall Performance Indicator (PI) Rationale				

A set of objectives are listed in the ratified Altata-Ensenada del Pabellon fisheries management plan, in the section specific to mollusc fisheries: (1) target stocks are recovered, well managed, and protected; (2) increased profitability of fishing activities in the lagoon system; (3) more balanced and supportive social environment; (4) improved environmental conditions of the lagoon system; (5) inspection and surveillance system refined and updated. These are management objectives that apply directly to the UoA fisheries as it covers the Altata-Ensenada del Pabellon lagoon fisheries.

These objectives are embedded in the fishery specific management system and cover many topics, from social equity, to security, and the outcomes expressed in Principle 1 and Principle 2 of the MSC Standard. SG60 is met.

Beyond these objectives, a workplan has been developed for molluscs, including both UoA target species. This plan lists clear actions, to achieve well defined objectives across a period of three years. The plan can be downloaded from here: https://www.gob.mx/inapesca/documentos/plan-de-manejo-pesquero-ecosistemico-del-sistema-lagunar-altata-ensenada-del-pabellon-sinaloa. The action plan and objectives for the relevant fisheries begin on page 37.

As such, the team believes that well defined and measurable short and long term objectives aligned with MSC's Principles 1 and 2 are in place, and SG80 and SG100 are met.

References

NA

Draft scoring range	≥80
Information gap indicator	Information sufficient to score PI

Scoring table 27. PI 3.2.2 – Decision-making processes

PI 3.2.2		The fishery-specific management system includes effective decision-making processes that result in measures and strategies to achieve the objectives, and has an appropriate approach to actual disputes in the fishery		
Scoring Issue		SG 60	SG 80	SG 100
a	Decision-making processes			
	Guide post	There are some decision-making processes in place that result in measures and strategies to achieve the fishery-specific objectives.	There are established decision-making processes that result in measures and strategies to achieve the fishery-specific objectives.	
	Met?	Both UoAs: Yes	Both UoAs: Yes	
b	Responsiveness of decision-making processes			
	Guide post	Decision-making processes respond to serious issues identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take some account of the wider implications of decisions.	Decision-making processes respond to serious and other important issues identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take account of the wider implications of decisions.	Decision-making processes respond to all issues identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take account of the wider implications of decisions.
	Met?	Both UoAs: No	Both UoAs: No	Both UoAs: No
c	Use of precautionary approach			
	Guide post		Decision-making processes use the precautionary approach and are based on best available information.	
	Met?		Both UoAs: No	
d	Accountability and transparency of management system and decision-making process			

	Guide post	Some information on the fishery's performance and management action is generally available on request to stakeholders.	Information on the fishery's performance and management action is available on request, and explanations are provided for any actions or lack of action associated with findings and relevant recommendations emerging from research, monitoring, evaluation and review activity.	Formal reporting to all interested stakeholders provides comprehensive information on the fishery's performance and management actions and describes how the management system responded to findings and relevant recommendations emerging from research, monitoring, evaluation and review activity.
	Met?	Both UoAs: Yes	Both UoAs: No	Both UoAs: No
e	Approach to disputes			
	Guide post	Although the management authority or fishery may be subject to continuing court challenges, it is not indicating a disrespect or defiance of the law by repeatedly violating the same law or regulation necessary for the sustainability for the fishery.	The management system or fishery is attempting to comply in a timely fashion with judicial decisions arising from any legal challenges.	The management system or fishery acts proactively to avoid legal disputes or rapidly implements judicial decisions arising from legal challenges.
	Met?	Both UoAs: Yes	Both UoAs: No	Both UoAs: No

Overall Performance Indicator (PI) Rationale

The decision-making process at the national level is well established. Decision making is defined as in Section 7.3.1. Beyond this, the CONAPESCA website provides further details, notably on transparency and accountability, and on the way in which stakeholder consultation takes place through the National Advisory Committee for Responsible Fisheries. There is however no information available directly on the UoA's performance. This is most likely due to the lack of monitoring, control and enforcement around the UoAs.

While the chocolate clam fishery closure is a response to a serious issue in the fishery, the assessment team does not believe this was done in a timely manner, given that a voluntary closure was required by the fishermen before any formal management action was taken. The lack of regulation and control of the chocolate clam fishery was acknowledged in the *Informe final para la implementacion de una Zona de refugio Pesquero en la Bahia de Altata-Ensenada del Pabellon* and was cited as one of the reasons that the population of this species was significantly reduced. As a result, SG60 is not met for SIb.

In terms of the performance of the fishery, and relevant management action, some information was provided to the team via Pronatura Noroeste, namely licencing conditions. There is also some information available in the Altata-Ensenada del Pabellon fisheries management plan (Plan de Manejo Pesquero) on clam catch trends, and so the team determines that some information is available on the fishery's performance.

According to the documents and legislation presented to the team, management decisions are taken based on the precautionary approach. It is not clear if they are based on the best available information, as the team has not seen information gathering in practice.

As for the approach to disputes, there is no evidence indicating that the fishery or management authority is acting in defiance of any laws pertaining to the sustainability of the fishery. **SG60 is met**. The team is not aware of how the fishery/management authority responds to judicial decisions – further information should be sought on this. **SG80 not met.**

References

NA

Draft scoring range	<60
Information gap indicator	More information sought on the approach to disputes within the fishery.

Scoring table 28. PI 3.2.3 – Compliance and enforcement

PI 3.2.3		Monitoring, control and surveillance mechanisms ensure the management measures in the fishery are enforced and complied with		
Scoring Issue		SG 60	SG 80	SG 100
a	MCS implementation			
	Guide post	Monitoring, control and surveillance mechanisms exist, and are implemented in the fishery and there is a reasonable expectation that they are effective.	A monitoring, control and surveillance system has been implemented in the fishery and has demonstrated an ability to enforce relevant management measures, strategies and/or rules.	A comprehensive monitoring, control and surveillance system has been implemented in the fishery and has demonstrated a consistent ability to enforce relevant management measures, strategies and/or rules.
	Met?	Both UoAs: No	Both UoAs: No	Both UoAs: No
b	Sanctions			
	Guide post	Sanctions to deal with non-compliance exist and there is some evidence that they are applied.	Sanctions to deal with non-compliance exist, are consistently applied and thought to provide effective deterrence.	Sanctions to deal with non-compliance exist, are consistently applied and demonstrably provide effective deterrence.
	Met?	Both UoAs: No	Both UoAs: No	Both UoAs: No
c	Compliance			
	Guide post	Fishers are generally thought to comply with the management system for the fishery under assessment, including, when required, providing information of importance to the effective management of the fishery.	Some evidence exists to demonstrate fishers comply with the management system under assessment, including, when required, providing information of importance to the effective management of the fishery.	There is a high degree of confidence that fishers comply with the management system under assessment, including, providing information of importance to the effective management of the fishery.
	Met?	Both UoAs: Yes	Both UoAs: No	Both UoAs: No

d	Systematic non-compliance		
	Guide post		There is no evidence of systematic non-compliance.
	Met?		Both UoAs: Yes

Overall Performance Indicator (PI) Rationale

While management plans (for both the UoA fishery and the Altata-Ensenada del Pabellon) call for monitoring control and surveillance efforts, the team has seen no evidence that these effectively ensure that the requirements and laws are upheld. In fact, much of the evidence presented to the team cites a lack of monitoring, control, and surveillance as one of the causes for the recent decline of the chocolate clam stock. Though there are thought to be checks on whether or not fishers carry the appropriate licence, this alone cannot be considered "mechanisms" as stated in the SG60 guidepost, further, this measure in isolation cannot be considered effective in ensuring the conditions of the licence are met. SG60 not met.

The team has been presented with an inspection report from 2021, where a surveillance team inspected the closed area for chocolate clam. The inspection report indicates that people were seen collecting clams, and fled once they noticed the surveillance team. Twelve kilos of chocolate clam were found, with many juveniles among the catch. The clams were then returned to the wild by the officers. Unfortunately, it was not possible to identify the individuals carrying out the illegal fishing activity. As a result, there is no evidence of sanctions being applied, though there is evidence of monitoring and enforcement activities (whether they are an effective deterrent is not known at this time).

The team has also not seen any evidence that sanctions are applied in cases of non-compliance. As a result, the team is not able to determine if the current ban on targeting chocolate clam is effective deterrent, though the voluntary suspension of fishing this species is a sign that licence-holding fishermen may honour the ban. This self-imposed ban provides an indication that fishers may generally comply with the management system for the fishery under assessment, but there is currently no documented evidence of checks or inspections to substantiate this.

References

NA

Draft scoring range	<60
Information gap indicator	More information sought on monitoring initiatives since the documentation presented to the team was published.

Scoring table 29. PI 3.2.4 – Monitoring and management performance evaluation

PI 3.2.4		There is a system of monitoring and evaluating the performance of the fishery-specific management system against its objectives There is effective and timely review of the fishery-specific management system		
Scoring Issue		SG 60	SG 80	SG 100
a	Evaluation coverage			
	Guide post	There are mechanisms in place to evaluate some parts of the fishery-specific management system.	There are mechanisms in place to evaluate key parts of the fishery-specific management system.	There are mechanisms in place to evaluate all parts of the fishery-specific management system.
	Met?	Both UoAs: No	Both UoAs: No	Both UoAs: No
b	Internal and/or external review			
	Guide post	The fishery-specific management system is subject to occasional internal review.	The fishery-specific management system is subject to regular internal and occasional external review.	The fishery-specific management system is subject to regular internal and external review.
	Met?	Both UoAs: No	Both UoAs: No	Both UoAs: No
Overall Performance Indicator (PI) Rationale				

No mechanisms to evaluate the fishery specific management system can be discerned. While the review of the Altata-Ensenada del Pabellon fisheries management plan could be considered an occasional internal review, this is the first management plan of its kind, and so the review of this plan cannot be considered an “occasional internal review” since it’s only happened once. If the management plan were to undergo a review before it is replaced by a new management plan, this might be considered a form of occasional internal review. As this is not currently in place, the team determines that SG60 is not met for this PI.

References

NA

Draft scoring range	<60

Information gap indicator	More information sought on management plan reviews within the Altata-Ensenada del Pabellon (or indeed, any other fishery-specific management system)

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9 Appendices

Appendix 1 Assessment information

Appendix 1.1 Small scale fisheries

Table 18. MSC small scale fisheries

Unit of Assessment (UoA)	Percentage of vessels with length <15m	Percentage of fishing activity completed within 12 nautical miles of shore
1	100%	100%
2	100%	100%

Appendix 2 Evaluation processes and techniques

Appendix 2.1 Site visits

No site visit was held for this pre-assessment.

Appendix 2.2 Recommendations for stakeholder participation in full assessment

In a full assessment, it would be beneficial to speak to fishers, buyers, members of the management committee of the Altata-Ensenada del Pabellon lagoon system, representatives of the UoA cooperatives, the research bodies conducting work on the target species, a member of the control and inspection authority in the region, local and international NGOs who could provide expertise on the Altata-Ensenada del Pabellon lagoon system, and perhaps a representative of a fisheries governance body.

Appendix 2.3 Risk-based Framework outputs

2.3.1 Consequence Analysis

Annex PF3 requires that the team select the subcomponent on which the fishery has the largest impact to determine whether the fishery causes “detectable change”, “possible detectable change”, or “insignificant change” on the following subcomponents: population size, reproductive capacity, age/size/sex structure, and geographic range.

To reach a robust conclusion for the Consequence Analysis, thorough stakeholder workshops would need be held. These meetings were outside the scope of this pre-assessment, and the assessment team recommends that the Consequence analysis be explored by local stakeholders in combination with Pronatura Noroeste.

Table 11. CA scoring template

	Scoring element	Consequence subcomponents	Consequence score
Principle 1: Stock status outcome	Chirla clam chocolata clam	**Population size**	Unknown
		Reproductive capacity	Unknown
		Age/size/sex structure	Unknown
		Geographic range	-
Rationale for most vulnerable subcomponent	To be discussed with stakeholders		
Rationale for consequence score	To be discussed with stakeholders		

2.3.2 Productivity Susceptibility Analysis (PSA)

Table 21. PSA productivity attributes and scores

Performance Indicator	**1.1.1**	
Productivity		
Scoring element (species)	Chocolata clam (*Megapitaria squalida*)	
Attribute	Rationale	Score
Average age at maturity	1.2-2.2 years	**1**
Average maximum age	3/4 years	**1**
Fecundity	8 million eggs/individual	**1**
Reproductive strategy	Broadcast spawner	**1**
Trophic level	Assume <2.75	**1**
Density dependence Invertebrates only	Assumed no depensatory or compensatory dynamics demonstrated or likely	**2**
Susceptibility		
Attribute	Rationale	Score
Areal Overlap	The hand picked fishery operate in an area corresponding to more than 30% of the stock area.	**3**
Encounterability	High overlap with fishing method - default score for target species.	**3**
Selectivity of gear type	Individuals < size at maturity are frequently caught and individuals < half the size at maturity are retained by gear.	**3**
Post capture mortality	Retained species default score.	**3**

Table 21. PSA productivity attributes and scores

Performance Indicator	**1.1.1**	
Productivity		
Scoring element (species)	Chirla clam (*Chione californiensis*)	
Attribute	Rationale	Score
Average age at maturity	3-4 years	**1**
Average maximum age	2-3 years	**1**
Fecundity	Several million eggs, based on other small clam species fecundity	**1**
Reproductive strategy	Broadcast spawner	**1**
Trophic level	Assumed <2.75	**1**

Density dependence Invertebrates only	Assumed no depensatory or compensatory dynamics demonstrated or likely	**2**
Susceptibility		
Attribute	Rationale	Score
Areal Overlap	The hand picked fishery operate in an area corresponding to more than 30% of the stock area.	**3**
Encounterability	High overlap with fishing method - default score for target species.	**3**
Selectivity of gear type	Individuals < half the size at maturity are rarely caught.	**1**
Post capture mortality	Retained species default score.	**3**