Pre-Assessment of the Clam fishery: chocolata (*Megapitaria squalida*), red (*M. aurantiaca*) and white (*Dosinia ponderosa*) in Puerto Libertad, Gulf of California, Mexico

Prepared for:

Sociedad Cooperativa de Producción Pesquera Mojarra del Arrecife SC de RL de CV.

Prepared by:

Ernesto Gastélum Nava, Lorena Rocha Tejeda & Francisco Javier Fernández Rivera Melo (COBI)

Reviewed by:

Mónica Valle-Esquivel, Jodi Bostrom, and Erin Wilson

(MRAG Americas)

Validated by MRAG Americas

April, 2020

Comunidad y Biodiversidad, A.C.

Calle Isla del Peruano #215
Colonia Lomas de Miramar
Guaymas, Sonora, México, CP 85448
Correo electrónico pes@cobi.org.mx (información)

Conformity Assessment Body (CAB)	MRAG Americas
Fishery client	Sociedad Cooperativa de Producción Pesquera Mojarra del Arrecife SC de RL de CV
Assessment Type	Comprehensive pre-assessment
Project code	US2647_COBI_MX_PA_Validation
Version	3.0
Prepared by	Ernesto Gastélum Nava, Lorena Rocha Tejeda and Francisco Javier Fernández Rivera Melo (COBI)
Reviewed by	Mónica Valle-Esquivel, Jodi Bostrom, Erin Wilson (MRAG Americas)
Approved by	Amanda Stern-Pirlot (MRAG Americas)

Content

1.1 Tables

1.2 Figures

Glossary

Biomass: Individual or group of individuals of a species of stock, expressed in weight.

Bycatch: Species caught in a fishery whose objective is a different species or a different size interval of the same species.

Ecosystem health: A measure of the ecosystem's adaptability (its capacity to maintain its structure and behaviour pattern under stress), the organization (number and diversity of the interactions between components of the ecosystem) and the energy (a measure of the activity, the metabolism or primary productivity). A healthy ecosystem is capable of maintaining its structure (organization) and function (vigour) over time during situations of stress (adaptability).

Exclusive economic zone (EEZ): An area subject to national jurisdiction (up to 200 miles wide) declared in accordance with the provisions of the United Nations Convention regarding the Law of the Sea of 1982, in which the coastal state has the right to explore and exploit living and non-living resources and the obligation to conserve and organize them.

Fishery: The term refers to the sum of all fishing activities of a given resource. For instance, hake or shrimp, or the activities of a unique type or method of fishing for a resource, e.g. fishing with nets near the beach or trawling.

Fishing effort: Represents the number of fishing gears of a specific type used in the fishing grounds in a given unit of time, p.eg. Number of drag hours, number of hooks thrown or number of times a purse seine is charged, per day, etc.

Fishing gear: Represents the set of materials and implements used to carry out activities aimed at extracting fishing resources.

Fishing permits: It is the document by means of which the competent authority authorizes physical (private) or moral persons (cooperative societies or companies), so that they can carry out extraction activities of species whose total, partial or temporary life is water, to the obtaining of economic benefits.

Fishing quotas: Fishing quote cannot be transferable, hereditary or tradable. Establish the quantity of resource that can be extracted during the fishing season, helping to maximize resource use under the principle of maximum sustainable yield (Cunningham, 2013). Fishing quotas are used to control biomass extraction, so as not to exceed biological limits.

Hookah: The hookah system consists in the provision of air to the diver from the surface by means of an armed machine that is on the deck of the boat. The machine is made up of an internal combustion engine or air compressor that sucks the ambient air and introduces it into a container tank.

Indicator: A variable of a system (such as a fishery) that can be tracked, in order to have a measurement of the state of the system at a given time. Each of the indicators must be linked to one or more reference points and used to monitor the status of the fishery in relation to the reference points.

Logbooks: Notebook that allows you to keep a written record of various actions.

Over exploitation: It is to perform an excessive activity on them, to extract an extra profit, without thinking about the damage they cause, being able to extinguish them if they aren't renewable or prevent their normal reproduction because of the intense use if they are not renewable.

Reference point: It is a point of fixed rate that serves as a basis for evaluating the results of the management regarding the achievement of an operational objective and that corresponds to a situation considered desirable (objective points of reference) or undesirable, which when it occurs requires immediate adoption of measurements (reference limit point).

Stock: Group of surviving individuals available from the cohorts of a fishery resource in a given time period, which can be referred to as biomass or number of individuals.

Trophic level: Position of organisms in the food chain, determined by the transfer of energy from one level to another.

Acronyms

BRP: Biological Reference Point.

CA: Consequence Analysis

CAB: Conformity assessment body.

CITES: The Convention on International Trade in Endangered Species of Wild Fauna and Flora.

CNP: National Fishery Chart**.**

COBI: Comunidad y Biodiversidad, A.C.

CONAPESCA: National Commission of Fishing and Aquaculture, in charge for managing and organizing the fishing activity in Mexico.

CPUE: Catch per Unit of Effort.

CRIAP: Regional Aquaculture and Fisheries Research Center.

CSO: Civil Society Organizations.

DOF: Official Gazette.

ETP: Endangered, threatened, and protected species**.**

FAO: United Nations Food and Agricultural Organisation

FIP: Fishery Improvement Project.

GC: Gulf of California.

GDIS: General Directorate of Inspection and Surveillance.

HCR: Harvest Control Rules

INAPESCA: National Institute of Fisheries and Aquaculture.

IUCN: International Union for Conservation of Nature.

LGEEPA: General Law of Ecological Equilibrium and Environmental Protection.

LGPAS: General Law of Sustainable Fishing and Aquaculture.

MBA: Monterrey Bay Aquarium.

MSC: Marine Stewardship Council

MSY: Maximum Sustainable Yield.

NOM: Official Mexican Standard.

PI: Performance Indicator.

PMP: Fisheries Management Plan.

PSA: Productivity Susceptibility Analysis.

PRI: Point of Recruitment Impairment

PROFEPA: Federal Attorney of Environmental Protection.

RBF: Risk Base Framework.

SADER: Secretary of agriculture and rural development.

SAGARHPA: Ministry of Agriculture, Livestock, Water Resources, Fisheries and Aquaculture, to the state of Sonora.

SAGARPA: Ministry of Agriculture, Livestock, Rural Development, Fisheries, and Food.

SAGARHPA: Secretariat of Agriculture, Livestock, Water Resources, Fisheries and Aquaculture, to the state of Sonora.

SCT: Ministry of Communications and Transportation.

SCPP: Cooperative Society of Fishery Production.

SEMAR: Marine Ministry.

SEMARNAT: Ministry of the Environment and Natural Resources.

SENASICA: National Service of Health, Safety and Food Quality.

SG: Scoring Guidepost.

SI: Score issue.

TAC: Total Allowable Catch.

UNAM: National Autonomous University of Mexico.

UoA: Unit of Assessment is defined as what is under evaluation and includes: a) the target population, b) the fishing gear or method, and c) the fleet, or vessels, individual fishing operators and other eligible fishers.

UoC: Unit of certification.

2 Executive summary

This report presents the results of a previous Marine Stewardship Council (MSC) evaluation of the chocolata clam (*Megapitaria squalida*), white clam (*Dosinia ponderosa*) and red clam (*Megapitaria aurantiaca*) fishery in Puerto Libertad, Sonora. This assessment refers to the Principles of the MSC for Sustainable Fisheries.

The report only provides guidance and the result of a full evaluation will be subject to deliberation by an evaluation team. A full MSC assessment would not necessarily be influenced by the results of this pre-assessment. In the MSC evaluation process, the burden of proof lies with the fishery. This previous assessment describes the fishery in the Gulf of California, focusing on the northwestern part of Sonora, where the vessels of the Mojarra del Arrecife Cooperative operate. The cooperative has four commercial vessels that are directly engaged in fishing.

The Client Group are integrated by the "Cooperative Society of Fishery Production (SCPP) Mojarra del Arrecife SC de RL de CV ", B. Sc. Ernesto Gastélum Nava, B. Sc. Lorena Rocha Tejeda and M. Sc. Francisco Javier Fernandez Rivera Melo (COBI) carried out the pre-assessment and Dr. Mónica Valle-Esquivel (MRAG Americas) led the review.

B.Sc. Ernesto Gastélum Nava carried out the pre-assessment. He graduated from the Technological Institute of Guaymas as an Aquaculture Engineer. He currently works as sustainable fisheries project manager in Comunidad y Biodiversidad, A. C. (www.cobi.org.mx), a civil society organization (CSO) with the mission of promoting the conservation of marine biodiversity and the establishment of sustainable fisheries through participation effective. He comes from a family of fishermen (artisanal and industrial) from the central region of the Gulf of California and has four years of experience working in projects for the management and use of sustainable fisheries tools, as well as in coastal fishing management actions in the state of Sonora and Baja California.

Currently, in COBI, Mr. Gastélum is responsible for Fishery Improvement Projects (FIP): Integrating tools for conservation and fisheries management of the clam resource in Puerto Libertad: marine reserves and sustainable fishing", as well as the "Integrated management for the use and recovery of penshell (*Atrina tuberculosa*) in the Midriff Islands Region, Sonora".

B.Sc. Lorena Rocha Tejeda. She joined to COBI, in 2016 as an assistant to the strategic line Sustainable Fisheries, where she supported projects focused on regulatory issues, fishing management tools and integrated management areas for the recovery of bivalves in Sonora. In 2017 she became a Sustainable Fisheries Project Manager, in the Fishery Improvement Project (FIP) of jumbo squid in the Gulf of California, working in direct coordination with the National Committee System Product jumbo squid that integrates four states (Baja California, Baja California Sur, Sonora and Sinaloa), fishers, CSO, government institutions, scientists, and other stakeholders. Likewise, she is supporting other activities related to other bivalve FIPs (clams and penshells), yellowtail, ocean whitefish, red snapper, Caribbean lobster), and contributing to development and implementation of these projects, which COBI leads in Mexico. In the past three years she has participated in national and international workshops and forums on the implementation of fisheries sustainability standards and Fishery Improvements Projects, also collaborating in the development of fisheries management plans, and in the creation of action plans for sustainable fisheries. She is in charge of updating all of COBI's Fishery Improvement Projects on the official FIPs platform: FisheryProgress.org. Lorena received a B.Sc. in Marine Biology, from Universidad del Mar (UMAR) in Puerto Angel, Oaxaca (2007-2012), where she worked with reproductive aspects of finfish and cephalopods.

M.Sc. Francisco Fernandez Rivera Melo carried out the pre-assessment. He graduated from the Universidad Autonoma de Baja California Sur as a Marine Biologist and has a master's degree in Marine and Coastal Management. He has 15 years of experience developing and implementing projects for sustainable fisheries management in collaboration with rural communities, authorities and CSO. He possesses solid skills in building capacity in fishermen, college students and managers. Mr. Fernandez has knowledge and experience with Mexican fisheries management tools (no-take zones, quotas, fishing gear, etc.). He is also experienced in underwater monitoring. He currently works as a sustainable fisheries coordinator at COBI. He is responsible to supervise the implementation and fundraising for the Sustainable Fisheries Program in COBI. Other activities are designed, assess and implement Fishery Improvement Projects in eight fisheries in Mexico (clams, penshell, squid, octopus, spiny lobster, ocean tilefish, yellowtail and red snapper). He is an Associate technical consultant for Marine Stewardship Council.

Dr. Mónica Valle-Esquivel (Oversight and Review) joined MRAG Americas in 2010 as Senior Fisheries Biologist. She has over 15 years of experience in the sustainable management of marine fisheries. She specialized in fish and shellfish population dynamics, stock assessment, design and evaluation of management strategies, statistical analysis, risk analysis, and fishery simulation modeling. Dr. Valle worked with the University of Miami and NOAA Fisheries as a post-doctoral stock assessment scientist, and has provided scientific advice to FAO, CITES, CARICOM, ACP Fish II, and other international organizations for the management of tropical marine species the US, Latin America, and the Caribbean. In Mexico she coordinated a United Nations (UNIDO) coastal management project within the Gulf of Mexico Large Marine Ecosystem program. At MRAG Americas, Dr. Valle has worked with institutions, scientists, fishers, managers, CSO, and other stakeholders to promote and achieve sustainability of fishery resources around the world. She is a certified Marine Stewardship Council lead assessor, and for nine years has served as a team leader and member for several fisheries, ranging from invertebrate fisheries to highly migratory fish. Among other professional achievements, Dr. Valle has acquired wide experience in the development and implementation of fishery improvement projects and fishery management plans, in the design and analysis of various monitoring programs, and in essential fish habitat and ecosystem assessments. Dr. Valle received a B.Sc. degree in Biology from the National Autonomous University of Mexico (UNAM), and a Ph.D. in Marine Biology and Fisheries from the Rosenstiel School of Marine and Atmospheric Science, University of Miami.

In a full assessment, the fishery must reach a score of 60 or more on all scoring issues to achieve certification. In addition, all PIs need to reach a minimum score of SG60 in a full assessment. A Principle level score is calculated as a sum of the weighted average of the individual PIs within each Principle. A summary of the main findings in each principle is provided below.

Principle 1

Strengths: The National Fishery Chart (CNP) (DOF, 2018) defines the clam fishery as a resource with development potential in the state of Sonora. It has a variable catch quota by zone and bank, based on 15% of the population size of the *M. aurantiaca* and 20% of *M. squalida* greater than the minimum catch size. In addition, in Puerto Libertad, only one cooperative (Mojarra del Arrecife) has three permits from the three species: red clam, chocolata clam, and white clam (*Dosinia ponderosa*). The white clam's management tools are defined in the commercial fishing permit. These permits describe the minimum authorized sizes and fishing banks for each specie. The Mojarra del Arrecife cooperative is committed to the sustainable fishing of the resource. INAPESCA, the cooperative, and COBI work together to carry out evaluations of the three species to estimate annual catch quotas.

Weaknesses: The current status of the stocks is unknown because the information is not available to the public.

Principle 2

Strengths: The fishing method used by the clam fishery consists of a highly selective method (hand collection) and there is no recorded bycatch (primary, secondary and ETP species). The divers of the Mojarra del Arrecife cooperative, perform underwater monitoring of the habitat where the clams are found, and also monitor the fishery through the use of fishing logbooks.

Weaknesses: The fishing method is unlikely to affect the structure and function of the ecosystem. However, there is no information about the effect of extracting clams biomass from the ecosystem. An ecosystem model is being developed to prove there is no negative impact in the food chain. The fishery has a lack of documented and public information on this subject.

Principle 3

Strengths: The legal system in Mexico includes a structured, and generally effective fishery management system that meets most of the MSC criteria for P3. Fisheries policy is based on a Fisheries Law (LGPAS) that delegate's management and research responsibilities to CONAPESCA and INAPESCA. These agencies collaborate with other federal, state and municipal authorities in the development, implementation, and enforcement of fisheries laws and regulations. There is a consultation process open to interested parties, and the roles and responsibilities are generally clear.

Weaknesses: There is no management plan for the clam fishery in the Gulf of California, nor is there an official standard with defined specific objectives. Management would be strengthened through a community management plan. Illegal fishing is reported to CONAPESCA but these reports are not considered. Evidence of compliance by

the fishery is required, as well as an assessment of the magnitude and characteristics of illegal fishing in the region. MCS activities may need to be reinforced and better documented.

Conclusion: Some improvements are necessary to meet the MSC requirements to become a candidate for certification. This pre-assessment should help to identify the main issues that the ongoing FIP should address.

3   Introduction

The Mojarra del Arrecife Cooperative Society in association with Comunidad y Biodiversidad, A.C. Mexico, hired MRAG Americas to review and validate a preliminary assessment, following the standards of the MSC, for the clam fishery captured by hookah diving in the town of Puerto Libertad in the Gulf of California. The fishery targets is the chocolata clam (*Megapitaria squalida*), white clam (*Dosinia ponderosa*) and red clam (*Megapitaria aurantiaca*).

In this report, the fishery is analyzed with the objective of obtaining a comprehensive vision that allows responsible decision making for the implementation of a fishery improvement program. The client chose to follow the MSC methodology because it uses the most rigorous and demanding standards available.

An additional objective is to identify any obstacle to certification and provide recommendations to improve each of the performance indicators that are evaluated, which are provided in the scoring tables. In addition, once a sustainable framework is implemented, it would be desirable for the Client to seek access to new and better national and international markets.

The Mojarra del Arrecife cooperatives provide information through the use of fishing logbooks. The bodies responsible for research and fisheries regulations, such as INAPESCA, CONAPESCA and the SAGARHPA, have been working closely with producers and CSO for the sustainable management of the clam fishery in Puerto Libertad.

3.1   Aims and constraints of the pre-assessment

The MSC is an independent, global, non-profit organization. It works to enhance the responsible management of seafood resources and to ensure the sustainability of global fish stocks and the health of the marine ecosystem. The MSC harnesses consumer power by identifying sustainable seafood products through an eco-label. The MSC has identified the following mission statement: "To safeguard the world's seafood supply by promoting the best environmental choice."

The objective of pre-assessments is to provide a focus for an eventual Fishery Improvement Project or MSC full assessment. This part of the process provides a basis for understanding the fishery in the context of the MSC Fishery Certification Requirements v2.0 and informs the client of the likelihood of achieving certification of their fishery. The pre-assessment also clarifies with the client the philosophy and expectations of the MSC and identifies the strengths and weaknesses of the fishery with respect to the MSC Standard.

For the preparation of this pre-assessment report, the requirements of the "Fisheries Certification Requirements v2.0" were used as a basis and the "MSC Pre-Assessment Reporting Template v3.0" format provided by the MSC was used. There were no constraints for this pre-assessment.

3.2   Version details

The pre-assessment was conducted in accordance with the certification requirements of the MSC v2.3. The MSC pre-assessment report template v3.0 was used for the report.

Table 1. Fisheries program documents versions

Document	Version number
MSC Fisheries Certification Process	**Version 2.1**

MSC Fisheries Standard	**Version 2.01**
MSC General Certification Requirements	**Version 2.0**
MSC Pre-Assessment Reporting Template	**Version 3.0**

4   Unit(s) of Assessment

4.1   Unit(s) of Assessment

Based on the revised information, it was determined that the clam fishery in this pre-assessment is within the scope of the MSC program because: (i) introduced species are not used, (ii) the fishery does not use destructive practices such as poison or explosives, (iii) fishing takes place within the Mexican exclusive economic zone (EEZ) and there is no unilateral exemption from any international agreement, (iv) the fishery is not subject to any agreement of international management, (v) the fishery has not been considered within any certification process and (vi) the clam species of the *Megapitaria* and *Dosinia* genus are not considered in any protection or conservation list, their fishing banks are commercially virgin. Based on the above, it is confirmed that the Puerto Libertad clam fishery is manually caught by hookah diving and can be evaluated within the MSC's principles for fisheries sustainability.

The unit of assessment (UoA), in which the present work is focused, is the artisanal fishery of clams caught manually by hookah diving in the Gulf of California, mainly in the town of Puerto Libertad in the state of Sonora, by the Mojarra del Arrecife cooperative.

The Mojarra del Arrecife cooperative is the only cooperative that works with the clam resource and has permits for the extraction of chocolata clam (*M. squalida*), red clam (*M. aurantiaca*) and white clam permit (*Dosinia ponderosa*) in Puerto Libertad, Sonora.

Table 2. Unit(s) of Assessment (UoA)

UoA	Description
Species	Chocolata clam (*Megapitaria squalida*), Red clam (*Megapitaria aurantiaca*) and White clam (*Dosinia ponderosa*)
Stock	Chocolata, red, and white clams: Gulf of California stocks
Geographical area	Northern Gulf of California, Mexico.
Harvest method/gear	Manual by hookah-type diving
Client group	SCPP Pesquera Mojarra del Arrecife SC de RL de CV
Management system	SAGARHPA- CONAPESCA and INAPESCA
Other eligible fishers	Divers that work with the cooperative but are not members yet.

Justification for choosing the Unit of Assessment	This UoA was selected because the fishing cooperative of Puerto Libertad is the only one that has commercial permits to harvest the three clam species, it is organized in the area, and is interested in starting a FIP.

5 Traceability

5.1 Traceability within the fishery

In January 2019, in collaboration with Future of Fish, a decision was made for the implementation of solid full chain traceability in the Puerto Libertad clam fishery, in which COBI supports joint improvement with producers. Working on the fishery´s traceability is within a broader program of fishery improvement projects, with the objective of establishing broader commitments in the fishery supply chain, both for national markets and for export markets. Contramar is a high-end restaurant, committed to quality and only works with seasonal seafood. With the Mojarra del Arrecife cooperative, it collaborates in the purchase and sale of sustainable clams (red clam, chocolata clam, and white clam) from Puerto Libertad, which led them to work on a fisheries improvement project. As part of the traceability of the clam fishery, they establish communication for the development of the project, support the sustainability of resources so that they can reach the consumer well.

Current Puerto Libertad to Mexico City Supply Chain

The clam supply chain under investigation begins in Puerto Libertad and ends in Mexico City (Supply Chain **Figure 1**). The cooperative harvests the red, chocolata and white clams, which are cleaned and stored for no longer than 24 hours in a tank located in the back of the cooperative leader's home. The clams are then packaged by species into styrofoam boxes with gel ice packs to ensure product freshness and driven approximately 3 hours by a cooperative member from Puerto Libertad to Hermosillo, the closest town with access to air transport. In Hermosillo, the boxes are loaded onto a plane (Aeromexico) and shipped directly to Mexico City (flight time of approximately 3.5 hours) and picked up directly from the airport by a staff member from the Contramar restaurant in Mexico City. The clams are transported directly to the restaurant by the staff member and delivered to the kitchen on a bi-weekly basis, most often on Tuesdays and Thursdays.
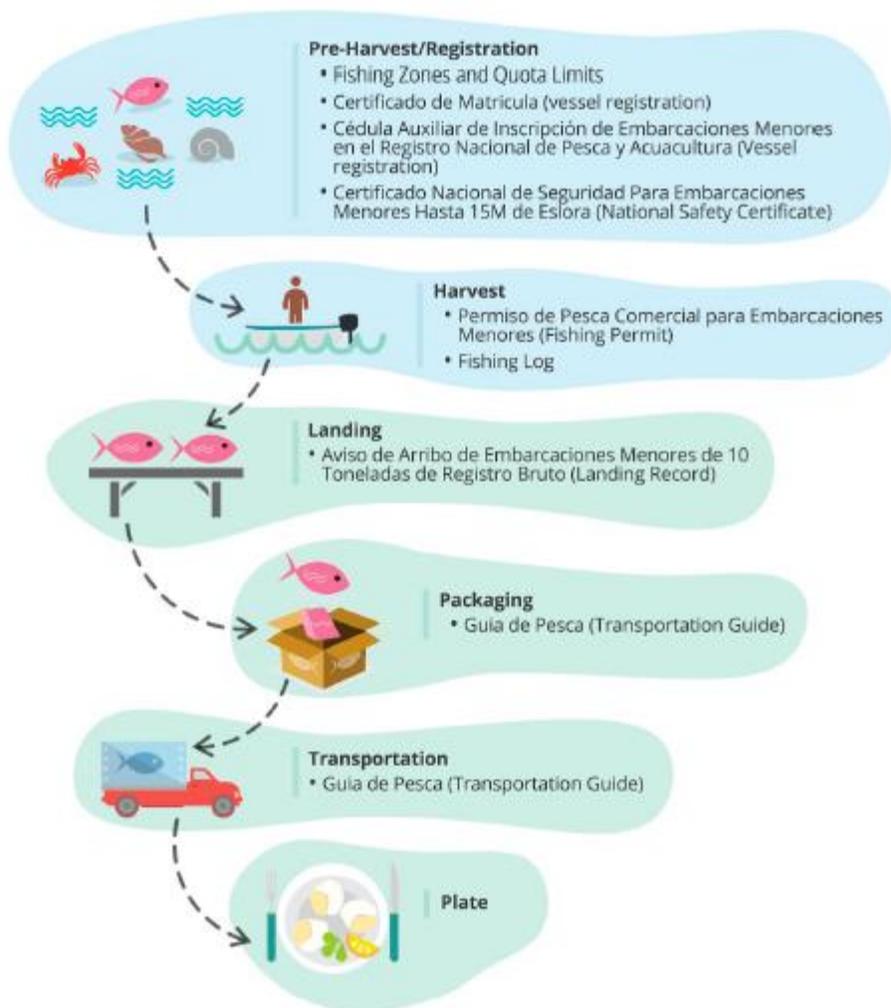
Figure 1. Diagram of the clam supply chain and associated traceability documentation needed at each node.

Table 3. Traceability within the fishery.

Factor	Description
Will the fishery use gears that are not part of the Unit of Certification (UoC)? If Yes, please describe: - If this may occur on the same trip, on the same vessels, or during the same season; - How any risks are mitigated?	*No* *Clams in Puerto Libertad are only captured manually, using semi-autonomous hookah diving*
Will vessels in the UoC also fish outside the UoC geographic area?	*No.* *The main fishing area of the UoA is located within the waters of Sonora, along the coast of Puerto Libertad.*

If Yes, please describe:
 	
   - If this may occur on the same trip;
   - How any risks are mitigated?	

Do the fishery client members ever handle certified and non-certified products during any of the activities covered by the fishery certificate? This refers to both at-sea activities and on-land activities.
 	
   - Transport
   - Storage
   - Processing
   - Landing
   - Auction
 	
If Yes, please describe how any risks are mitigated.
	Clams are the only target species, and the only resource that is caught in this fishery, and is not certified at the moment. There will be no risk of mixing with non-certified product.
	
	The activities that cover the Mojarra del Arrecife cooperative include storage, processing, landing and transportation, as well as the sale to a first-class restaurant, such as Contramar in Mexico City.
	
	Divers classify the catch according to size once the clams are extracted from the sea; they know the recommended sizes for the three clam species: chocolata clam 64 mm; red 97 mm and white 80 mm. All three species are captured manually with the help of a stainless steel spatula.
	
	There is no certified product yet, but the species are identified and handled from capture to processing at the cooperative's facilities.

Does transhipment occur within the fishery?
 	
If Yes, please describe:
 	
   - If transhipment takes place at-sea, in port, or both;
   - If the transhipment vessel may handle product from outside the UoC;
   - How any risks are mitigated?
	No
	
	The clams are harvested by divers from the cooperative, then they soak the clams in buckets with water for purification, then they are processed and packaged for shipment to the Contramar restaurant in Mexico City.
	
	There are no other fishermen in the town of Puerto Libertad that have the fishing permit to extract the clam resource.

Are there any other risks of mixing or substitution between certified and non-certified fish? If Yes, please describe how any risks are mitigated.	*No*

5.2   Market and price

Clam capture is done by commercial divers in the Puerto Libertad region. The price at the beach can be found at $ 100 a dozen red clam and $ 80 each dozen chocolata and white clams. However, the consumer price may exceed prices ranging from $ 150 to $ 300 pesos per dozen. The number of vessels dedicated to the capture of this resource is three to four, which are the ones that the cooperative has.

6   Pre-assessment results

6.1   Overview

Analysis of the information showed that the clam fishery of Puerto Libertad is within the scope of the MSC standard. However, some performance indicators (PIs) received a conditional pass, with scores between 60 and

80. These would likely require conditions if the fishery was undergoing a full assessment or would need improvements before moving to a full assessment. These PIs would be important areas for a FIP to focus improvement activities.

As noted in **Table 4** below, the indicators marked in red imply that the 60 level is not likely to be met. Indicators marked in yellow imply that the 80 level is not likely to be met; these indicators are liable to raise conditions in a full assessment. Indicators marked in green meet the 80 level or higher and are likely to pass a full assessment. More details are provided in the individual scoring tables for Principles 1, 2 and 3.

Table 4. Key to assign the probable score level to the simplified score sheet.

Definition of scoring ranges for PI outcomes estimates	Shading to be used	Instructions for filling 'Likely Scoring Level' cell
Information suggests fisheries is not likely to meet the SG60 scoring issues.	Fail (<60)	Add either text (pass/ pass with conditional/ fail) or the numerical range (<60 / 60-79 / ≥80) appropriate to the estimated outcome to the cell.
Information suggest fishery will reach SG60 but may not meet all of the scoring issues at SG60. A condition may therefore be needed.	Pass with Condition (60-79)	
Information suggest fishery is likely to exceed SG80 resulting in an unconditional pass for this PI. Fishery may meet one or more scoring issues at SG100 level.	Pass (≥80)	Shade the cell of each PI evaluation table with the color which represents the estimated PI score.

Principle 1

There is not enough information about the biology, reproduction and the stock of clams in the north western region of Mexico (Sonora). INAPESCA, COBI, and producers are working to gather this information. These investigations will generate recommendations for the harvest strategy, which will be used both in the evaluation and in a fisheries management plan, as well as in the development of an official standard.

Although there is information about the permits. CONAPESCA issued these permits in 2015 for the chocolata and red clam fishery, which began to be officially extracted, and the white clam permit was issued at the end of 2017. INAPESCA and the cooperative are working on monitoring for the evaluation of clams and annual quota. There is no stock assessment available to the public, so the RBF was used to score this principle and assess the current state of the fishery in the region. A stock assessment should be performed to estimate and define the banks for each clam stock (white, chocolata and red).

Principle 2

RBF was applied (PI 2.4.1) to understand stock status and the effect on the habitat and the ecosystem. In addition, the cooperatives in the UoA capture clams by hand using hookah gear, the method is highly selective and there is no bycatch (primary, secondary, or ETP species). Likewise, there are biological monitoring data collected by divers from the cooperatives, however, it is important that the information is documented. Principle 2 indicators in general scored above 80.

The fishing method is unlikely to affect the structure and function of the ecosystem. However, there is no information about the effect of extracting clam biomass from the ecosystem; an ecosystem model is being developed to understand and document if there are negative impacts on the food chain. There is no such information from the fishery.

The legal fishing framework in Mexico is based on the LGEEPA (General Law of Ecological Equilibrium and Environmental Protection) and LGPAS (General Law of Sustainable Fisheries and Aquaculture). These laws define and delegate fishery management to INAPESCA (research) and CONAPESCA (management). These federal agencies have the support from other municipal, state and federal entities for the monitoring, implementation, and application of the laws and regulations related to fisheries.

The cooperatives are working with CONAPESCA to improve management of the fishery, and there is research support from INAPESCA in stock assessment (unavailable) and annual quotas. However, it is necessary to publish a Fisheries Management Plan, or any official document that can define the specific short and long term objectives for the fishery.

In addition, there is no specific review protocol of the management system, but updates to the CNP, so there must be an external peer review of the management system, as well as the strategy addressing illegal fishing.

6.1.1   Recommendations

Based on the results of this pre assessment, several areas were identified where the fishery did not meet the MSC standard. However, the FIP continues to work on stock assessment, analyzing the effect of fishing gear on the habitat, as well as the effect on the ecosystem and on the design of specific management tools, particularly in the areas identified as critical for the sustainability of the fishery. This analysis should help improve key indicators and provide a general basis for the action plan of that must be adopted to comply with the MSC standard.

6.2   Summary of potential conditions by Principle

In a full assessment, indicators that are not likely to meet the 80 level (scoring 60-79) are liable to raise conditions. However, conditions are beyond the scope of a pre-assessment, particularly when there are many indicators <60 that would fail the fishery altogether. Otherwise, each of the PIs with a score 60-79 would require a condition. **Table 5** shows the number of PIs scoring <60 for each principle.

Table 5. Summary of Performance Indicator level scores

Principle of the Fisheries Standard	Number of PIs with draft scoring ranges <60
Principle 1 – Stock status	None
Principle 2 – Minimising environmental impacts	None
Principle 3 – Effective management	None

6.3 Summary of Performance Indicator level scores

Table 6. Summary of Performance Indicator level scores.

PRINCIPLE 1		
Performance Indicator	Draft scoring range	Data deficient?
1.1.1 – Stock status	**>80 (RBF)**	**Yes**
Rationale or key points		
The RBF approach was used to determine the level of risk to the status of the clams stocks. There is currently no stock assessment for any of the three clams (*M. aurantiaca, M. squalida* and *Dosinia ponderosa*) of the Gulf of California. However, there are analyses that have been carried out by INAPESCA and the cooperative to estimate the annual catch quotas, using four years of data (2015 to 2018). In 2015 the first chocolata and red clam permits for the cooperative were issued; in 2017, the white clam permit was obtained. Stock assessment reports are not available from the competent fisheries authorities. Clams are currently classified as a resource with "potential of development" in the state of Sonora (CNP, 2018).		
1.1.2 – Stock rebuilding	**NA**	**N/A**
Rationale or key points		
There is no information indicating that the clam stocks have collapsed (DOF, 2018). For this reason, the reconstruction of the stocks does not apply.		
1.2.1 – Harvest Strategy	**60 – 79**	**Yes**
Rationale or key points		
There are fishing permits that specify management measures that include: the use of fishing books, quotas, minimum sizes and fishing banks (endorsed by INAPESCA). INAPESCA uses MSY as reference points for chocolata clams and red clams. The 2018 CNP indicates that the variable catch quota by zone and bank is based on 15% of the population size for the *M. aurantiaca* species and 20% for *M. squalida;* but the white clam still does not appear on the list. The recommendations to achieve a better score are to update the data on the harvest controls in the CNP so that they are specific to the state of Sonora and to implement a Fisheries Management Plan for the clam resource in the region. One of the recommendations is to include the white clam and include the benchmarks in the CNP.		
1.2.2 – Harvest control rules and tools	**60-79**	**Yes**
Rationale or key points		
There are tools to control catches and there is evidence that regulations are working. Three fishing management tools are used fishing gear, minimum sizes, and quotas. This information is evidenced by the use of fishing books and landing tickets. There are no well-defined HCRs that guarantee that the exploitation rate is reduced as it approaches the PRI. The CNP, 2018 indicates that the variable catch quota by zone and bank is based on 15% of the population size for the *M. aurantiaca* species and 20% for *M. squalida*.		

1.2.3 – Information and monitoring	60 – 79	Yes
Rationale or key points		

There is information related to the structure and productivity of clam extraction in the locality of Puerto Libertad (CONAPESCA), fleet composition and other data to support the harvest strategy.

The use of INAPESCA logbooks in the clam fishery is consistent by fishermen, but information and analysis should be compiled and made public.

1.2.4 – Assessment of stock status	>80 (Default from RBF)	Yes
Rationale or key points		

RBF approach was applied to PI 1.1.1, according to the MSC methodology, a score of > 80 is assigned to this PI by default. INAPESCA carries out an annual assessment to estimate the clam fishing quotas. It is likely that these assessments are subject to peer reviews by INAPESCA staff, but there is no evidence to support this claim. In addition, there are no additional assessments that have not been explored by other interested parties, so it is not known whether they are subject to review. INAPESCA has not provided information on these evaluations.

PRINCIPLE 2		
2.1.1 – Primary Outcome	>80	Yes
Rationale or key points		

Because it is a 100% selective fishery, it is manually caught with a spatula, there are no primary species. therefore there is no management for specie.

2.1.2 – Primary Management	>80	Yes
Rationale or key points		

There are no primary species in the UoA (*Megapitaria aurantiaca*, *M. squalida* and *Dosinia ponderosa*), it is a very selective fishery and the fishing gear itself is a partial strategy. The fishing gear used in the fishery is a stainless steel spatula and is approved in the CNP (2018), in addition to landing tickets and logbooks, they are shown that there is no catch of other species, this is evidence that It is well implemented.

2.1.3 – Primary Information	>80	Yes
Rationale or key points		

According to the official fishing logbooks of INAPESCA there are records of the absence of primary species of the in the UoA, there are no major nor minor primary species, it is a very selective fishery that does not present risks for any other species.

2.2.1 – Secondary Outcome	>80	Yes

Rationale or key points

It is a selective fishery, there is no record for secondary species so there is no impact. Since the fishing method (manual collection) is highly selective. There are reliable data on the composition of the UoAs' capture that demonstrate the absence of secondary species (Clam fishery report, COBI 2019).

2.2.2 – Secondary Management	**>80**	**Yes**

Rationale or key points

100% probability that there is no bycatch, the fishing method (manual collection) is highly selective. There is no evidence that indicates any discard or capture of secondary species. The art of fishing itself acts as a partial strategy.

2.2.3 – Secondary Information	**>80**	**Yes**

Rationale or key points

It is a 100% selective artisanal fishery. There is some quantitative evidence, which is described through a report of the Puerto Libertad clam fishery that indicates that there is no extraction of secondary species. Based on this information, there is adequate evidence to assess the impact of the UoAs.

2.3.1 – ETP Outcome	**>80**	**Yes**

Rationale or key points

There is no record of the ETP species. There is information on catches by means of landing tickets and logbooks. This information indicates that there are no interactions of the UoAs with ETP species. The information is adequate and accurate regarding the impact of the fishery on these species, as described in the report of the clam fishery 2015 to 2019. Therefore, with this information, it is possible to determine with a high degree of confidence that there is no negative effect on the ETP. They are not classified in any list under protection.

2.3.2 – ETP Management	**>80**	**Yes**

Rationale or key points

It has been determined with a high degree of confidence that there is no interaction of the UoAs with ETP species. The selectivity of gear and location that the UoAs use constitutes a strategy that ensures the UoAs do not hinder the recovery of ETP species. SG80 is met. SG100 is not met since there is not a comprehensive strategy in place

2.3.3 – ETP Information	**>80**	**Yes**

Rationale or key points

There is no interaction with ETP species; the fishing method (manual collection) is highly selective. Therefore, this allows the team to determine with a high degree of certainty that there are no UoA-related impacts, mortalities, injuries, or consequences for the status of the ETP species.

2.4.1 – Habitats Outcome	**>80 (RBF)**	**Yes**

Rationale or key points

The RBF approach was used to determine the level of risk for the status of the habitats where this fishery occurs. In Sonora, clam capture occurs between 5 and 15 meters deep in sand and gravel bottom. The scoring elements for the white clam and chocolata fishery are fine sand, for the red clam is gravel.

There is no evidence that the clam fishery affects the habitat, but because it is a very selective fishery only a small amount of sand is removed from the substrate to obtain the clams.

2.4.2 – Habitats Management	>80	Yes

Rationale or key points

There is minimal interaction of the UoAs with the main habitat. There is a fishing bank for each species of clams and a no-take zone, which is stipulated in the commercial fishing clam permits. Each fishing bank was delimited by the cooperative's divers, the COBI staff, and the INAPESCA staff who are responsible for managing that area. There is no evidence in a plan or document where direct investigations are reported within the area.

2.4.3 – Habitats Information	>80	Yes

Rationale or key points

There is information on underwater monitoring conducted by certified divers in Puerto Libertad for the area where the clams are found, which is composed of fine sand and gravel with low relief. The divers of the Mojarra del Arrecife cooperative, are responsible for carrying out underwater monitoring, are trained as technical divers to assess the habitat, all the information collected must be documented.

2.5.1 – Ecosystems Outcome	>80	Yes

Rationale or key points

Due to the highly selective nature of the fishery, the general health of the target stock, and because the fishing activity is unlikely to affect species composition, community distribution or other key ecosystem elements.

2.5.2 – Ecosystems Management	60-79	Yes

Rationale or key points

In the fishing regulations is not specified any ecosystem objectives of the fishery, but it is unlikely that the fishery has considerable effects on the structure or function of the ecosystem. The fishing cooperative has a no-take zone for multi-species that are an octopus, scallops, groupers, and other invertebrates. Because the target species have management measures and are not overexploited, the fishing method does not cause damage to other species or habitat, ecosystem measures may not be necessary.

2.5.3 – Ecosystems Information	60 – 79	Yes

Rationale or key points

There are no specific analyses of ecosystem impacts, considerable changes in uniformity or dominance of species, or studies of the ecological roles or exploitation rates. The specific impact of removing target species (clam) biomass

from other predators or prey species is not known exactly. However, because clam populations are in good condition and the fishery does not represent a risk to other species, the habitat or ecosystem. Studies are only needed to understand the ecological role of clams. However, there are monitoring of the no-take zones with monitor divers. Likewise the Ecopath model is being built to understand the impact of fishing in the ecosystem.

PRINCIPLE 3		
3.1.1 – Legal and customary framework	**>80**	**No**
Rationale or key points		
In Mexico, fishing activity is regulated at the federal level by the General Law of Sustainable Fisheries and Aquaculture Article 27 Constitutional (LGPAS). In addition to an official document called CNP, which is periodically reviewed and includes all authorized Mexican fisheries in waters under federal jurisdiction. In the CNP there is a section with the list and management for species of commercial importance.		
3.1.2 – Consultation, roles and responsibilities	**>80**	**No**
Rationale or key points		
The LGPAS explicitly describes the roles and responsibilities of the governance agencies. Most of the agencies (CONAPESCA, INAPESCA, local authorities) and stakeholders involved in the fisheries management system establishes the form of coordination with other Federal, state, and municipal entities. The Development of laws and regulations requires an open consultation process that encourages and facilitates active engagement of stakeholder groups		
3.1.3 – Long term objectives	**>80**	**No**
Rationale or key points		
The LGPAS describes clear long-term objectives to guide decision-making. They incorporate precautionary concepts and are consistent with the MSC standard. One of the prime objectives is to establish the basis for the conservation, protection, rebuilding, and sustainable utilization of fisheries and aquaculture resources, and of the supporting ecosystems.		
3.2.1 – Fishery specific objectives	**60 – 79**	**No**
Rationale or key points		
The clam fishery in the Gulf of California does not have a Fisheries Management Plan (PMP) or any other local document, where the specific objectives are described. Although the fishery has managed through the CNP, it is necessary to develop a NOM, PMP and/or a community management plan to include a short-long term specific objectives, and harvest control rules for a strategy throughout the state of Sonora.		
3.2.2 – Decision making processes	**60 – 79**	**Yes**
Rationale or key points		
There are some management measures for the fishery, such as: fishing permits, fishing gear and boat specifications, which allow general decisions to be made for clam fishery. When direct information from fishermen is required,		

CONAPESCA and INAPESCA carry out consultations. This occurs when regulations need changes in fishing gear. In addition, when government agencies need recommendations for a fisheries management plan, producers, government agencies and civil society organizations participate in the process. Also, there is a local committee in charge of define the rules for local fishing, however, there is no evidence.

3.2.3 – Compliance and enforcement	60-79	Yes
Rationale or key points		

The cooperative conducts monitoring of its resources, to ensure compliance with regulations. The cooperative notify the authorities when there are violations by other fishermen, but the competent authority does not respond. The Mojarra del Arrecife cooperative is the only cooperative with a white, chocolata and red clam permit in Puerto Libertad. In addition, there is a local committee in charge of defining the rules for local fishing.

3.2.4 – Management performance evaluation	60-79	Yes
Rationale or key points		

The CNP and CONAPESCA's yearbook are the only legal documents that are subject to occasional internal review. However, an effective regular review of the management system is not in place.

6.4 Principle 1

6.4.1 Principle 1 Background

Scientific Name: *Megapitaria squalida*

Common Name: Chocolata or brown clam

Classification

Animalia

    Mollusca

        Bivalvia

           Veneroida

              Veneroidea

                Veneridae

Megapitaria squalida (G. B. Sowerby I, 1835)

This species is known as the chocolata clam, chocolata clam or Mexican clam, it is one of the commonly found bivalves in the northwest of Mexico and Peru. *M. squalida* lives in a marine environment, buried in the sediment and migrates to deeper waters during growth. The shell is sub-elliptical, convex and smooth, with a grey-brown and bright periostracum.

Scientific name: *Megapitaria aurantiaca* (G. B. Sowerby I, 1831)

Common name: red clam

Classification

Animalia

    Mollusca

        Bivalvia

           Veneroida

              Veneroidea

                Veneridae

Megapitaria aurantiaca (G. B. Sowerby I, 1831)

M. aurantiaca exhibits a low pink coloration with an opaque brown-orange periostracum, the interior surface sometimes displays orange dyeing on the edge of the hinge. This species can exceed a body size of 120 mm (Fisher et al., 1995).

Scientific Name: *Dosinia ponderosa* (Gray, 1838)

Common Name: White clam, queen clam

Classification

Animalia

   Mollusca

      Bivalvia

         Veneroida

            Veneroidea

               Veneridae

                  Dosinia ponderosa (Gray, 1838)

The white clam (*Dosinia ponderosa*) has a white color, with a bright cream colored periostracum, the internal surface is white. This organism can grow to body sizes greater than 145 mm (Baqueiro and Stuardo, 1977, Holguín- Quiñones and González-Pedraza, 1994, Sevilla, 1995).

Distribution

M. squalida is one of the most abundant bivalves in the Northwest of Mexico. It is distributed from Puerto Peñasco, Gulf of California, Mexico (31°20'48.68" N and 113°38'6.48" W), to Guayaquil in Ecuador (2°52'16.82" S and 80° 9'59.58" W; Arellano-Martínez et. al. 2006). *M. aurantiaca* is distributed from the Gulf of California, Mexico (30 ° and 114 ° 32''59''O 28'60.00''N) to Salinas in Ecuador (2°13'00 "S and 80 ° 57 '00 "W, Olsson 1961, Keen 1971). *Dosinia ponderosa* is distributed from Laguna Ojo de Liebre in Baja California Sur, Mexico (27 °53'41 "N and 114 ° 7 '54.5" W), including the Gulf of California to Paita, in Peru (5 ° 5'28 "S and 81º 6 '23 "W). This is from the province of San Diego to the Panamic region (Briggs, 1974). (**Figure 2**).
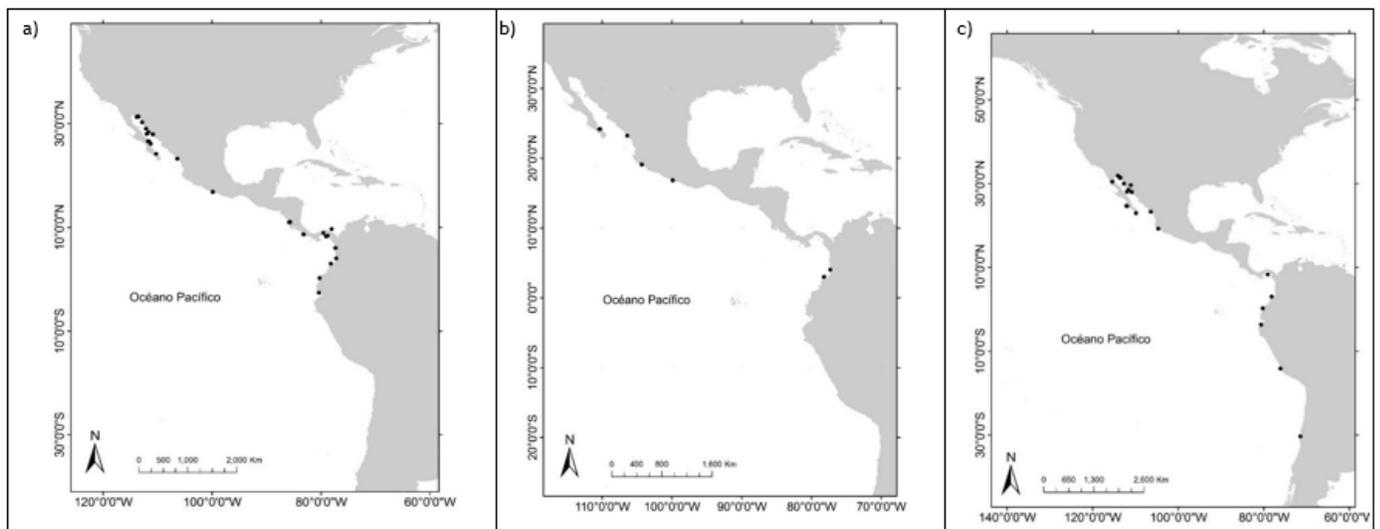
Figure 2. Maps of the recorded clams including a) Chocolata (*Megapitaria squalida*), b) red (*Megapitaria aurantiaca*) and c) white (*Dosinia ponderosa*).

Lyfe cicle

The clam chocolata is a long-lived species, since organisms with a maximum age of up to 10 years have been found (Aragón-Noriega, 2017), and has a relatively slow growth (Schweers et al. 2006, Tripp-Quezada 2008), with sizes maximum reported 120 mm shell length (Singh et al. 1991, Poutiers 1995). It has also been observed that the growth of this clam is decreasing according to age, or the longer the shell, the lower the growth rate (Baqueiro and Stuardo 1977, Singh et al. 1991, Tripp-Quezada 2008). On average, the specimens grow at a rate of 3 to 5 mm per month (Baqueiro and Stuardo 1977, Singh et al. 1991, Castro-Ortiz et al. 1992) and the larger specimens show a smaller growth of only 0.6 mm per month (Baqueiro and Stuardo 1977).

The relationship between the proportion of males and females varies depending on the location. Romo et al. (2009) found a significantly higher proportion of females in La Paz Bay. Bahía Magdalena presented an unusual high percentage of hermaphroditic individuals (> 15%), possibly as a tactic to ensure reproductive success in conditions of low population density. Villalejo-Fuerte et al. (2000) found a 1:1 ratio in the Loreto area.

The red, white and chocolata clams have separate sexes and do not have sexual dimorphism, the ratio between the proportion of males and females is 1: 1 in the Bahía Concepción area (Baqueiro y Stuardo 1997, Arreola 1997, Villalejo-Fuerte et al. 2000).

Table 7. Estimated growth parameters of *Megapitaria squalida*, *M. aurantica* and *Dosinia ponderosa* derived from other authors in different areas.

Species	Location	Linf (mm)	*K*	Growth performance	To	Z	M	E	Source
M. aurantiaca	Zihuatanejo	107	0.54	3.79	0.78	2.23	0.69	0.69	Baqueiro, 1998
Dosinia ponderosa	Isla Ixtapa	106	0.75	3.92	0.92	1.92	0.76	0.60	Baqueiro, 2003
M. squalida	El Coyote	104	0.64	3.84	0.79	3.29	0.75	0.77	Baqueiro, 2003
M. squalida	Zihuatanejo	80	1.10	3.85	0.06	3.02	1.62	0.46	Baqueiro, 2003
M. squalida	B. Magdalena	83	0.655	3.654	Nd	1.61	Nd	Nd	Schweers et al 2006
M. squalida	B. Concepción	86.13	0.209	Nd	0.056	Nd	Nd	Nd	Castro-Ortiz, 1992

Fertilization occurs externally. The fertilized egg gives rise to a larva (veliger) that will live for a few weeks at the mercy of the currents. When it reaches a size of between a quarter and a third of a millimeter, it goes down to the bottom to bury itself and start a metamorphosis in which it loses the swimming organ and develops gills, passing the larval leaflets to become its future shells (**Figure 3**).
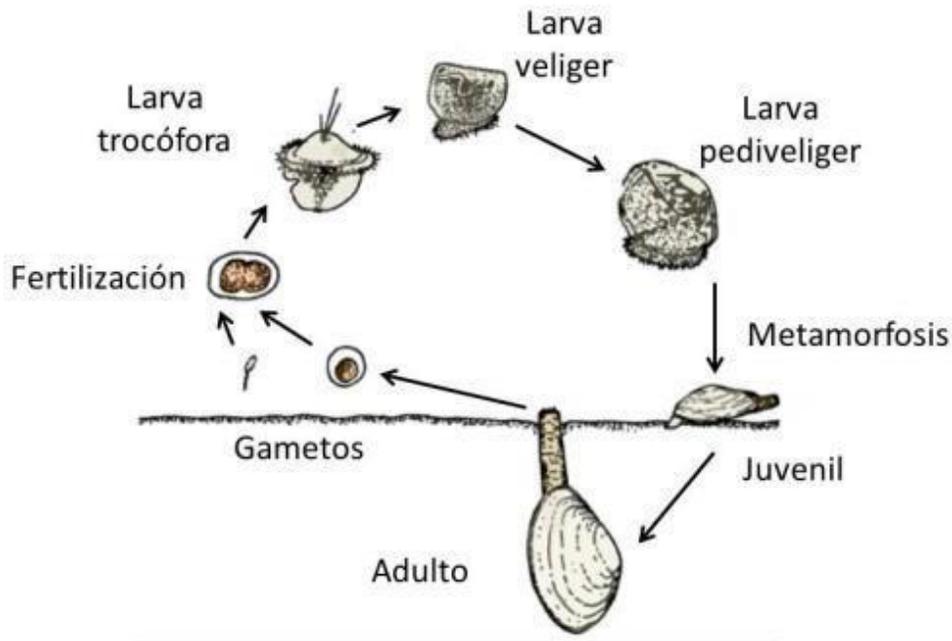
Figure 3. Schematic of the reproductive cycle of clams.

Reproduction

The reproductive cycle of the chocolata, red and white clam varies geographically, according to the phenotypical characteristics of the species; they respond differently to environmental variables at each location (Porter 1964; Hesselman et al., 1989). The most important physical factor in the regulation of reproduction is the temperature of the water (Arellano *et al.*, 2006, Arreola, 1997).). The reproductive period for the chocolata clam in the site of Ojo de Liebre, Baja California Sur, is during the season from January to August (Arellano *et al.*, 2006), whilst in Loreto (BCS), reproduction occurs throughout the year (Villalejo-Fuerte *et al.*, 2000).

Studies of the reproductive cycle of the red clam in Mexico show that this species spawns throughout the year (Baqueiro and Sturado 1977; Garcia et al., 1994). The red clam population in Espíritu Santo exhibits two reproductive peaks, the first occurs from May to November and the second from December to April (Garcia et al 1994), whilst the Zihuatanejo population exhibits peaks from October to November, and between February and May (Baqueiro and Stuardo 1997).

For the white clam, the reproductive period occurs throughout the year, although the highest peaks appear between June and October, both in Ixtapa and in Bahía Concepción (Arreola 1997; Baquiero and Aldana 2000).

M. squalida is a predominantly gonochoristic species, exhibiting separate sexes (Villalejo-Fuerte et al. 2000), although some hermaphrodite organisms can be occasionally observed (Quiñones-Arreola 2003; Romo-Piñera et al., 2009). This clam does not demonstrate sexual dimorphism (Arellano-Martínez et al. 2006).

Studies conducted in Bahía de La Paz and Bahía Magdalena have found that the size of first maturity of the chocolata clam is the same in both males and females. They are 64.5 mm in La Paz and 85 mm in Bahía Magdalena, although organisms in gonadal development can be observed at smaller sizes (Romo et al. 2011).

Description of the fishery.

The clam fishery of *Megapitaria* and *Dosinia* genus is conducted along the coasts of the Gulf of California, mainly in Baja California Sur and Sonora. This fishery involves the use of small-scale vessels with a length of approximately 21 ft. and outboard motor of 75 to 115 hp. The fishing gear, hookah-type diving, consists of a compressor and hose of length from 50 to 115 meters, which is adapted to an air regulator with a nozzle for the diver. Normally, for the capture of clams, one or two divers are necessary, a lifeline and a driver per vessel. The

extraction of the clam is manual and a small spatula or shovel to lift the sand and a net bag known as jaba, where the diver places the collected clams. Once the collection of the clam resource has been completed, the diver attaches a line from the bag, containing the collected clams, to a rope connected to the end of the lifeline which is then pulled to the deck of the boat, keeping the bag in the water. The clam fishery in Puerto Libertad is especially important since it is a resource for sustainable and profitable exploitation, which can be an alternative to local fishing.

To be able to legally access these resources, the fishers apply to the National Commission of Aquaculture and Fishing (CONAPESCA) for either promotional (for developing fisheries) or commercial fishing permits. These permits form part of a large variety of tools for the management of fisheries which assure the responsible use of the species of interest. The traditional tools such as permits, closures and minimum catch size have been used for years. However, they have not been sufficient to assure the sustainability of the fishing activity, mainly due to the instruments having a mono-specific focus, in addition to the null or scarce inspection and surveillance. For this reason, it has been necessary to complement traditional methods with additional management tools (e.g. quotas, no take zone) to achieve a complete management of the ecosystem and to be able to create robust economies in the communities.

Cooperatives in Puerto Libertad, in collaboration with Comunidad y Biodiversidad, A.C. (COBI), have contributed to this task, actively working with government agencies in charge of the management, and research of fishery resources (CONAPESCA and INAPESCA, respectively) in the design and management for the use of the clam resource in the community. In 2015, the exploitation permits for the clam chocolata (*Megapitaria squalida*) and red clam (*Megapitaria aurantiaca*) were approved for three local cooperatives; in 2017, the white clam permit for a cooperative was issued, with a validity of two years. These authorizations have the following conditions: the cooperatives will share the same banks (642 ha), the quota will be divided equally for each of the cooperatives, the fishing effort will be two vessels per cooperative, in addition to the ban and the minimum size will be the same as for the rest of the Gulf of California and finally, there will be a marine reserve zone (no-take zone) (129.00 ha). Obtaining these permits is considered a great achievement for several reasons, they are the first clam authorizations in the region, in addition to including several fishing management tools (traditional and non-traditional). Also, these results represent a great success for the implementation of a fisheries improvement project, which promotes the sustainable fishery of bivalves in the state of Sonora.

In 2015, the Mojarra del Arrecife cooperative, with commercial fishing permits, began the capture in a sustainable manner for the clam resource. Since this cooperative had a genuine interest in the conservation of the resource and, at the same time, exploiting the resource through good fishing practices; In January 2017, they were selected to carry out a Fishing Improvement Project (FIP). The FIP will aim to maintain the sustainability of the resource, gain access to better markets and, therefore, will be socially and ecologically beneficial. This will be achieved with the support of interested parties such as INAPESCA, fishermen, SAGARHPA, CONAPESCA, and COBI.

Resource management scheme

The brown or black chocolata clam and the red chocolata clam are grouped together by the CNP (DOF 2018) as the fishery management unit "Chocolata Clam". This fishery is managed through commercial fishing permits and quotas. This group does not have a specific regulation nor a fishery management plan. The fishery of these species is at its sustainable maximum (Eastern coast of the Gulf of California) and some populations are found to be in decline (West coast of Baja California and Bahía Magdalena) (DOF, 2018).

With respect to this resource, the CNP recommends the following:

A minimum catch size of 64 mm (Gulf of California) and 80 mm (Bahía Magdalena) in length. The exploitation rate will be between 15% and 20% of the population above the minimum size.

❖ Prepare and publish the Official Mexican Standard to regulate the use of the resource.
❖ Prepare and publish a Fisheries Management Plan to manage the resource.
❖ Do not increase the effort in Baja California Sur.
❖ In Baja California, Sonora and Sinaloa the fishing effort will be determined based on technical studies from INAPESCA.
❖ The catch quota is authorized after assessment and technical opinion from INAPESCA.

In areas where banks are unknown, the following procedure applies:

❖ Users must conduct a survey to locate the banks. Once the survey is carried out, they must send the geographical coordinates to the CRIAP-INAPESCA corresponding to each region.
❖ With the location of the banks, INAPESCA, through the corresponding CRIAP will carry out the assessment study to estimate the population size and issue the opinion with the management recommendations.
❖ Implement a monitoring and follow-up program for the fishery to assess its impact, under the coordination and supervision of INAPESCA.
❖ Establish the period of official closure to protect the period of reproduction with prior technical opinion from INAPESCA.
❖ Limit diving activities to depths less than 30 meters, in order to ensure the safety of divers.

Fishing zones

Fishing zones include marine waters of Federal Jurisdiction and Lagoon Systems of the Gulf of California, including the western coast of the Baja California Peninsula. The brown chocolata clam live buried in sandy-muddy sediments up to 120 m deep; for diver safety, capture is allowed up to 30 m. The red chocolata clam is distributed from the intertidal zone to 10 meters deep.

Figure 4. Contribution (%) of the Gulf of California states to the chocolata clam fishery at the national level (CNP 2018).

Historic trends

Arreguín-Sánchez and Arcos-Huitrón (2011) carried out an assessment of the state of exploitation of fishery resources in the country, and show different trends in each resource (finfish, abalone, shark, clams, etc.) from 1956 to 2009. These authors include several species of bivalves within the clam group, which belong to the families: Arcidae, Pectinidae, Spondylidae and Veneridae. The authors classified the clam group to be in a state of maximum utilization, although no assessments have been carried out by species or for the northern area of Sonora where Puerto Libertad is located.

One of the main fisheries that have developed in Mexico in the last decade is the clam fishery; this activity leaves an important economic spill in the communities when the capture season of the main species is closed (Arellano-

Martínez et al., 2006). One of the main species that are caught in Puerto Libertad are leopard grouper (*Mycteroperca rosacea*), Octopus (*Octopus spp.*), and Gulf coney (*Hyporthodus acanthistius*). Most species of the Veneridae family do not have an official historical fishing record in the Gulf of California. For the *Megapitaria* genus, there are catch data; in the CNP (DOF, 2018) the production of chocolata clam is presented as being captured in Baja California Sur, Sonora and Sinaloa (**Figure 4**).

At the national level, Baja California Sur records 68% of the average annual catch of clams. In the 1993-2015 period the catch recorded in Sonora, Sinaloa and Baja California remained stable in the order of 1,000 t of fresh weight (**Figure 5**) (CNP, 2018).
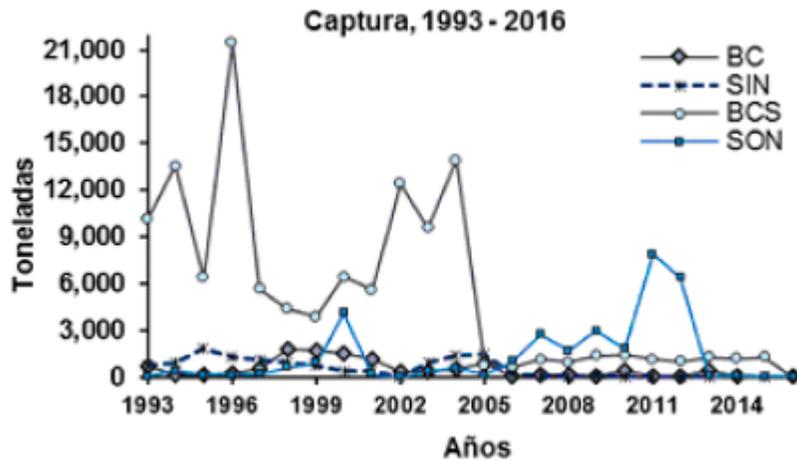
Figure 5. Average catch of clams in the Gulf of California 1993-2016 (CNP, 2018).

Baja California Sur (BCS) is the main clam producer in Mexico; from 2006 to 2013, the total chocolata clam (*M. squaliada*) catch was 9,534 T in live weight, which occupied second place in the total "clam" production. Research and labor in production have been conducted in accordance with the management guidelines established by the CNP, which require the use of fishing permits, catch quotas and minimum weights. Six important fishing regions are known in BCS: Bahia de La Paz, Laguna Ojo de Liebre, Bahia Magdalena, Laguna San Ignacio, Bahia de Loreto and the coast of Santa Rosalía. From 1992 to 2002, the capture of this organisms increased from 315 T to 1,128 T, the sites that contributed most to this increase in volume were Laguna Ojo de Liebre and Bahia de La Paz. The catches in Bahia Magdalena have decreased from 457 T during the year 2001 to 73 T during 2006 (**Figure 6**). The evaluation of the state of the fisheries revealed that Bahia de La Paz and Laguna Ojo de Liebre are running at maximum capacity, Bahia Magdalena exhibited indicators of overexploitation, and areas of Laguna San Ignacio, Bahia de Loreto and Santa Rosalía have potential to develop the activity (López-Rocha et al., 2010).
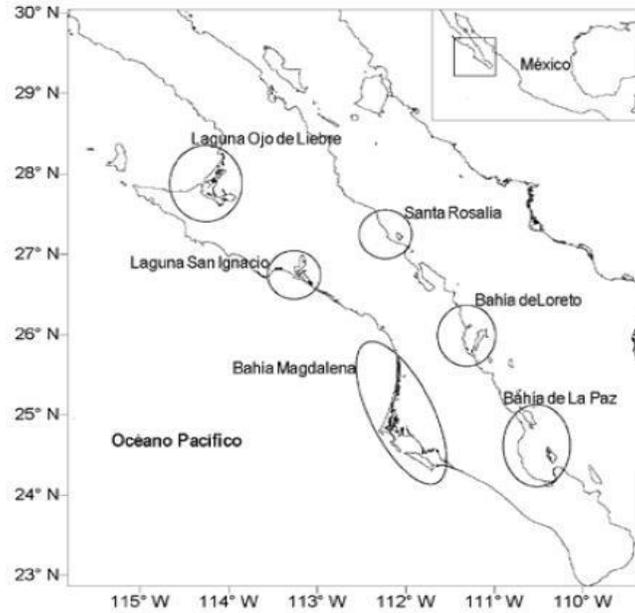
Figure 6. Main zones of chocolata clam catch in the Gulf of California and the Pacific Ocean (BCS) (López et al., 2010)

6.4.2 Catch profiles

The total catch of chocolata clam in the state of Sonora has varied as time passes and has reached 99 tons in 2013 (CONAPESCA, 2015). From 2001 to 2016 the fishery registered more than 390 tons. The clam fishery in Puerto Libertad was not carried out commercially, but traditionally for the fisherman's self-consumption. It was until 2015 when the first chocolata and red clam permits were granted to three cooperatives of that site. In 2017, the first white clam permit (*Dosinia ponderosa*) came out for a cooperative in Puerto Libertad. In Sonora there is already a history of white clam production in the year 2000 to date due to the fact that there were already permits to access the resource in other locations of Sonora (**Figure 7, Figure 8**).
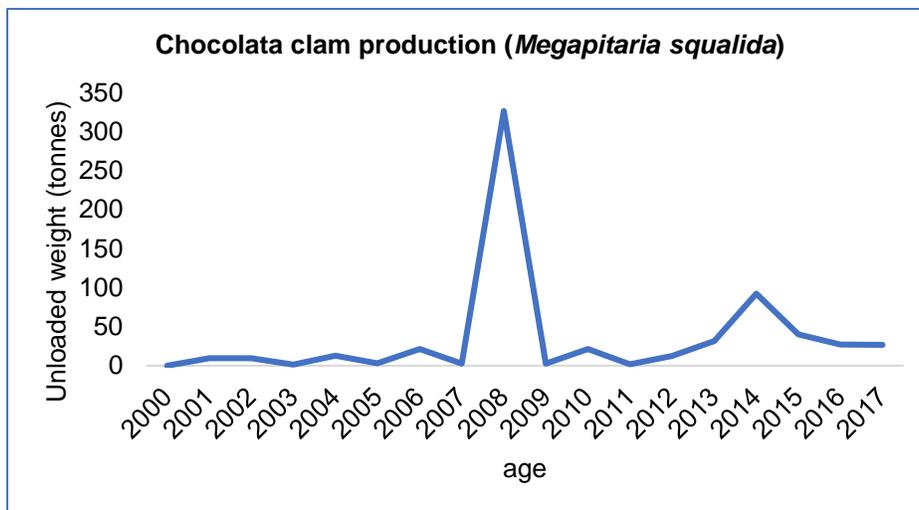
Figure 7. Total chocolata clam production in the state of Sonora.
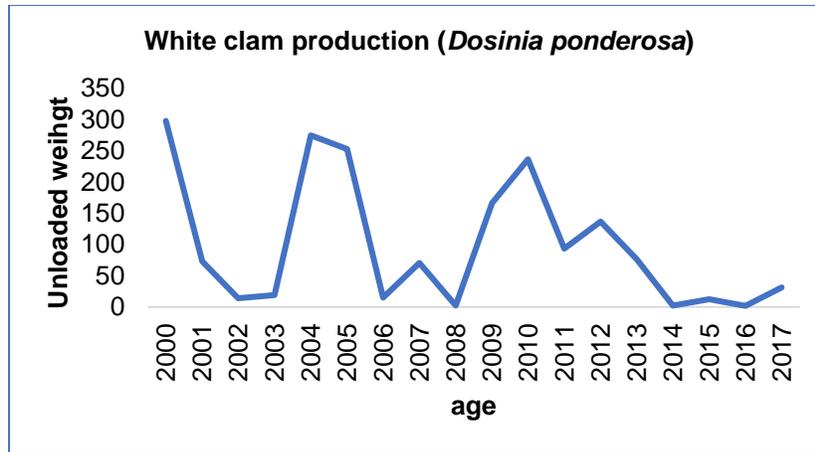
Figure 8. Total white clam production in the state of Sonora.

The following graphs show the annual data (numbers and kilograms) of white, red, and chocolata clam catches from Puerto Libertad, which were obtained from the fishing logs that are completed by the Mojarra del Arrecife cooperative every day. White clam production begins to register in 2017, the year in which the first permit was granted in the location. The volume reported does not exceed the annual quota granted by INAPESCA and always collecting clams with the size indicated in the fishing permit that is 64mm for chocolata clam, red 96 mm and white 80 mm (**Figure 9**).
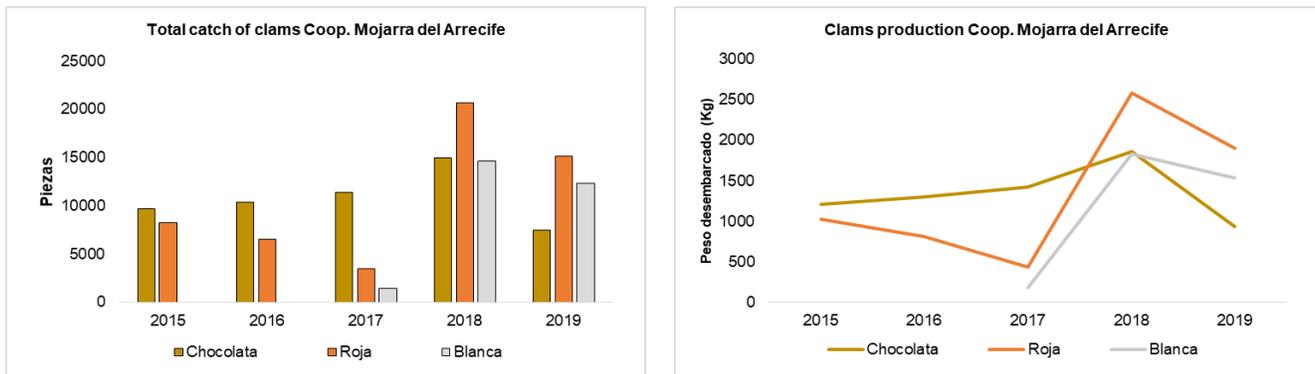
Figure 9. Total clam catch in Puerto Libertad from 2015 to 2019.

6.4.3   Total Allowable Catch (TAC) and catch data

Table 8. Total Allowable Catch (TAC) and catch data: Chocolata clam

TAC	Year	**N/A**	Amount	**N/A**
UoA share of TAC	Year	**N/A**	Amount	**N/A**
UoA share of total TAC	Year	**N/A**	Amount	**N/A**

Total green weight catch by UoC	Year (most recent)	**2019**	Amount	**0.93 ton**
Total green weight catch by UoC	Year (most recent)	**2018**	Amount	**1.87 ton**
Total green weight catch by UoC	Year (second most recent)	**2017**	Amount	**1.4 ton**

Table 9. Total Allowable Catch (TAC) and catch data: Red clam

TAC	Year	**N/A**	Amount	**N/A**
UoA share of TAC	Year	**N/A**	Amount	**N/A**
UoA share of total TAC	Year	**N/A**	Amount	**N/A**
Total green weight catch by UoC	Year (most recent)	**2019**	Amount	**1.8 ton**
Total green weight catch by UoC	Year (most recent)	**2018**	Amount	**2.5 ton**
Total green weight catch by UoC	Year (second most recent)	**2017**	Amount	**0.43 ton**

Table 10. Total Allowable Catch (TAC) and catch data: White clam

TAC	Year	**N/A**	Amount	**N/A**
UoA share of TAC	Year	**N/A**	Amount	**N/A**
UoA share of total TAC	Year	**N/A**	Amount	**N/A**
Total green weight catch by UoC	Year (most recent)	**2019**	Amount	**1.5 ton**
Total green weight catch by UoC	Year (most recent)	**2018**	Amount	**1.8 ton**
Total green weight catch by UoC	Year (second most recent)	**2017**	Amount	**0.18 ton**

6.4.4 Principle 1 Performance Indicator scores and rationales

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?	**NA**	**NA**	**NA**

Rationale

There is no certainty of the data, and a stock assessment to define Reference Points for the fishery is in progress. INAPESCA currently defines the management objective ("reference points") as the harvest of a percentage of the population size (as indicated in the CNP, 2018). This information on the official clam assessments has not yet been shared by INAPESCA (CRIAP-Guaymas). In the CNP it specifies the variable catch quota by zone and bank, based on 15% of the population size of the *M. aurantiaca* species and 20% of *M. squalida* greater than the minimum catch size.

Considering the limited availability of stock assessment information and given the limited data situation, a preliminary RBF analysis was conducted for clams from Puerto Libertad (*M. squalida, M. aurantiaca* and *Dosinia ponderosa*) that includes a productivity-susceptibility analysis (PSA) and a consequence analysis (CA). Results from RBF are included in Appendix 9.3.

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?		**NA**	**NA**

Rationale

There is no official stock assessment for the clam resource, so it was necessary to conduct an RBF analysis. INAPESCA uses the MSY and the mortality rate as a reference for the fishing quota of chocolata clam and red clam, but it does not specify how it is calculated for each species.

References

DOF, 2018.

Clams Worksheets RBF

Draft scoring range and information gap indicator added at Announcement Comment Draft Report

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

Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	**Chocolate, Red, White Clam** **≥ 80 (RBF)**
Information gap indicator	**More information sought**
Data-deficient? (Risk-Based Framework needed)	**Yes**

PI 1.1.2 – Stock rebuilding

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
	Rebuilding timeframes		
a 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?	**N/A**		**N/A**
Rationale			

Not applicable; according to RBF results the clam stocks are not overfished or in need of rebuilding.

b	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?	**N/A**	**N/A**	**N/A**

Rationale
Not applicable
References

Draft scoring range	**N/A**
Information gap indicator	

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?	**Yes**	**No**	**No**

Rationale
CONAPESCA manages red clams and chocolatas in a section of the CNP (DOF, 2018) as "Clams", with a strategy that limits the catch to those fishermen who have commercial fishing permits, as indicated in the CNP (DOF 2012, 2018). The CNP is an official document that provides a technical description of the main fisheries and their regulations, in this case for red clams and chocolatas.

Based on a study by Lopez Rocha, et al (2019) on population dynamics, abundance and reference points for clams in Puerto Libertad. Recommendations: The management objective is to harvest 10% of the estimated average biomass for the population > 65 mm long for chocolata clam, which would be equivalent to 4.4 tons. For red clam, the recommended objective is to extract a maximum of 10% of the estimated average biomass for the population> 80.85 mm in length, which would be equivalent to 17.4 tons; and for white clam, the recommended objective is to extract a maximum of 10% of the estimated average biomass for the population> 85.34 mm in length, which would be equivalent to 128.4 tons.

According to the MSC, a harvest strategy is the combination of monitoring, stock assessment, harvest control rules (HCR) and management actions. The clam fishery monitors landings, performs assessments to estimate the annual quota, defines a quota for white, red and chocolata clams and has regulations for both species. Official no public stock assessments by the bodies in charge (INAPESCA) were not available for this pre-assessment, it appears that the harvest strategy adjusts to the status of the stock quotas every year according to the state of the stock to maintain abundance at a certain level. Management objectives have not been clearly defined, but there are catch quotas calculated through calculating annual abundance assessments (unavailable for this pre assessment), size limits, so management actions are taken to control harvest; Thus, the harvest strategy is expected to reach target points a minim of abundance or exploitation levels, SG60 is met. The harvest strategy is also responsive to the state of the stock, but since management objectives, as reflected in PI1.1.1 are not clearly defined, the fishery does not meet SG80.

	Harvest strategy evaluation			
b	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?	**Yes**	**No**	**No**

Rationale

Catches and biomass have remained stable for a period of time and the fishery has not collapsed. In addition, a study conducted by the Autonomous University of Baja California Sur (UABCS) on clam reproduction indicates that the three species spawn all year round. Catch quotas, size limits, and access permits have been established. Therefore, the harvest strategy is likely to work based on previous experience or plausible argument, meeting SG60.

Work is being done to evaluate the harvest strategy for the clam fishery of Puerto Libertad. There is still not enough evidence to prove the performance or achievement of the objectives. For this reason, SG80 is not meet.

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

Rationale

CONAPESCA monitors the catches of chocolata and red clams in the Gulf of California through a landing report system, which includes information on landings and fishing effort. The clam resource in Puerto Libertad has been

evaluated since 2015, when the first clam resource permits were granted in that location. There is no evidence of the latest stock assessments (not available), but the status of the stock is being evaluated frequently. According to the INAPESCA reports that establish the annual quota, it is mentioned that the fishery is well regulated and monitored by government agencies. There is limited data because the fishery is new (no more than five years), therefore, the data is insufficient. However, it is probable that the harvest strategy is working. Given this information, this scoring issue meets the SG60.

	Harvest strategy review		
d	Guide post			The harvest strategy is periodically reviewed and improved as necessary.
	Met?			**No**

Rationale

The harvest strategy is not periodically reviewed and improved as necessary because it is a new fishery.

Therefore, taking a precautionary approach, this scoring issue does not meet SG100.

	Shark finning		
e	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?	**N/A**	**N/A**	**N/A**

Rationale

The target species are not sharks. Also, the fishing method is very specific, there is no bycatch; therefore, there is a high degree of certainty that shark finning is not taking place.

	Review of alternative measures		
f	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?	**Yes**	**Yes**	**No**

Rationale

The capture strategy established by CONAPESCA uses very rigorous tools. The fishery is managed by permits that include restrictions on fishing gear, quotas, sizes, fishing grounds and no take zone. This fishery is artisanal and is very selective. Monitoring is supported by the use of logbooks to generate all the information that is required. Through the application of these measures, there is no unwanted catch of the target stock. Development of the different measures and the annual assessments and quotas indicate that there is a regular review of alternative measures. Thus, the SG80 level is met. It does not meet the SG100 level because it is not clear that there are biennial reviews.

References

Commercial fishing permits of the Mojarra del Arrecife cooperative.

DOF, 2018.

López-Rocha et al. 2019.

Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	**60-79**
Information gap indicator	**More information sought**

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
	HCRs design and application		
a 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?	**Yes**	**No**	**No**

Rationale

Clam fishing in Puerto Libertad is mainly based on size limits (64 mm for chocolata clam, 96 mm for red), fishing zones and an annual quota for each stock. There is general compliance with all three regulations. In the case of the annual quota for clams, there is a monitoring program that ensures that fishing will stop when the quota is reached; therefore, there are generally understood HCRs or available in general terms that are expected to reduce the exploitation rate as the point of recruitment impairment (PRI) is approached.

There are however no stock status indicators or benchmarks available for the clam fisheries in Puerto Libertad, and there are no limit or target values for biomass, catch or fishing mortality yet, but work is being done to generate such information. The 2018 CNP only indicates that 15 to 20% of the biomass estimated by INAPESCA should be extracted each year.

There are no well-defined HCRs that ensure that the exploitation rate is reduced as the PRI is approached. Therefore, SG80 is not met.

	HCRs robustness to uncertainty		
b 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?		No	No

Rationale

There are no available harvest control rules for this fishery, except closing the fishery when the quota is reached, so they are not robust to uncertainties.
Without the above elements, SG80 is not met.

	HCRs evaluation			
c	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?	**Yes**	No	No

Rationale

Some regulations, such as permitted fishing gear, seasonal closures, size limits, and quotas are easy to apply, but there is no official standard or management plan for the clam fishery in the Gulf of California. Fishermen enforce the internal regulations of their cooperative, respecting the annual quota granted by CONAPESCA through INAPESCA's research. But there is still no evidence of the official standards or objectives for the fishery (apart from the reference catch levels), so there is only some evidence that the tools used are effective in controlling exploitation, so only SG60 is met. There is still no available evidence indicating that the tools in use are appropriate and effective to achieve the required level of exploitation, also because HCRs are not well defined.

Without such evidence, this scoring issue fails to comply with SG80.

References

DOF, 2012, 2018.

Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	**60-79**
Information gap indicator	**More information sought**

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		

		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.
	Guide post			
	Met?	**Yes**	**Yes**	**No**

Rationale

There is information related to the structure and productivity of clam extractions in the locality and in the state of Sonora (CONAPESCA), fleet composition and other data to support the harvest strategy. The clam fishery in the Gulf of California is of great economic importance, and biological and fishery information is being generated for Puerto Libertad. This information will serve to provide recommendations for creating an official standard and a fishery management plan. Due to the lack of information available today, the current stock status was evaluated with the aid of an RBF analysis. There is still no information available on the structure of the stock or its productivity, but work is being done to generate this information with the support of researcher Dr. Jorge Lopez Rocha of UNAM Sisal.

Fleet composition: CONAPESCA maintains a database with the number of (commercial vessels registered in each state, classified by fleet (large and small-scale vessels). The database also includes a list of the individuals holding fishing permits.

To determine the productivity of the stock, all the information that is generated regarding the catches of clams in Puerto Libertad is being collected through the use of logbooks and landing tickets, which include fishing permit, the number of vessels, and the place where the clams are caught. In addition, biometrics data are collected to assess the size composition during the fishing period.

Clam samples are being collected in Puerto Libertad to collect biological information, to inform studies on reproduction, age and growth, population dynamics, habitat, gear and fishing activity. An Ecopath analysis is also being conducted to understand the composition, trophic structure, ecological interactions and ecosystem function of these clams in this region.

All this work is being conducted by INAPESCA staff, Mexican universities and producers of the Mojarra del Arrecife cooperative. Relevant information began to be collected from 2015 to date (when the first clam fishing permits were issued).

The harvest strategy is limited to fishing licenses, vessel and gear restrictions and does not take any biological, stock productivity, or environmental information into account, except the size limits to protect immature clams. Considering that there is sufficient information to support the harvest strategy, this issue would meet SG60 and SG80.

A wide range of information on the fishery and the harvest strategy has either not been produced or is not yet available, thus SG100 is not met.

	Monitoring			
b	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	Stock abundance and UoA removals are **regularly monitored at a level of accuracy and coverage consistent with the harvest control rule**, and **one or**	**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

		more **indicators** are available and monitored with sufficient frequency to support the harvest control rule.	inherent **uncertainties** in the information [data] and the robustness of assessment and management to this uncertainty.
Met?	**Yes**	**No**	**No**

Rationale

The abundance of the stocks and the extractions of the fishery are monitored regularly through the use of fishing logbooks for clams. Implementation of logbooks has provided INAPESCA with a level of precision and coverage consistent with the (generally understood) harvest control rules. One or more indicators are available that are monitored frequently enough to support the harvest control rules, but they need to be published.

The abundance indicator available for the stock has been CPUE. Catch and effort are monitored regularly, and the CPUE is estimated frequently enough to monitor abundance; annual assessments are conducted and quotas are estimated for the clams in Puerto Libertad. However, the report of all fleets in each state of the Gulf of California is unlikely to be completed, so both catch and effort can be underestimated. This problem only is met at the SG60 level.

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

Rationale

There are catches of chocolata and white clams in the state of Sonora, with catch records for the Puerto Libertad obtained through landing tickets since 2015 for chocolata and red clams, and 2017 for white clams.

Commercial catches are monitored reasonably well and are sufficient for stock assessment. The catches of artisanal, subsistence or recreational fleets are unknown. The existing monitoring program collects all the necessary information from the commercial fishery. It is noted if there are other retained species or any discards. There are no independent studies of the fishery or observer coverage to estimate these extractions. The level of monitoring is sufficient for the harvest strategy but all other fishery removals from the stock are not known, so SG80 is not met.

References

Clams datasheet.

Gastélum-Nava E., 2017.

Lopez Rocha, et al 2018.

https://www.conapesca.gob.mx/wb/cona/informacion_estadistica_por_especie_y_entidad

Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	**60-79**
Information gap indicator	**More information**
Data-deficient? (Risk-Based Framework needed)	**Yes**

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?		**NA**	**NA**

Rationale

Because an RBF approach was applied to PI 1.1.1, according to the MSC methodology, a score of> 80 is assigned to this PI by default.

INAPESCA has implemented the use of logbooks in the clam fishery, but the analysis of the information must be recompiled and made public. There are already annual catches of the fishery in Sonora and in the location of Puerto Libertad.

Assessments are already carried out to predict the state of the stock and the current conditions. INAPESCA carries out an annual assessment to estimate clam fishing quotas. This information is used to determine the annual catch quota for clam species in the Puerto Libertad.

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?	**NA**	**NA**	

Rationale

Because an RBF approach was applied to PI 1.1.1, according to the MSC methodology, a score of > 80 is assigned to this PI by default

According to the evaluations carried out by INAPESCA in Puerto Libertad for the clam fishery, they base their recommendations on harvest levels stipulated in the 2018 CNP. These suggest that some generic reference points have been estimated, such that variable catch quotas by area and bank are estimated. These are based on 15% of the population size for *Megapitaria aurantiaca* and 20% for *M. squalida* and the minimum size limits (64mm for *M. Squalida* and 97mm for *M. aurantiaca*). This is reflected in a technical opinion by INAPESCA.

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?	**NA**	**NA**	**NA**

Rationale			
Because an RBF approach was applied to PI 1.1.1, according to the MSC methodology, a score of > 80 is assigned to this PI by default			
It is not possible to identify the sources of uncertainty since the assessments carried out by INAPESCA are not available.			

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

Rationale			
Stock assessments are carried out to assess status. INAPESCA carries out annual analyses to estimate fishing quotas. Since none of this information has been provided by INAPESCA, an RBF analysis was used to evaluate PI 1.1.1. It is not known if the methods used by INAPESCA are robust or if alternative hypotheses have been explored.			
Because an RBF approach was applied to PI 1.1.1, according to the MSC methodology, a score of> 80 is assigned to this PI by default.			

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

Rationale		
Because an RBF approach was applied to PI 1.1.1, according to the MSC methodology, a score of> 80 is assigned to this PI by default.		
The assessments are likely to undergo peer reviews within INAPESCA, but there is no evidence to support this claim. In addition, evaluations have not been explored by other interested parties, so it is not known whether it has been subject to review.		

References
Clams Worksheets RBF

Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	**≥80 (RBF)**
Information gap indicator	**More information sought**

6.5 Principle 2

6.5.1 Principle 2 background

The Gulf of California occupies a unique oceanographic position within the marginal seas of the Pacific Ocean. Located between the arid peninsula of Baja California and the equally arid states of Sonora and Sinaloa, the gulf is an evaporation basin, formed by the mountain range of the peninsula, which separates the Pacific Ocean, blocking its influence on humidity. One of the principle characteristics of the gulf is the annual temperature range of the sea surface; the annual average temperature in the north of Puerto Peñasco is 16 º C; while that of the south of Cabo San Lucas is 19 º C (Roden and Groves, 1959).

The region of the Midriff Isles extend from the north of the Isla Ángel de la Guarda (29º 34') to the Isla San Pedro Mártir (28º 23'). The floor of this region constitutes five basins which form a "V" shape. The most northern region, Cuenca del Delfin, has an almost flat floor, and in its southern portion, it reaches 900 m of depth. From there, the Cuenca de Salsipuedes basin continues, which is very narrow and can reach depths of the up to 1,400 m. This basin does not exhibit a large quantity of sediment due to high velocities reached by the tidal currents. The San Esteban, Tiburón, and San Pedro Mártir basins reach depths similar to those of the Cuenca del Delfín. This is one of the most outstanding topographic characteristics of the region, and it exhibits a unique hydrographic regime. The basins function as funnels and restrict the circulation between the North Gulf and the Central Region; on the other hand, they act as generation points for the meeting of water bodies through strong tidal currents. The tidal surges occur throughout the year, according to the tidal regimes. This phenomenon is of great importance since it supplies the surface of the sea where sunlight penetrates with a large quantity of nutrients that are used by plankton, an essential producer in the food chain (Case and Cody, 1983; de la Lanza, 1991).

In the community of Puerto Libertad, the main activity is artisanal fishing for migratory, coastal and deep reef species, such as sand bass and ocean whitefish. The clam fishery is now one of the most important fisheries, which has been exploited for no more than two years with fishing permits, since this resource has been traditionally caught for local consumption.

A study conducted by Romo et al. (2015) described how heavy metals are incorporated into the food chain, beginning with photosynthetic organisms, which are consumed by numerous bivalves such as the chocolata clams, scallops, lion's paw scallops, and oysters. In the bivalves, the absorption of these metals mainly occurs through their diet, which mostly consists of photosynthetic organisms known as phytoplankton. The bivalves have a capacity to tolerate and accumulate high concentrations of contaminants; therefore, they are widely used for heavy metal studies and are considered bio indicators of ocean health, allowing an estimation of the degree and effect of the heavy metals in marine ecosystems and, in turn, the impact on human health through direct consumption of these fishery resources. However, there are no problems related to the presence of zoonosis, nor are there health aspects that can negatively affect the capture of the clam resource in Puerto Libertad.

Non-target species

It is a very selective fishery, and its fishing method is manual by hookah type diving. Since the clams are the target species, they are selected one by one, so there are no retained or incidental species. In case of not reaching the commercial size, the clams are returned to the sea according to the specifications of the clam fishing permit.

Endangered and / or protected species

As described in the previous section, fishing gear is very selective; therefore, no other species is caught incidentally or is there a risk of capturing species that are endangered, threatened or protected by any national or international regime (e.g., turtles, marine mammals, birds).

Table 11. Scoring elements

Component	Scoring elements	Designation	Data-deficient
Target (Hookah UoA)	*Megapitaria squalida, Megapitaria aurantiaca,* and *Dosinia ponderosa*	Target species	Yes
Primary (Hookah UoA)	No Primary Species	NA	No
Secondary (Hookah UoA)	No Secondary Species	NA	No
ETP (Hookah UoA)	No ETP Species	NA	No
Habitats (Hookah UoA)	Sand	Main	Yes
Habitats (Hookah UoA)	Gravel	Main	Yes
Ecosystems	Foodweb dynamics	NA	No

6.5.2 Principle 2 Performance Indicator scores and rationales

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			
a 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?	**Yes**	**Yes**	**Yes**

Rationale

According to the definition of MSC, there are no main or minor primary species in the UoAs. Therefore, this scoring issue meets SG100.

	Minor primary species stock status		
b 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?			**Yes**

Rationale

The fishery is a 100% selective, the clams are manually captured by means of a spatula, which is always aimed at the target species. Bait of other species is not used, and no primary species are caught. This scoring issue meets SG100.

References	
Interviews with fishermen of the Mojarra del Arrecife cooperative.	
DOF, 2018.	
Draft scoring range and information gap indicator added at Announcement Comment Draft Report	

Draft scoring range	**>80**
Information gap indicator	**Information sufficient to score PI**
Data-deficient? (Risk-Based Framework needed)	**No**

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
	Management strategy in place		
a	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?	**Yes**	**Yes**	**No**

Rationale
There are no primary species in the UoAs for *Megapitaria aurantiaca, M. squalida,* and *Dosinia ponderosa*. Official data on the composition of the capture of the UoA indicates that it is a very selective fishery. There is no strategy to maintain or rebuild the primary species affected by the fishery. However, the gear itself acts as a partial strategy, and the UoAs do not affect any primary species, so SG80 is met. As there is no established strategy, SG100 is not met.

	Management strategy evaluation		
b	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?	**Yes**	**Yes**	**No**

	Rationale			

There are no primary species in the UoAs for *Megapitaria aurantiaca, M. squalida,* and *Dosinia ponderosa*. Official data on the catch composition for the UoA indicates that it is a very selective fishery. There are no main or minor primary species in the UoAs, and the gear itself acts as a partial strategyThus, information from the fishery provides confidence that the partial strategy works, but since there is no testing, the SG100 level is not met.

	Management strategy implementation			
c	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?		**Yes**	**No**

	Rationale

There are no primary main or minor primary species in the UoAs. Logbook data on the catch composition show that it is a very selective fishery. This meets SG80; but there is no clear evidence that the partial strategy is being implemented successfully, so SG100 is not meet.

	Shark finning			
d	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 shark species that constitute primary species for the UoAs.

	Review of alternative measures			
e	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 primary 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 primary 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 primary species, and they are implemented, as appropriate.
	Met?	**NA**	**NA**	**NA**

	Rationale

There are no main or minor primary species in the UoAs. Catch records show that it is a very selective fishery, with no catch of other species. Therefore, this scoring issue is not evaluated given the absence of other species.

References

Fishery logbooks 2015 to 2019 of the Mojarra del Arrecife cooperative.

Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	**>80**
Information gap indicator	**Information sufficient to score PI**

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?	**Yes**	**Yes**	**No**

Rationale

There are no main or minor primary species in the clam UoAs of Puerto Libertad. The data on catch composition from the UoA show that is a very selective fishery that presents no risk to any other species. Fishermen record their clam catches in logbooks which are attached to the landing reports and are submitted to the competent authority. This information is not always publicly available, but, is used to update the CNP. This level of quantitative information is adequate to assess the UoAs' impacts on primary species, so SG80 is met. SG100 is not met since there is not a high degree of certainty.

b Information adequacy for assessment of impact on minor primary species			
Guide			Some quantitative information

			is adequate to estimate the impact of the UoA on minor primary species with respect to status.
Met?			**Yes**

Rationale

There are no main or minor primary species in the UoAs. The official data on catch composition of the UoA shows that is a very selective fishery that presents no risk to any other species. There is some quantitative information, recorded in the logbooks (fishing books) and landing tickets that are reported to INAPESCA, which indicate that 100% of the catches are made of red, chocolata and white clams. There are no primary species; therefore, SG100 is met.

	Information adequacy for management strategy		
c			
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?	**Yes**	**Yes**	**No**

Rationale

There are reliable data on the UoAs´catch composition that demonstrate the absence of secondary species (Clam fishery report, COBI 2019). Therefore, SG80 is met.

Quantitative information is reported in the fishing books and in the trip tickets reported to INAPESCA, and this information is adequate to support a possible partial strategy for the management of primary species, if any. Therefore, SG80 is met. Since there is no comprehensive information to support a strategy, SG100 is not met.

References

Fisheries logbooks 2015 to 2019 of the Mojarra del Arrecife cooperative.

Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	**>80**
Information gap indicator	**Information sufficient to score PI**

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 Guide post	**Main secondary species stock status**		
	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?	**Yes**	**Yes**	**Yes**

Rationale

There is a 100% probability that secondary species are not captured since the fishing method (manual collection) is highly selective. There are reliable data on the composition of the UoAs' capture that demonstrate the absence of secondary species (Clam fishery report, COBI 2019). Therefore, SG100 is met.

b Guide post	**Minor secondary species stock status**		
			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?			Yes

Rationale

There is a 100% probability that there are no secondary species since the fishing method (manual collection) is highly selective. In fact, there are official data on the composition of the catch for the UoAs that prove the absence of secondary species in this fishery. Therefore, SG100 is met.

References

Clam fishery report of Puerto Libertad (Internal report COBI).

Fisheries logbooks 2015 to 2019 of the Mojarra del Arrecife cooperative.

Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	**>80**
Information gap indicator	**Information sufficient to score PI**
Data-deficient? (Risk-Based Framework needed)	**No**

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
	Management strategy in place		
a	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?	**Yes**	**Yes**	**No**

Rationale

There is no evidence that it indicates any discard or capture of secondary species because it is a 100% selective artisanal fishery. The gear itself acts as a partial strategy, and there are no secondary species so SG80 is met. Since there is no 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 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?	**Yes**	**Yes**	**No**

Rationale

There is no evidence that indicates any discard or capture of secondary species; it is a 100% selective artisanal fishery. There are official data on the composition of the catch for the UoAs that prove the absence of secondary species in this fishery. Therefore, there is some objective basis for confidence that if the partial strategy would be generated, it would work, based on information directly about the UoA. Therefore, this scoring issue met SG80. SG100 is not met since there is no testing to support a partial strategy.

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 some evidence that indicates there are no secondary species; it is a 100% selective artisanal fishery. Through official data logbooks, it has been determined that there are no secondary species in the UoAs; therefore, these catch profiles demonstrate the absence of any other species, which reinforces the appropriate management strategy of the UoA. This issue reaches SG80 but not SG100 since there is no clear evidence.

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 is no unwanted catch of sharks.

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	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	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.	species and they are implemented as appropriate.	species, and they are implemented, as appropriate.
	Met?	**NA**	**NA**	**NA**

Rationale
There is no evidence to indicate any discard or capture of secondary species; it is a 100% selective artisanal fishery. Thus, alternative measures for secondary species are not required, and this issue is not applicable and therefore not scored.

References
Clam fishery report of Puerto Libertad (Internal report COBI)
Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	**>80**
Information gap indicator	**Information sufficient to score PI**

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?	**Yes**	**Yes**	**No**

Rationale
It is a 100% selective artisanal fishery. There is some quantitative evidence, which is described through a report of the Puerto Libertad clam fishery that indicates that there is no extraction of secondary species. Based on this information, there is adequate evidence to assess the impact of the UoAs. SG80 is met. SG100 is not met since there is not a high degree of certainty.

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?			**Yes**

Rationale

There are no main or minor secondary species in the UoAs. There are official data on the composition of the catch for the UoAs, which demonstrate the absence of secondary species in this fishery. There is some quantification would be through the landing tickets, which do not show unwanted catches. Therefore, SG100 is 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?	**Yes**	**Yes**	**No**

Rationale

There are no secondary species in the UoA. There are official data (e.g., Landing tickets) on the composition of the UoA catch that demonstrate the absence of secondary species in this fishery. According to this quantitative information, it is adequate to support a partial strategy that could be generated if there are secondary species in the future. SG80 is met. As there is no comprehensive information to support a strategy, SG100 is not met.

References

Clam fishery report of Puerto Libertad (Internal report COBI)

Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	**>80**
Information gap indicator	**Information sufficient to score PI**

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

According to the review of the ETP species and the catch data (2015-2019), the UoAs do not interact with any ETP species that is under any regime of any of the national and international institutions/organizations and national and foreign laws, such as NOM-059, CITES, and IUCN, or any other of this nature. Since there are no national and/or international limitations, this issue is not scored.

b	**Direct effects**		
	Guide post	Known direct effects of the UoA are likely to not **hinder recovery** of ETP species.	Known direct effects of the UoA are 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?	**Yes**	**Yes**	**Yes**

Rationale

There is information on catches by means of landing tickets and logbooks. This information indicates that there are no interactions of the UoAs with ETP species. The information is adequate and accurate regarding the impact of the fishery on these species, as described in the report of the clam fishery 2015 to 2019.

Therefore, with this information, it is possible to determine with a high degree of confidence that there is no negative effect on the ETP species so this scoring issue meets SG100.

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?		**Yes**	**Yes**

Rationale

According to the total catches reported by fishermen in the landing tickets, there is no effect on ETP species, and the loss of fishing gear (Ghost Fishing) is also nil. There is no interaction with ETP species; the fishing method (manual collection) is highly selective. Thus, there is a high degree of confidence that the fishery will not produce unacceptable impacts or significant detrimental indirect effects on ETP species. SG100 is met.

References
Clam fishery report of Puerto Libertad (Internal report COBI).

Draft scoring range	**>80**
Information gap indicator	**Information sufficient to score PI**
Data-deficient? (Risk-Based Framework needed)	**No**

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
	Management strategy in place (national and international requirements)			
a	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 and/or international limitations or requirements, this scoring issue is not scored.

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?	**Yes**	**Yes**	**No**

Rationale

It has been determined with a high degree of confidence that there is no interaction of the UoAs with ETP species. The selectivity of gear and location constitutes a strategy that ensures the UoAs do not hinder the recovery of ETP species. SG80 is met. SG100 is not met since there is not a comprehensive strategy in place.

	Management strategy evaluation			
c	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?	**Yes**	**Yes**	**No**

Rationale

It has been determined with a high degree of confidence that there is no interaction of the UoAs with the ETP species. Due to the selectivity of the gear, the location of the fishery, there is an objective basis for the confidence that the strategy will work based on information directly from the fishery. SG80 is met, but SG100 is not met since there has been no quantitative analysis to support high confidence.

	Management strategy implementation			
d	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?		**Yes**	**Yes**

Rationale

It has been determined with a high degree of confidence that there is no interaction of the UoAs with ETP species. There is clear evidence of the absence of ETP species; therefore, this fishery is achieving its objective as set out in scoring isue (b). SG100 is met.

	Review of alternative measures to minimize mortality of ETP species			
e	Guide post	There is a review of the minimise potential effectiveness and practicality of alternative measures to 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?	**NA**	**NA**	**NA**
Rationale				

It has been determined with a high degree of confidence that there is no interaction of the UoA with the ETP species through the fishing records; Therefore, this scoring problem does not need to be scored.

References	

Clam fishery report of Puerto Libertad (Internal report COBI)
DOF, 2010.
Norma Oficial Mexicana NOM-059-SEMARNAT-2010

Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	**>80**
Information gap indicator	**Information sufficient to score PI**

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
	Information adequacy for assessment of impacts		
a	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?	**Yes**	**Yes**	**Yes**
Rationale				

There is no interaction with ETP species; the fishing method (manual collection) is highly selective. Therefore, this allows the team to determine with a high degree of certainty that there are no UoA-related impacts, mortalities, injuries, or consequences for the status of the ETP species. SG100 is met.

		Information adequacy for management strategy		
b	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?	**Yes**	**Yes**	**No**

Rationale

According to the justification presented in PI 2.3.1 and the information is shown in capture data, there is no interaction with ETP species; therefore, this allows the team to determine with a high degree of certainty that there is no effect or impact of the UoAs. SG80 is met, but SG100 is not meet since there is not a comprehensive strategy.

References

Clam fishery report of Puerto Libertad (Internal report COBI)

Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	**>80**
Information gap indicator	**Information sufficient to score PI**

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
	Commonly encountered habitat status		
a	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?	**NA**	**NA**	**NA**

Rationale

The RBF approach was used to determine the level of risk for the state of the habitats where this fishery occurs, since there is no information on the status of habitats and their relationship with the UoA

In Sonora, clam capture occurs between 5 and 15 meters deep. The scoring elements for clams in these areas are sand and gravel. The fleet has no interaction with other habitats. The scoring elements for the white clam and chocolata clams are fine sand, for the red clam it is gravel bottom.

The type of substrate in the area for white and chocolata clams is composed of fine sediments (0.1-1 mm). The geomorphology is flat, with a simple surface structure with small ripples. The biota is composed of small sponges and other small communities of low-scale invertebrates.

Clams are found in coastal waters (0-25 m), with a sub-biome of coastal margin less than 25 meters. The main feature is the sediment plains.

Another type of substrate in the area for red clam is medium size gravel/pebble (4-60 mm). The geomorphology is of low relief, with irregular topography with a rough surface structure. The biota is composed of small sponges and other small communities of low-scale invertebrates.

RBF scores:

- Sand: ≥80
- Gravel: ≥80

	VME habitat status		
b	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?	**NA**	**NA**	**NA**

Rationale

The RBF approach was used to determine the level of risk for the state of the habitats where this fishery occurs, since there is no information on the status of habitats and their relationship with the UoA.

Also, The UoAs do not interact with the Vulnerable Marine Ecosystem (VME) habitats.

	Minor habitat status		
c	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?			**NA**

Rationale

The RBF approach was used to determine the level of risk for the state of the habitats where this fishery occurs, since there is no information on the status of habitats and their relationship with the UoA.

References
Clams PLI Worksheet RBF

Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	≥80 (RBF)
Information gap indicator	More information sought
Data-deficient? (Risk-Based Framework needed)	Yes

Overall Performance Indicator scores added from Client and Peer Review Draft Report

Overall Performance Indicator score	
Condition number (if relevant)	

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?	Yes	Yes	No

Rationale
It has been determined with a high degree of confidence that there is minimal interaction of the UoAs with the main habitat. There is a fishing bank for each species of clams and a non-fishing zone, which is stipulated in the commercial fishing clam permits. Each fishing bank was delimited by the cooperative's divers, the COBI staff and the INAPESCA staff who are responsible for managing that area. These factors plus the selectivity of the gear and the location the fishery uses constitute a strategy, which is expected to ensure the UoAs do not cause serious or irreversible harm. SG80 is met. SG100 is not meet since the strategy does not consider the management of all MSC UoAs and non-MSC fisheries.

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	There is some **objective basis for confidence** that the measures/partial strategy will work, based on **information directly about**	**Testing** supports **high confidence** that the partial strategy/strategy will work, based on **information directly about the UoA and/or**

			similar UoAs/habitats).	**the UoA and/or habitats** involved.	**habitats** involved.
	Met?		**Yes**	**Yes**	**No**

Rationale

Based on the legal fishing equipment used, the team concludes that there is an objective basis for confidence that the strategy will work based on information directly on the UoA and the habitats involved. SG80 is met. Since it is a new fishery, testing has not yet occurred. Therefore, SG100 is not met.

		Management strategy implementation		
c	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?		**Yes**	**No**

Rationale

The fishing permit issued by CONAPESCA indicates a fishing bank and a no take zone for clams. There is no negative impact on the habitat, but there is no evidence to prove it in a plan or document where it reports direct investigations within the area. Due to the selectivity of gear, location that the fishery uses, there is some quantitative evidence that this strategy is being implemented successfully, so SG80 is met. SG100 is not met since there is not clear quantitative evidence.

		Compliance with management requirements and other MSC UoAs'/non-MSC fisheries' measures to protect VMEs		
d	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?	**NA**	**NA**	**NA**

Rationale

There is no impact on VMEs and therefore this issue is not scored.

References

Clam Fishing Permit 2019 (Coop, Mojarra del Arrecife).

DOF, 2018.

Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	**>80**
Information gap indicator	**More information sought**

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			
a — 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 (RBF)**	**Yes (RBF)**	**No**

Rationale

Although the probability that the fishery impacts the habitat is minimal, there is no concrete evidence of the effect of the fishery on the seabed, but it is expected to be minimal or zero. The RBF was used to score PI 2.4.1. Based on information from underwater monitoring conducted by certified divers in the city of Puerto Libertad in areas of fine sand and gravel with low relief, this (quantitative) information is adequate to estimate the types and distribution of the main habitats, so SG80 is met. SG100 is not met since the distribution of all habitats is unknown.

	Information adequacy for assessment of impacts		
b 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:** Qualitative information is adequate to estimate the consequence and spatial attributes of the main habitats.	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 **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	The physical impacts of the gear on all habitats have been quantified fully.

				main habitats.	
	Met?	**Yes**	**Yes**	**No**	

Rationale

Although the probability that the fishery impacts the habitat is minimal, there is no concrete evidence of the effect of the fishery on the seabed so the RBF was used to score PI 2.4.1. From experience in other places and from regional studies, it would be possible to identify the nature of the impacts of the fishery, and a well-attended workshop would probably provide the available evidence. Information is being collected to better understand the effects of the clam fishery in the habitat. A research protocol is being developed to measure and monitor the effect of fishing gear on the habitat by means of diving and video recordings of clam extractions. Therefore, some quantitative information is available and is adequate to estimate the consequence and spatial attributes of the main habitats. SG80 is met, but SG100 is not meet, since the physical impacts of the gear on all habitats have been not quantified fully.

	Monitoring			
c	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

Based on the adequate information collected to detect any increase in risk to the main habitats, through the fishing logbooks, it is determined that there is no negative effect of fishing gear and fishing activity on the habitat.

Information is being collected to detect any increased risk to the main habitats where white, chocolata and red clams are harvested. In the future, with all the information acquired, changes and effects on the clam fishing habitat of Puerto Libertad will be measured through subtidal monitoring. Comparing fishing banks versus non-fishing areas.

This SI meets SG80 but not SG100 since distribution changes for all habitats are not measured.

References

Monitoring protocol to evaluate the capture and the effect on the habitat using a video camera (Protocol of Comunidad y Biodiversidad, A.C.).

Field data on underwater monitoring for clams, Technical report of bivalve mollusks 2015-2019 in Puerto Libertad.

Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	>80
Information gap indicator	**More information sought**

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**	**Yes**	**No**

Rationale

According to a study of the effects on the invertebrate fishing on the ecosystem, it shows that they play an important role and that their exploitation can have an impact on the ecosystem similar to that of fish (Smith et al. 2011). Bivalves also play important non-trophic relationships, such as transforming habitats, no take zones and improving water quality for other species (Day and Brach 2002; Anderson et al. 2011).

It is highly unlikely that the UoAs will disrupt the key elements of the ecosystem due to the small scale of the fishery. The UoAs can be considered highly unlikely to alter key elements of the ecosystem structure due to the highly selective nature of the fishery, the general health of the target stock, and because the fishing activity is unlikely to affect species composition, community distribution or other key ecosystem elements. The scoring issue meets SG80 but not SG100 since there is no evidence for the UoAs.

References

Ecosystem effects of invertebrate fisheries
Smith et al. 2011; Day and Brach 2002; Anderson et al. 2011
Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	>80
Information gap indicator	**More information sought**
Data-deficient? (Risk-Based Framework needed)	

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	There are **measures** in place,	There is a **partial strategy** in	There is a **strategy** that

		if necessary which take into account the **potential impacts** of the UoA on key elements of the ecosystem.	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.	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.
b	Met?	**Yes**	**Yes**	**No**

Rationale

There are certain measures in place such as assessments of local banks (before the season) within the UoA, the designation of quotas and fishing permits, an official closure (DOF, 2018), selective fishing gear, no take areas, and re-population. The above measures are considered as a partial strategy, which is in place and which takes into account available information and is expected to restrain impacts of the UoA on the ecosystem. SG80 is met. However, there is a lack of a plan to address all the main impacts, so SG100 is not met.

	Management strategy evaluation			
b	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

There is an objective basis to trust that the partial strategy will work because it respects the no take zone and fishing banks (DOF, 2018). SG80 is met. There is no evidence yet to support with high confidence that the strategy will work, although ecosystem monitoring was just recently implemented by the Mojarra del Arrecife Cooperative. SG100 is not met.

	Management strategy implementation			
c	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 some evidence that the measures (especially refuge areas) are being implemented successfully because the clam populations are stable, there is no bycatch or interaction with ETP species, the fishing method (by hand) is highly selective and represents minimal to no risk to habitats, and the removal of clams is not likely to disrupt the ecosystem or its components. SG80 is met.

Clear evidence is needed to be able to meet SG100.

References	
Fishing permits, Technical document on annual quota for clams.	

Draft scoring range	**60-79**
Information gap indicator	**More information sought**

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 from the monitoring project carried out in Puerto Libertad to evaluate the clam fishery for changes in the habitat and ecosystem. There is no information that is evidenced or endorsed by any researcher or organization yet. Work is being done on an evaluation framework on the impact on the ecosystem from the clam fishery. Thus, the information is adequate to identify the key elements of the ecosystem where the clams are located, and SG60 is met.

There is a lack of adequate information to fully understand the key elements of the ecosystem. For this reason SG80 score is not met.

	Investigation of UoA impacts			
b	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

It is suspected that the impacts of the UoAs on key elements of the ecosystem are low. The impacts of the fishery are being investigated in detail. Such information will be used to determine the effect of the fishery on the ecosystem (health and balance). However, there has been a no deeper investigation that can make it evident, so this scoring issue meets SG60 but not SG80 or SG100.

c	Understanding of component functions			
	Guide post		The main functions of the components (i.e., P1 target species, primary, secondary and ETP species and Habitats) in the ecosystem are **known**.	The impacts of the UoA on P1 target species, primary, secondary and ETP species and Habitats are identified and the main functions of these components in the ecosystem are **understood**.
	Met?		Yes	No

Rationale

The main functions of the ecosystem components are known. Also Ecopath modeling software is being used to understand the impact of the UoA on the ecosystem. Clam landing records and ecosystem modeling will help to fully examine the trophic structure and energy flows in the Gulf of California for artisanal fisheries operating in this region. This information will help to understand the key role of clam species in the ecosystem. In addition, the clam's fishery does not represent a danger or threat to the primary, secondary or ETP species, since it is a 100% selective and directed fishery, as documented in the fishing books and monitoring. Therefore, this scoring issue reaches the SG80, but SG100 is not met since the ecosystem components are not yet understood.

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?		Yes	No

Rationale

Since there is no bycatch or interaction with ETP species, the main components are the target species (clams) and the habitat. The clam populations appear stable, and the effects on habitat are minimal. An Ecopath analysis is being conducted to assess what the impacts of the UoAs may be on key ecosystem components. Therefore, this scoring issue reaches SG80, but SG100 is not met since the main impacts on the ecosystem elements are not known.

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?		Yes	No

Rationale

Research is being done on the aspects of the UoAs in the ecosystem. This implies gathering enough information to perform an analysis to detect the changes and effects that the fishery could have on the ecosystem, and detect any increase in risk level. Work is being done to gather information through the use of fisheries logbooks and monitoring. Because there is still no obvious information, which may be adequate to fully support the development of the strategy, SG80 is met, but SG100 is not met.

References
Fishing logbooks.
Landing tickets during the year 2015 to 2019 of the Mojarra del Arrecife cooperative.
Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	**60-79**
Information gap indicator	**More information sought**

6.6 Principle 3

6.6.1 Principle 3 background

Legal framework

Fisheries in Mexico are regulated by federal, state and municipal agencies; in addition, research groups and Civil Society Organizations play an important role in the management of the fishery resources (Arreguín-Sánchez 2006; Arreguín-Sánchez and Arcos-Huitrón 2011).

In Mexico, there are 18 ministries at the federal level, two of which are closely linked to fishery management (SEMARNAT and SAGARPA) and two more have a secondary role (SEMAR and SCT). SEMARNAT (Ministry of the Environment and Natural Resources) incorporates criteria and instruments that assure the optimum protection, conservation and exploitation of the country's natural resources and allow the sustainable development of ecosystems and biodiversity conservation.

SAGARPA (Ministry of Agriculture, Livestock, Rural Development, Fisheries and Food) is a dependency of the federal executive whose main objective is to manage, regulate and promote the integral and sustainable development of primary activities (fishing, agriculture, livestock and aquaculture). Fishing and aquaculture activities are managed through two decentralized agencies, INAPESCA and CONAPESCA which are also under the scope of the Federal executive. Fisheries management is carried out through operative plans, management plans, official regulations and fishery no-take zone, in accordance with General Law of Sustainable Fishing and Aquaculture (LGPAS) (DOF, 2018).

The National Institute of Fisheries and Aquaculture conducts, directs, and coordinates the scientific research and the development of proposals for fisheries management and, in conjunction with SEMARNAT, is responsible for producing the CNP, a document that outlines the strategies and actions that, in accordance with the fishery law, must be met to regulate each fishery without altering the ecological equilibrium. In practice, surveys and stock assessments are completed by Regional Fishery Centers known as CRIAPs, which are subdivisions of INAPESCA.

The CNP (DOF, 2012) is the most influential document on Mexican fisheries, which represents a primary assessment tool for fisheries and includes an inventory for each known fishery resource in the nation. It also provides a short description of each fishery, defines levels of effort applied to each species or group of species within a certain area, in addition to the permitted fishing gears.

The CNP groups the brown chocolata and red chocolata clams of commercial importance into the "Chocolata Clam" category (DOF, 2018). The two species belong to the family Veneridae, representing the sub-family Pitarinae that includes *Megapitaria aurantiaca* and *M. squalida*; which are the most economically important mollusks in the region. *M. aurantiaca* is distributed from the Gulf of California, Mexico, to Salinas in Ecuador, and *M. squalida* has been reported from the Laguna Guerrero Negro or east San Jose in Baja California, Mexico, the Gulf of California to Macora, Peru (DOF, 2012).

In Mexico, federal, state and municipal government agencies develop and apply fishery policies. In addition, there are both state and regional committees and councils; academic institutions and CSO which are involved in Mexican fishery policies.

Currently, the coastal-marine and ocean management in Mexico is regulated by a number of national laws, regulations, decrees and secretarial agreements. There are two main laws that define the fishery management system in Mexico: 1) LGPAS, and 2) The General Law of Ecological Balance and Environmental Protection (LGEEPA).

The management of fisheries in Mexico is centralized. CONAPESCA establishes and monitors compliance with management regulations. The access to fisheries, according to LGEEPA, is regulated by permits and concessions that are issued by CONAPESCA to physical (permit holders) or moral (generally cooperatives) persons. There is a fishing office in Puerto Libertad that has a technical representative, the Office Manager who issues the landing tickets, located in the town of Bahia de Kino. The main roles of the

Office Manager are to sign the landing tickets, report the catch to federal offices and fishing guides, and to transport the fishery product to other towns and states.

In Puerto Libertad, there is a temporary no take zone located in the coastal marine zone known as Cerro Bola, with a validity of 5 years. The establishment of the no take zone was based on the technical opinion RJL/INAPESCA/DGAIPP/0993/2016, issued by INAPESCA on 12th July 2016, and validated on 27th June 2017. The no take zone has a surface of 74.76 hectares. The defined zone is displayed below (**Figure 10**), in marine waters within the jurisdiction of Puerto Libertad.
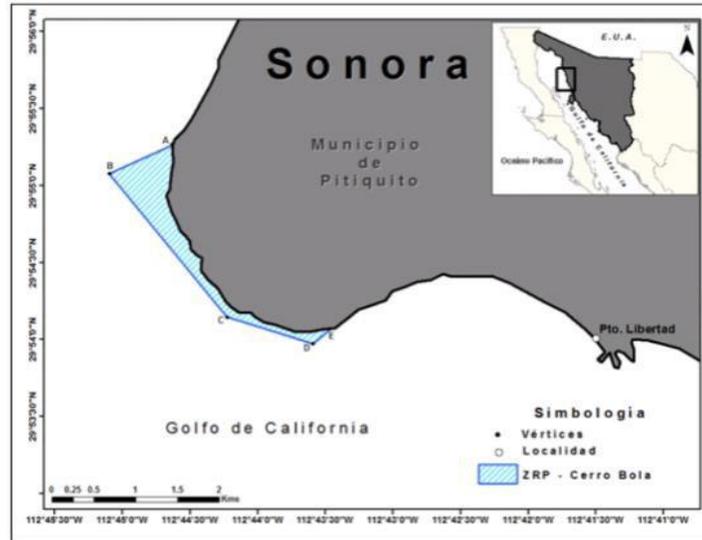

Figure 10. Cerro Bola Fishing Refuge Zone decreed by CONAPESCA in 2017

Traditional tools such as permits, closed seasons and minimum sizes have been used for years; however, they have not been sufficient to assure that the fishing activities are sustainable, mainly due to the specific focus of these tools. Therefore, it is necessary to implement other non-traditional legal tools such as quotas and no take zone. The no-take zones are defined areas in waters of federal jurisdiction with the primary purpose of conserving and contributing, naturally or artificially, to the development of the fishery resources through their reproduction, growth or recruitment, in addition to preserving and protecting the surrounding environment (DOF, 2017). As described, the cooperatives and the committee of Puerto Libertad have requested a new no take zone for the clam resource in the Puerto Libertad, which also helps the community to limit access to the large vessels that can cause damage to the habitat and ecosystem.

Official Standards and Regulations

At the national level, the specific instrument for Mexican fisheries legislation is the LGPAS, which provides guidelines for the regulation of fisheries. Linked to this law are fisheries regulations and Official Mexican Norms (NOMs) that define management measures, such as temporal/ seasonal/ spatial closures, size limits, vessel/gear specifications, fishing licenses, limited entry, catch quotas, etc. NOMs are mandatory (legally binding), and consist of technical regulations that control specific fisheries.

The National Fisheries Chart (CNP) is another binding instrument used by fisheries authorities. The CNP includes recommendations of a large number of fisheries and provides fisheries and conservation indicators, as well as recommendations by INAPESCA that must be observed by fishers and authorities. The CNP is updated with new fisheries, status, and regulations approximately every year. The most recent CNP was issued in 2018 (DOF, 2018). Fishery management plans are also elaborated by INAPESCA as a tool specified in the law to establish the management goals and the harvest strategy for each fishery.Principle 3 Performance Indicator scores and rationales.

6.6.2 Principle 3 Performance Indicator scores and rationales

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
	Compatibility of laws or standards with effective management		
a 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?	**Yes**	**Yes**	**Yes**

Rationale

Mexico has a constitutional government with a legislature that sets overall governance and policy through a national fishery law (LGPAS). The law delegates management and research responsibility to CONAPESCA and INAPESCA. State Fisheries Committees can participate in the development of fisheries policies, but normally have only a consultative role. NOMs, the CNP, and PMPs set specific requirements for individual fisheries.

There is a federal and state-based legal framework for cooperation among management agencies and with stakeholders, capable of delivering sustainable fisheries that is consistent with Principles 1 and 2. This represents an effective, binding national legal system, likely to meet SG100.

	Resolution of disputes		
b 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?	**Yes**	**Yes**	**No**

Rationale

The management system brings fishermen into the deliberation process. Fishermen and other stakeholders may challenge decisions during the deliberation process, requiring a response from the government, and subsequently

through the courts.

The system has a transparent mechanism to resolve legal disputes, also in the case of sanctions, which is considered to be effective, so SG80 is likely met. This scoring issue does not meet SG100 because the management system has not been tested and proven to be effective.

	Respect for rights			
c	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?	**Yes**	**Yes**	**Yes**

Rationale

Environmental and fisheries laws and regulations recognize the dependence on fishing for food and livelihood and include clauses to generally respect customary or traditional legal rights of the local fishermen. The LGPAS sets the basis for the development of fisheries in Mexico under the principle of sustainability and accounting for other biological, environmental and socio-economic factors. For example, article 72 of the LGPAS allows fishing without permits when fishing for food and livelihood by coastal communities. This article prohibits the sale of the product that was fished for consumption for coastal communities. The rights of indigenous peoples fish for food and cultural rituals are given priority and special considerations (OECD, 2013). SG100 is likely to be met.

References

DOF, 2007, 2014, 2018.
OECD, 2013.
SCS Global 2016.

Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	**>80**
Information gap indicator	**Information sufficient to score PI**

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			
a 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?	**Yes**	**Yes**	**Yes**

Rationale

There is good knowledge of the roles, authority, and key areas of responsibility (data collection, management decision-making, technical innovation for capture, etc.) of the legislature. According to the LGPAS, different institutions interact with the fisheries authority: SADER, SEMARNAT, SEMAR, INAPESCA, CONAPESCA and SENASICA, local authorities, and stakeholders that are involved in the fishery. The roles and responsibilities of the main government agencies involved in the fisheries management system are explicitly defined and well known, and are provided in the Principle 3 background section of this report. Therefore this scoring issue meets SG100.

	Consultation processes		
b 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?	**Yes**	**Yes**	**No**

Rationale

The management system incorporates consultation processes that regularly seek integration of local and empirical knowledge and relevant information. According to the LGPAS, article 2, objective VII aims to determine and establish the basis for the creation and operation of mechanisms for the participation of producers engaged in fishing and aquaculture activities (DOF, 2012).

In particular, article 22 of LGPAS defines the national and state council at inter-sectorial forum for consultation, support, coordination and advice to CONAPESCA in management.

The state council is responsible for the definition of management objectives in PMP (DOF, 2012), so this scoring issue meets SG80. However, INAPESCA and CONAPESCA don't consider how the information is obtained and do not explain how it is used, so SG100 is not met.

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?		**Yes**	**Yes**

Rationale

The national and state councils provide the opportunity for all stakeholders to be involved in the consultation process, including federal, state, and local authorities (fishery, environmental, enforcement), scientists, fishermen, industry groups, and CSO. All interested parties are called to workshops and meetings and are given opportunities to participate. For example, during the development of PMPs, INAPESCA holds public consultation meetings. The Sub-committee of Responsible Fishing also facilitates the participation of stakeholders to propose, compile, review, approve and publish NOMs.

The consultation process encourages and facilitates active engagement of stakeholder groups involved in drafting, reviewing, and approving norms, the CNP, and PMPs before they are published in the final version. SG100 is likely met.

References

DOF, 2007, 2014, 2018.

Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	**>80**
Information gap indicator	**Information sufficient to score PI**

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			
a 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?	**Yes**	**Yes**	**Yes**

Rationale

The fisheries law (LGPAS) incorporates these main objectives:
- Promote and regulate the integrated management and sustainable utilization of fisheries and aquaculture, considering the social, technological, productive, biological and environmental aspects;
- Promote enhanced quality of life of the country's fishing and aquaculture livelihoods through programs implemented for fisheries and aquaculture sectors;
- Establish the basis for the management, conservation, protection, rebuilding and sustainable utilization of fisheries and aquaculture resources and the protection and rehabilitation of ecosystems in which these resources are found;
- Set ground rules for planning and regulating the exploitation of fishery resources and aquaculture media or selected environments;
- To procure the preferential access, use and enjoyment rights for indigenous communities in the regions where they live.
- Establish the basis for coordination among federal, state, and local authorities to implement the fisheries laws.
- Set out the basis to provide fishing concessions and permits for fishing activities and aquaculture.
- Establish the baseline for monitoring, control, and surveillance activities.
- Provide support and promote scientific and technological research.

The LGPAS incorporates clear long-term objectives that guide decision-making, consistent with the MSC standard. As outlined above, the LGPAS defines one of its prime objectives as establishing the basis for the conservation, protection, rebuilding, and sustainable utilization of fisheries and aquaculture resources, and of the supporting ecosystems. The LGPAS also establishes that authority must adopt the precautionary approach for the conservation and protection of fishery resources and ecosystems. Clearly, the terms sustainable use, preservation, and conservation are used repeatedly in the management policy, which implicitly and explicitly incorporates precautionary concepts. This indicator is likely to meet SG100.

References

DOF, 2007.

Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	**>80**
Information gap indicator	**Information sufficient to score PI**

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?	**Yes**	**No**	**No**

Rationale

The clam fishery in the Gulf of California (GC) does not have an official Standard (NOM) or a Fisheries Management Plan (FMP), where the short- and long-term objectives would be described. The fishery is managed through the National Fisheries Chart (CNP, 2018), where general objectives are laid out and management measures for the fishery are outlined. Therefore, it is necessary to develop a NOM and FMP, so the fishery only meets SG60, but not SG80.

References

DOF, 2018.

Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	**60-79**
Information gap indicator	**More information sought**

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	There are **some** decision-	There are **established**	

	post	making processes in place that result in measures and strategies to achieve the fishery-specific objectives.	decision-making processes that result in measures and strategies to achieve the fishery-specific objectives.	
	Met?	**Yes**	**No**	

Rationale

The process to review, evaluate, and revise management regulations in Mexico is often based on demand by producers and fishermen. The process starts by scoping issues and identifying potential solutions. The public has an opportunity to provide information and opinions. Subsequently, the authorities propose measures, either in the form of regulations or legislation. Workshops with stakeholders are held to receive comments. Draft laws or regulations are published in the Official Gazette and undergo another opportunity for public comment before implementation. Public comments affect the final product; in some cases, by weakening the originally proposed measures.

There are some measures for the clam fishery in Puerto Libertad, such as sizes, quotas, fishing areas, permits, boats, etc.), which means that some general decisions were made for that fishery. However, scientific advice is not always incorporated into the decisions, or it can take several years before recommendations are considered in the regulation.

The fisheries improvement project (FIP) in Puerto Libertad, represents an initiative of NGOs, Universities, researchers and producers to collaborate with the authorities in the development of effective regulations based on scientific research.

The fishery meets SG60 but not SG80, since the processes to develop and implement measures and strategies are not clear or established.

		Responsiveness of decision-making processes		
b	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?	**Yes**	**Yes**	**No**

Rationale

Two types of decisions are made by the management system in Mexico: changes to laws and regulations, and emergency regulations, responding to critical issues. Once draft laws or regulations are published in the official Gazette, there is opportunity for public comment before implementation. Public comments affect the final product, but scientific advice is not always incorporated into the decisions, or can take several years before recommendations are considered in the regulation. The process may be slow, but in general, it is considered transparent and inclusive.

There is some evidence available for the analysis of whether the public supports the previous management recommendations provided by INAPESCA and CONAPESCA for the clam fishery in the Gulf of California, since in the updated CNP 2018 recommendations are included to create a clam NOM and work on a Fisheries Management Plan. It also outlines the clam ban in the Laguna Ojo de Liebre of Guerrero Negro in Baja California Sur. The CNP presents evidence of the fishery's problems in other regions of the Gulf of California, , thus meeting the SG80 level.

For the locality of Puerto Libertad, research is being done on clam reproduction, growth parameters and resource assessment to provide management recommendations; this work is being carried out by COBI, researchers from UNAM Sisal, UABCS and producers. However, it is unclear if all issues are addressed by the decision making process, so the SG100 level is not met.

	Use of precautionary approach			
c	Guide post		Decision-making processes use the precautionary approach and are based on best available information.	
	Met?		**Yes**	

Rationale

To date, there are measures in place to protect the clam resource in Puerto Libertad and avoid overfishing. There is a seasonal closure for the Baja California Sur area for chocolata clam (CNP 2018). The fishing permits issued by CONAPESCA include an addendum (DGOPA) that provides the precautionary management tools used in the fishery, such as: minimum sizes, quotas, fishing banks, etc.). Therefore SG80 is reached.

	Accountability and transparency of management system and decision-making process			
d	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?	**Yes**	**Yes**	**No**

Rationale

INAPESCA's reports provide some information on the fishery's performance and management action is generally available on request to stakeholders; therefore it reaches SG80. However, the reports lack details on the methodology used to estimate parameters, indicators, etc., so the SG100 level is not met.

	Approach to disputes			
e	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?	**Yes**	**Yes**	**No**

Rationale

The management system is inclusive and there is no evidence that there are obstacles that prevent the timely resolution of conflicts. There are currently no pending legal disputes. To resolve illegal fishing conflicts in the locality, the Puerto Libertad cooperative relies mainly on communication and exposes its problems to the competent authorities such as CONAPESCA. SG80 is met. However, there is no evidence that the management system or fishery acts proactively to avoid conflicts or resolve legal disputes (Stiles et al. 2014), thus the SG100 is not met.

References

Comments from the fishermen of the Mojarra del Arrecife cooperative.

DOF. 2018.

Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	**60-79**
Information gap indicator	**More information sought**

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
	MCS implementation		
a 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?	**Yes**	**No**	**No**

Rationale

There is not very effective surveillance by agencies such as CONAPESCA, INAPESCA, SEMAR. Due to the isolation of the community, the Mojarra del Arrecife cooperative is responsible for the compliance and enforcement of regulations.

A community surveillance group is being formed through the support of the Puerto Libertad Fisheries and Aquaculture Committee, in which the Mojarra del Arrecife cooperative participates to monitor the Cerro Bola no take zone and illegal capture of other species. This community group came from the need to stop illegal fishermen who catch clams within the areas granted to the cooperative to use the clam resource. There have not been any

violations or infractions by the users of the community of Puerto Libertad.

There is training in inspection and surveillance by competent authorities and experts in the field so that fishers can do a better job and address issues related to illegal activities or lack of compliance. There is a mechanism for monitoring, control, and surveillance by the Mojarra del Arrecife cooperative and therefore SG60 is met.

SG 80 is not met because a complete and established system has not yet been implemented.

	Sanctions			
b	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?	**Yes**	**No**	**No**

Rationale

The LGPAS specifies how field fisheries officers should conduct surveillance activities, report fishery violations and apply sanctions. They have to summit the case to the Attorney General's office, which is an independent body of the judiciary and the executive, responsible for investigating the offenses based on evidence. Fishery violations are sanctioned according to the LGPAS and other applicable laws and regulations.

CONAPESCA's GDIS aims at preserving marine ecosystems and species. The GDIS has 210 Federal Fisheries Officers strategically distributed throughout the national territory, inland waters and in the 17 coastal states of the Republic. The institutions responsible for application of sanctions are PROFEPA and the Federal Attorney General. SG60 is met.

There is no evidence that there are sanctions to deal with non-compliance, nor is it known whether they are applied systematically and demonstrably to provide effective deterrence. For this reason, SG80 is not met.

	Compliance			
c	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?	**Yes**	**Yes**	**No**

Rationale

The Fishermen of Puerto Libertad, especially the Mojarra del Arrecife cooperative, generally comply with the management measures included in their fishing permits for the clam resource, minimum sizes, fishing gear, quota, and fishing areas. There is evidence that the fishermen of the cooperative comply with the management system and provide the required information through arrival landing, and fishing logbooks, thus SG80 is met. However, there is not a high degree of confidence that other fishermen also comply; therefore SG100 is not met.

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

Rationale
There is no evidence of systematic non-compliance within the Mojarra del Arrecife cooperative, thus SG80 is met.
According to the conversations held at each meeting with cooperative staff, they point out that there are few people outside the cooperative who fish clams illegally, which can have a negative effect on their quota when INAPESCA conducts assessments.

References
Comments by the Mojarra del Arrecife cooperative 2019. DOF, 2007. SCS GLOBAL, 2018.

Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	**60-79**
Information gap indicator	**More information sought**

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?	**Yes**	**No**	**No**

Rationale
According to article 32 of the LGPAS the CNP is periodically reviewed and updated, however, the update system is not very clear. It is suggested that there are mechanisms to evaluate and update some parts of the management system, specifically the management measures that address the gear restrictions and number of permits, no take zone, and quotas. SG60 is met.
SG80 is not met because it is not clear whether there are mechanisms in place to evaluate key parts of the fishery-specific management system.

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?	**Yes**	**No**	**No**

Rationale

The CNP and CONAPESCA's fishery yearbook are the only legal documents that include a few specific management regulations. These documents are subject to occasional internal review, so SG60 is met. However, there is no evidence that regular internal and occasional external reviews occur, so SG80 is not met.

References

CNP, (DOF, 2012, 2018)

Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	**60-79**
Information gap indicator	**More information sought / Information sufficient to score PI**

7 List of references

Abbott, R.T. 1974. American Seashells 2a Ed. Van Nostrand Reihold Co. New York, 662 p

Anderson, S. C., Flemming, J. M., Watson, R and Lotze, H. K. (2011). Rapid global expansion of invertebrate fisheries: Trends, drivers, and ecosystem effects. PLoS ONE, 6, e14735.

Anthony D. M. Smith., Cristopher J. Brown, Catherine M. Bulman, Elizabeth A. Fulton, Penny Johnson, Isaac C. Kaplan, Hector Lozano-Montes, Yunne-Jai Shin, Jorge Tam. (2011). Impacts of Foshing Low-Trophic Level Species on Marine Ecosustems. Sciencie 333, 1147.

Aragón-Noriega E. A., 2017. Edad y crecimiento de la almeja chocolata *Megapitaria squalida* (Bivalvia: Veneridae) en la costa oriental del golfo de California. Hidrobiológica 27 (2): 175-184.

Arellano-Martínez, M., M.F. Quiñones-Arreola, B.P. Ceballos-Vázquez y M. Villalejo- Fuerte. 2006. Reproductive Pattern of the squalid callista *Megapitaria squalida* from Northwestern Mexico. J. Shellfish Res., 25:849-855.

Arreguin-Sanche, F. 2006. Pesquerías de México: (Diagnóstico y Perspectivas). In: P. Guzmán-Amaya & D. Fuentes-Castellanos (Eds.). Pesca, Acuicultura e Investigación en México. Cámara de Diputa-dos, LIX Legislatura / Congreso de la Unión. México. pp. 13-36.

Arreguín-Sánchez, F. y E. Arcos Huitrón. 2011. La pesca en México: estado de la explotación y uso de los ecosistemas. Hidrobiológica 21(3): 431-462.

Arreola-Hernandez J.F. 1997. Aspectos reproductivos de *Dosinia ponderosa*, Gray 1838 (Bivalvia: Veneridae) en Punta Arena, Bahía Concepción, B.C.S. Tesis Maestría. CICIMAR.

Baqueiro–Cárdenas, E. y J. Stuardo. 1977. Observaciones sobre la biología, ecología y explotación de *Megapitaria aurantiaca* (Sowerby, 1831), *M. squalida* (Sowerby, 1835) y *Dosinia ponderosa* (Gray, 1838) (Bivalva; Veneridae) de la Bahía de Zihuatanejo e Isla de Ixtapa, Guerrero, México. Anales del Centro de Ciencias del Mar y Limnología 4: 161–208.

Baqueiro, C. E., 1979. Sobre la distribución de Megapitaria aurantiaca (Sowerby),

M. squalida (Sowerby) y Dosinia ponderosa (Gray) en relación a la granulometría del sedimento (Bivlavia: veneridae): Nota científica. An. Centro Cienc. Del Mar y Limnol. Univ. Nal. Autón. Méx. 6: 25 - 32.

Baqueiro-Cardenas, E. 1998. Patrones en la dinámica poblacional y ciclo reproductor de Moluscos, Bivalvos y Gasterópodos de importancia comercial en México. Tesis de Doctorado. Centro de Investigación y de Estudios Avanzados del Instituto Politécnico Nacional. Mérida, Yucatán México.

Baqueiro, C.E. y D. Aldana-Aranda. 2000. A review of reproductive patterns of bivalve mollusks from México. Bulletin of Marine Science. 66(1):13-27.

Briggs, J.C. 1974. Marine zoogeography. McGraw Hill, New York, 475 p

Case, T.J. y M. L. Cody (Eds.) 1983. Islands biogeography in the Sea of Cortez.

Univ. of California Press, Berkeley. 503 pp.

Castro-Ortiz, J.L., A. Tripp-Quezada y B. Anguas-Vélez. 1992. Crecimiento de la almeja chocolata *Megapitaria squalida* (Sowerby, 1835) en Bahía Concepción, Baja California Sur México. Inv. Mar. CICIMAR, 7:1-7.

Corona-Fernandez, M., 2016. Biologia reproductiva de la almeja blanca, *Dosinia ponderosa* (Gray, 1838) en la Bahía de La Paz, B.C.S., Mexico.

De la Lanza Espino, Guadalupe. 1991. Oceanografía de mares mexicanos. Agt editor, Mexico. 569 p.

DOF. 1995. Norma Oficial Mexicana nom-016- pesc-1994 para regular la pesca de lisa y liseta o lebrancha en aguas de jurisdicción federal del Golfo de México y Mar Cribe, así como del Océano Pacífico, incluyendo el Golfo de California. Diario Oficial de la Federación. México. 3p.

DOF. 2007. Norma Oficial Mexicana nom-029- pesc-2006, Pesca responsable de tiburones y rayas. Especificaciones para su aprovechamiento. Diario Oficial de la Federación. México. 43p.

DOF. 2010. Norma Oficial Mexicana NOM-059- SEMARNAT-2010, Protección ambiental-Especies nativas de Mexico de flora y fauna silvestres-Categorías de riesgo y especificaciones para su inclusión, exclusión o cambio-Lista de especies en riesgo. Mexico.

DOF. 2012. Actualización de la Carta Nacional Pesquera y su anexo. Secretaría de Agricultura, Ganadería, Desarrollo Rural, Pesca y Alimentación. Diario Oficial. México), 1-112 p

DOF. 2017. Reglas de Operación del Programa de Fomento a la Agricultura de la Secretaría de Agricultura, Ganadería, Desarrollo Rural, Pesca y Alimentación para el ejercicio 2018.

DOF. 2018. Actualización de la Carta Nacional Pesquera y su anexo. Secretaría de Agricultura, Ganadería, Desarrollo Rural, Pesca y Alimentación. Diario Oficial. Mexico.

DOF. 2018. Ley General de Equilibrio Ecológico y la Protección al Ambiente. Publicado el 05 de junio de 2018.

Espinosa-Romero, M.J., M.Á. Cisneros-Mata, T. Mc Daniels y J. Torre. 2014. Aplicación del enfoque ecosistémico al manejo de pesquerías artesanales. Caso de estudio: Puerto Libertad, Sonora. Ciencia Pesquera 22(2): 65-80

Fiher W., F. Krupp, W. Schneider, C. Sommer, K.E. Carpenter y V.H Niem. 1995. Guía FAO para la identificación de especies para los fines de la pesca. Pacífico centro – oriental. Roma, FAO Vol. I Plantas e invertebrados: 1-646

García-Domínguez, F., García-Gasca, SA. Y Castro-Ortiz, JL., 1994. Spawning cycle of the red clam *Megapitaria aurantiaca* (Sowerby, 1831) (Veneridae) at Isla Espíritu Santo, Baja California Sur, México. Journal of Shellfish Research, vol. 13, no. 2, p. 417-423.

Hesselman, L. D., B. J. Barber & N. J. Blake. 1989. The reproductive cycle of adult hard clam, Mercenaria spp. In the Indian River Lagoon, Florida. J. Shellfish Res. 8:43-49

Holguín-Quiñones, O.E. and González-Pedraza, A.C. 1994. Moluscos de la franja costera de Michoacán, Colima y Jalisco, México. Dirección de Bibliotecas y Publicaciones, Instituto Politécnico Nacional, Mexico City

Keen, A. M. 1971. Sea shells of tropical West America. Marine mollusks from Baja California to Peru. 2º Ed. Stanford University Press, Stanford. 1064 p.

López-Rocha, Jorge A., Ceballos-Vázquez, Bertha Patricia, García-Domínguez, Federico A., Arellano-Martínez, Marcial, Villalejo-Fuerte, Marcial, y Romo- Piñera, Abril K. 2010. La pesquería de la almeja chocolata *Megapitaria squalida* (Bivalvia: Veneridae) en Baja California Sur, México. Hidrobiológica, 20(3), 230-237.

López-Rocha, Jorge A., Fernandez-Rivera Melo, F. J., Gastélum-Nava, E., Larios-Castro, E. and Romo-Piñera, A. 2018. Morphometric Relationship, Growth Parameters, and Natural Mortality as Estimated Primary Inputs for Fishery Management in Newfishing Areas for Bivalve Molluscs (Bivalve: Veneridae). Journal of Shellfish Research, 37(3):591-600.

López-Rocha, Jorge A., Fernandez-Rivera Melo, F. C., Gastélum-Nava, E. 2019. Population dinamics, abundance and reference points for clams in Puerto Libertad. Unpublished data.

Monitoring protocol to evaluate the capture and the effect on the habitat using a video camera (Protocol of Comunidad y Biodiversidad, A. C.). 2019.

Moreno-Báez M., Cudney-Bueno R., Orr B.J., Shaw W.W. Pfister T., Torre-Cosio J., Loaiza R., Rojo M. 2012. Integrating the spatial and temporal dimensions of fishing activities for management in the Northern Gulf of California, México. Ocean and Coastal Management 55: 111-127.

Monserrat-Ramón., 1993. Crecimiento y mortalidad natural de la ostra en la Bahía del Fangar. Acuicultura Marina: Fundamentos biológicos y tecnológicos de la reproducción.

OECD. 2013. Review of Fisheries: Policies and Sumary Statistics 2013. (DOI: 10.1787/rev_fish2013-en).

Olsson, A. A. 1961 Mollusks of the Tropical Eastern Pacific, Particulary from the Southern Half of the Panamic-Pacific Faunal Province (Panama to Peru). PanamicPacific Pelecypoda. Paleontological Research Institution, Ithaca N. Y. 574 p., 86 láms.

Porter, H. J. 1964. Seasonal gonad changes of adult clams *Mercenaria mercenaria* (L), in North Carolina. Proc. Natl. Shellfish Assoc. 55:35-52.

Poutiers, J.M. 1995. Bivalvos, 1:100-222. En: Fischer, W., F. Krupp, W. Schneider,

C. Sommer, K.E. Carpenter y V.H. Niem (Eds.) Guía FAO para la identificación de especies para los fines de la pesca. Pacífico centrooriental. Organización de las Naciones Unidas para la Agricultura y la Alimentación, Roma, 646 p.

Report of the description of the clam fishery caught by hand in Puerto Libertad. 2019. Comunidad y Biodiversidad, A. C. Reported Intern.

Roden, G. I. y G. W. Groves J. Marine Res. Recent oceanograpihe investigations in the Gulf of California. 1959 10-35 18 (1)

Romo Piñera, A.K., B. P. Ceballos-Vázquez, F. García-Domínguez y M.Arellano- Martínez. 2009. Unusual High Frequency of Hermaphroditism in the Gonochoric Bivalve *Megapitaria squalida* (Sowerby, 1835) (Veneridae). Journal of Shellfish Research 28(4):785-789

Romo-Piñera, A., M. Arellano-Martinez y F. Garica-Dominguez. 2011. Talla de primera madurez de la almeja chocolata *Megapitaria squalida*. 44ta Reunión anual de la Western Society of Malacologists y la 12da Reunión Bienal Nacional de Malacología y Conquiliología de la Sociedad Mexicana de Malacología, A.C. La Paz, Baja California Sur, México

Sartori, A.F. 2008. Siphonal structure in the Veneridae (Bivalvia: Heterodonta) whith an assessment of its phylogenetic application and review of veneridsof the Gulf of Thailand. Raffles. B. Zool., 18:103-125

Schweers, T., M. Wolff, V. Koch y F. Sinsel-Duarte. 2006. Population dynamics of *Megapitaria squalida* (Bivalvia: Veneridae) at Magdalena Bay, Baja California Sur, Mexico. Rev. Biol. Trop., 54:1003-1017.

SCS Global Services. 2016. Mexico Baja California Red Rock Lobster Fishery. MSC 2nd Re- Assessment Report. 213pp.

SCS Global Services. 2018. Almeja Chocolata Fishery Altata, Sinaloa. Pre- Assessment Report. 97pp.

Sevilla, M.L. 1995. Moluscos de la franja costera de Chiapas, México. Instituto Politécnico Nacional, Direcci6n General de Publicaciones, México D.F

Singh, C.J., J.A. Vélez y M.C. Fajardo. 1991. Estudio poblacional de la almeja chocolata *Megapitaria squalida* (Sowerby 1835) en Punta Coyote, Bahía de La Paz, B.C.S., México. Ciencia Pesquera, Instituto Nacional de la Pesca. México, 8:7-22.

Tripp-Quezada, A. 2008. Comunidades de moluscos asociados a ambientes de carbonatos modernos en el Golfo de California. Tesis de doctorado. Centro Interdisciplinario de Ciencias Marinas, Instituto Politécnico Nacional, 149p

Villalejo-Fuerte, Marcial. Fecundidad en *Argopecten circularis* (sowerby, 1835) (bivalvia: pectinidae) de bahía concepción, baja california sur, México. *bol. Invest. mar. cost.*[online]. 1995, vol.24, n.1, pp.185-189

Villalejo-Fuerte, M., M. Arellano-Martínez, B.P. Ceballos-Vázquez y F. García- Domínguez. 2000. Ciclo reproductivo de la almeja chocolata *Megapitaria squalida* (Sowerby, 1835) (Bivalvia: Veneridae) en Bahía Juncalito, Golfo de California, México. Hidrobiólogica, 10:165-168.

8 Appendices

8.1 Assessment information

8.1.1 Small-scale fisheries

To help identify small-scale fisheries in the MSC program, the CAB must complete the table below for each potential Evaluation Unit (UoA). For situations where it is difficult to determine exact percentages, the CAB can use approximations, e.g. to the nearest 10%.

Table 12. Small-scale fisheries

Unit of Assessment (UoA)	Percentage of vessels with length <15m	Percentage of fishing activity completed within 12 nautical miles of shore
Hookah diving for chocolata, red, and white clams in the Gulf of California	100%	100%

8.2 Evaluation processes and techniques

8.2.1 Site visits

In October 2016, the first fisheries certification workshop was held in Mexico City, where clam producers from the Puerto Libertad, CSO and government agencies participated. In this workshop different sustainability standards were presented, such as MSC, Fair Trade and MBA.

In January 2017, the first fishery improvement workshop for clams was held in the city of Hermosillo, Sonora, with the participation of: the Deputy Secretary of Fisheries of the State of Sonora Oceanologist Marco Ross, Oceanologist Silvia Carreño (SAGARHPA), Biologist Estefani Larios (INAPESCA CRIAP-Guaymas), Fisheries Sub-Delegate, Producers (Juan Gabriel Lopez Hermosillo and Víctor Hugo Valdivieso) and COBI staff.

COBI has been involved in the in the design of the clam fishery as a sustainable fishery. The steps involved in carrying out an FIP were presented to stakeholders, as well as the potential benefits or improvements that could be achieved.

The goal of the workshop was to define the objectives and roles of each actor involved in the fisheries improvement program. A minute was signed by participants, which was written and printed at the end of the meeting.

It was agreed to share the necessary information for the fishery assessments and follow up the meetings to see progress, achievements and problems that may be emerging in the time remaining for the next meeting.

8.2.2 Recommendations for stakeholder participation in full assessment

COBI is responsible for convening meetings with the working team of the Clam FIP in Puerto Libertad, to monitor progress and evidence of the work conducted. In this FIP the different fishing sectors are invoked such as Puerto Libertad Committee in collaboration with COBI, INAPESCA, Subsecretaría y Subdelegacion de Pesca y Acuacultura, we have worked hand in hand for the good management of the fishery. At each meeting, progress in the clam fishery is presented, changes in MSC scores and results of investigations such as the reproduction of red clam (*Megapitaria aurantiaca*), chocolata (*M. squalida*) and white clam (*Dosinia ponderosa*), as well as a review of the next steps.

The clam fishery project aims at being responsible and complying with the management regulations, which has helped to keep the clam population healthy. There is very good collaboration between the actors involved, which leads to more efficient work, without double efforts in monitoring and biometrics activities for resource research. Financing issues were discussed and this type of project could be replicated in other parts of the state of Sonora. The results of the reproduction of clams by Dr. Abril Romo was very helpful since it was scientifically proven that the clams of Puerto Libertad are spawning all year round, so it is suggested that there is no need for a close season.

Table 13. List of meetings held to start the FIP "Clams of Puerto Libertad".

Date	Place	Stakeholders	Purpose of the meeting
20/01/2017	Hermosillo, Sonora.	SAGARHPA SONORA	The meeting was held at the government offices of the Subsecretaría de pesca. The steps of FIP, the importance and the objetives and roles of each stakeholder involved in the proyect for the improvement of the resource were presented. The purpose of the meeting was also to define the agreements and objectives for the minor fishing project for the clam resource
		CONAPESCA SONORA	
		INAPESCA GUAYMAS	
		COBI	
		SCPP MOJARR DEL ARRECIFE	
		LOS PULPOS DE DON CAMERINO	
01/03/2017	Mazatlán, Sinaloa	SCPP MOJARRA DEL ARRECIFE	Delivery of documentation for fishing permits for red clams and chocolata
08/03/2017	Puerto Libertad, Sonora.	SCPP LOS PULPOS DE DON CAMERINO	Biometry of clams chocolata, white and red; for growth and mortality studies.
		SCPP MOJARRA DEL ARRECIFE	
		COBI	
11/05/2019	Guaymas, Sonora	INAPESCA	Follow-up to the logbook program for the clam fishery in Puerto Libertad
		COBI	
17/05/2017	Cd. Mexico	SCPP MOJARRA DEL ARRECIFE	The second Fisheries certification workshop was held in the Senate of the Republic; FIP Clams was presented as a sustainable fishery.
		EDF	
		PRONATURA	
		COBI	
		CONAPESCA	
		INAPESCA	
		EDF	Exchange of experiences with a bivalve group from
		COBI	

Julio 2017	Culiacan, Sinaloa	SCPP MOJARRA DEL ARRECIFE	the states of Sonora, Sinaloa and Baja California; The FIP of clams, the roles of each actor and the objective of the FIP in each bivalve mollusc fishery were explained
		NOS	
		OPRE (Organización de Pescadores para la Recuperación de la Ensenada La Paz)	
21/08/2017	Hermosillo, Sonora.	SAGARHPA SONORA	Follow-up Clams FIP of Puerto Libertad: progress on the project during the months of January to August 2017 were presented. Pre assessment.
		INAPESCA GUAYMAS	
		CONAPESCA GUAYMAS	
		COBI	
		SCPP MOJARRA DEL ARRECIFE	

Stakeholders to be consulted during a full evaluation

The main stakeholder groups of the clam fishery of Puerto Libertad are shown below.

Table 14. Group of stakeholders to be contacted in the elaboration of a fisheries assessment.

Stakeholders	Performance rol
SCPP Mojarra del Arrecife	Fishing production companies that have permission to extract clams in the Puerto Libertad
SAGARHPA	Subsecretaría de Pesca of the State of Sonora (State Government). Oceanologist Marco Antonio Ross Guerrero
Comunidad y Biodiversidad, A.C	Civil Society Organization that works with fishing communities, promoting marine conservation and sustainable fisheries through effective participation.
INAPESCA	Mexican institution in charge of fisheries scientific research and aquaculture nationwide
CONAPESCA	Government agency responsible for administering, ordering and promoting fishing and aquaculture activity.
Extensionista	People in charge of monitoring the projects or supports granted by the State Government
UABCS	Socially responsible institution that contributes with the best quality standards, to increase the level of human development of Baja California Sur society and the country.
Unidad Académica Sisal-UNAM	Research Institute in Mexico

Contramar	Restaurant specializing in fish and seafood served in a current and minimalist dining room with casual atmosphere.
Comité de Pesca y Acuacultura de Puerto Libertad	Agency composed of artisanal fishermen from the community of Puerto Libertad, Sonora.
NOS	Sustainable Northwest, civil society organization that supports Coastal communities generate a vision of the future, which strengthens their collective leadership.
EDF México.	International civil society organization, which for over 50 years has been dedicated to finding transformative solutions to the most serious environmental problems.
OPRE	Fishermen's Organization for the Recovery of Ensenada

8.3   Risk-Based Framework outputs

8.3.1   Consequence Analysis (CA)

The risk-based framework (RBF) assessment is a set of precautionary assessment methods for fisheries that exhibit limited quantitative data, unavailable stock and/or deficient or absent information.

For the Clam fishery of Puerto Libertad, the risk-based framework was used as a precautionary approach due to certain indicators not having sufficient or up to date information to permit a complete assessment of the fishery.

The RBF is only available for a small number of result indicators (PI): PI 1.1.1 State of the population, PI 2.1.1 Primary species, PI 2.2.1 Secondary species, PI 2.3.1 ETP species, PI 2.4.1 Habitats and PI 2.5.1 Ecosystems.

For each PI there is an analysis method: Consequence analysis (CA), which is evaluated in PI 1.1.1. Productivity and susceptibility analysis (PSA), which covers PI 1.1.1, 2.1.1, 2.2.1 and 2.3.1. Spatial consequence analysis (CSA), which is found in PI 2.4.1

It is important to mention that in PSA, neither the secondary species nor the ETP species were assessed, since the fishing gear used by the fishery is specific to the clam resource. Additionally, there is no other type of incidentally caught nor discarded species, neither are there interactions with protected or endangered species. Therefore, the assessment of the RBF attributes of these indicators does not apply to the clam fishery.

Table 15. CA scoring template

	Scoring element	Consequence subcomponents	Consequence score
Principle 1: Stock status outcome		Population size	>80
		Reproductive capacity	
		Age/size/sex structure	
		Geographic range	
Rationale for most	The CNP (DOF, 2018) classifies clams as possible potential for the states of Baja

En COBI hacemos uso responsable de recursos. Por favor no imprima este documento a menos que sea totalmente necesario. Use papel reciclado o de reuso.

www.cobi.org.mx   f COBI.mx   @COBI_mx

vulnerable subcomponent	California, Sonora and Sinaloa. While for Baja California Sur, it is exploited to the maximum sustainable level.
Rationale for consequence score	Because it is a recent fishery (2015), there has been no problem of overexploitation of the clam resource; fishers respect the catch quotas assigned through INAPESCA's assessments to estimate the annual quota. The cooperative is 100% committed to the sustainability of the resource.

8.3.2 Productivity Susceptibility Analysis (PSA)

Table 16. PSA productivity attributes and scores

Performance Indicator	1.1.1	
Productivity		
Scoring element (species)	*Megapitaria squalida, Megapitaria aurantiaca, Dosinia ponderosa*	
Attribute	Rationale	Score
Average age at maturity	The first catch size for clam chocolata is 64, 97 for red and 80mm for white clams. A study by Lopez-Rocha et al 2018, *Dosinia* white clams ripen from 103.44mm, *Megapitaria squalida* at 40.32mm and *Megapitaria aurantiaca* at 77.20mm is its first maturity size. While Corona-Fernandez 2016, the clams of the *Dosinia* species ripen from 95 to 100 mm and the minimum catch size is 96.9mm.	1
Average maximum age	Aragón-Noriega (2017) in a study conducted in Yavaros, south of Sonora found individuals up to 104 mm in length with a maximum age of 10 years and an average of 6 years. While a study conducted in Puerto Libertad by Lopez-Rocha 2018, chocolata clams were found with sizes.	1
Fecundity	There are no studies for these species specifying the number of fertilized oocytes. But there is a study of a bivalve mollusk in the Gulf of California with a fertility of more than 12 million oocytes with an average size of 60 mm (Villalejo Fuerte, 1995)	1
Average maximum size Not scored for invertebrates	NA	**NA**
Average size at maturity Not scored for invertebrates	NA	**NA**
Reproductive strategy	The clams of the genus *Megapitaria* and *Dosinia ponderosa* present a partial spawning and asynchronous gonadal development between females and males (Romo-Piñera, 2010; Corona-Fernandez, 2016).	1

En COBI hacemos uso responsable de recursos. Por favor no imprima este documento a menos que sea totalmente necesario. Use papel reciclado o de reuso.

www.cobi.org.mx f COBI.mx @COBI_mx

Trophic level	Bivalves are mostly phytoplanktophagous, that is, they feed on primary products, so they are located at a low trophic chain level (Monserrat-Ramón, 1993)	1
Density dependence Invertebrates only	**ND**	1

Susceptibility: Divers use a stainless steel spatula to extract the clam that is buried in the sand, then it is thrown into a mesh bag called java.

Fishery Only where the scoring element is scored cumulatively	*Megapitaria squalida, Megapitaria aurantiaca, Dosinia ponderosa*

Attribute	Rationale	Score
Area Overlap	The red, white and chocolata, clams are distributed approximately from the province of San Diego to the Panamic region (Briggs, 1974). In the Puerto Libertad, the clam fishing area is organized by fishing banks, which occupy 5 to 10% of the range of these species in the town in the Gulf of California. The cooperatives share the same banks for the extraction of clam chocolata in an area of 585,185 ha, for red clam 112 ha and for white clam it has 642 hectares, as indicated by the fishing permits, issued by CONAPESCA in 2017.	2
Encounterability	The position of the clam stock in Puerto Libertad in relation to the water column and the fishing gear are coincidental, the capture is done by diving, removing the substrate a little on the seabed where they live. (SCPP Mojarra del Arrecife)	3
Selectivity of gear type	The fishery is always directed to the clam species which is artisanal fishing, the fishing art is by means of hookah diving, they are extracted manually with the help of a stainless steel spatula (DOF, 2012), the diver only extracts commercial sizes, leaving juveniles and small sizes in their habitat	1
Post capture mortality	Clam regulation includes minimum catch sizes, which are: 64 mm for *Megapitaria squalida*, 97 mm for *M. aurantiaca* and 80 mm for *Dosinia ponderosa*, as recommended by the CNP (DOF, 2018). Therefore, there have been no catches of small sizes, always respecting the limits. This is mentioned because according to the empirical knowledge of the fishermen, they already know and estimate the size of their clams at the time of extraction, they mention that the small ones are the ones that return and bury themselves in a few minutes. This happens very rarely.	3
Catch (weight) Only where the scoring element is scored cumulatively	The average catch between 2018-2019 was 20,000 clams, which represents 50% of the quota granted.	1

En COBI hacemos uso responsable de recursos. Por favor no imprima este documento a menos que sea totalmente necesario. Use papel reciclado o de reuso.

www.cobi.org.mx   f COBI.mx   @COBI_mx

8.3.3 Consequence Spatial Analysis (CSA)

Table 17. CSA rationale table for PI 2.4.1 Habitats

Consequence	Rationale	Score
Regeneration of biota	It is in the coastal margin; where there is sandy sediment, gravel and the type of habitat is low risk since very little substrate is removed that is the habitat of the clams. However, the effect that this process may cause to other species that inhabit the area has not yet been evaluated.	Sand:1 Gravel:1
Natural disturbance	As reported on the distribution of clams and the type of habitat that is sandy; It does not present habitat disturbance.	Sand:1 Gravel:1
Removability of biota	It is a very selective fishery through diving, so there is no removal of epifauna.	Sand:1 Gravel:1
Removability of substratum	According to the habitat in which the clams are found, if there is removal of the substrate manually in a small amount which is recovered soon. However, there is no study that can support the low impact of this activity.	Sand:2 Gravel:2
Substratum hardness	The type of sediment found in the area where the clams are distributed is unconsolidated sediment. The activity does have contact with the substrate.	Sand:3 Gravel:3
Substratum ruggedness	The type of sediment in which the clams are buried is sandy silt. They do have contact with the sediment because they are buried.	Sand:1 Gravel:1
Seabed slope	On the coast, low slope. Not deep waters.	Sand:1 Gravel:1
Spatial	Rationale	Score
Gear footprint	The risk is low and minimal due to the size, mobility and impact of the fishing gear, which consists in the manual removal of the clams from the substrate.	Sand:1 Gravel:1
Spatial overlap	The area of distribution of the species in the Puerto Libertad is coincident with the area of clam capture (> 75%)	Sand:3 Gravel:3
Encounterability	The probability of encounter / contact of the fishing gear with the habitat is very low or minimal, since the manual method is used to remove the clams from the sediment.	Sand:3 Gravel:3

En COBI hacemos uso responsable de recursos. Por favor no imprima este documento a menos que sea totalmente necesario. Use papel reciclado o de reuso.

www.cobi.org.mx   f COBI.mx   @COBI_mx