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## Artisanal shrimp fishery in Mexico: Specific objectives

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# Strengthening the specific objectives of the white shrimp fishery *Litopenaeus vannamei* in Marismas Nacionales, Nayarit

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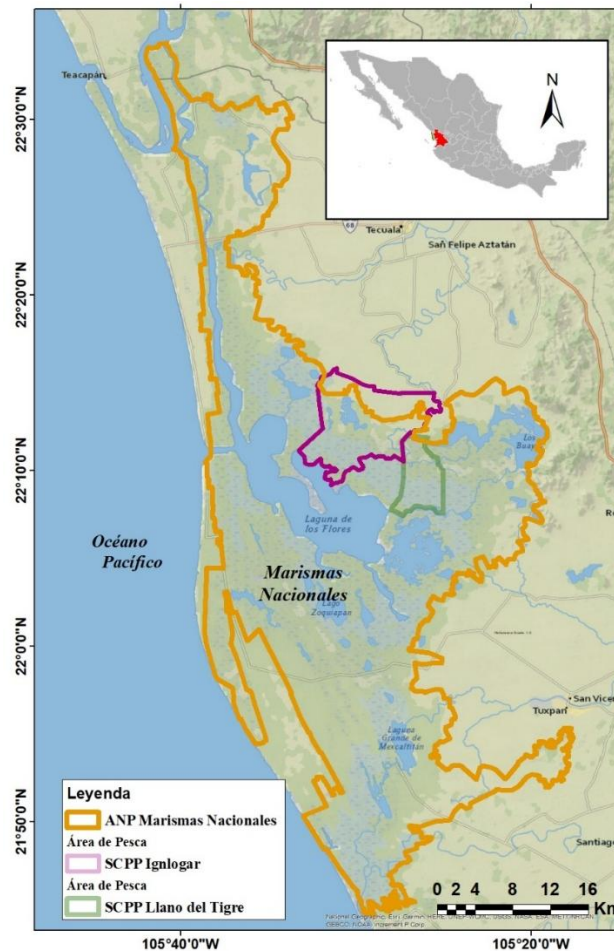
### I. Introduction

Shrimp fishing is one of the most important fisheries in Mexico, with the Mexican Pacific being the region where the largest share of the total shrimp catch (~92%) is extracted (SAGARPA, 2021). This fishery ranks third in terms of production volume; however, it ranks first in Mexico in terms of commercial value. Shrimp catches in the Mexican Pacific consist mainly of three species: blue shrimp (*Litopenaeus stylirostris* (Stimson 1871)), white shrimp (*L. vannamei* (Boone 1931)), and brown shrimp (*Farfantepenaeus californiensis* (Holmes, 1900), as well as other penaeid shrimp species. Shrimp of the genus *Litopenaeus* spend most of their time in areas influenced by or closely associated with river deltas, estuaries, or coastal lagoons. Their migratory movements are due to the nature of their life cycle, which is dependent on estuaries or coastal lagoons, which they use as areas for protection, feeding, and growth.

The white shrimp (*L. vannamei*) is distributed from Sonora, Mexico to Peru. In Mexico, the highest catch values in marine and protected waters are obtained in southern Sinaloa, Nayarit, and the Gulf of Tehuantepec (Chiapas). It is a species that also inhabits sandy and clay bottoms (Hendrickx, 1996), and its distribution is between 5 and 15 fathoms deep in the sea, although it can be found at depths of up to 50 fathoms.

The Nayarit white leg shrimp fishery within the Biosphere Reserve Marismas Nacionales (BRMN), represents an important economic activity in this protected natural area, because it is one of the main sources of food and livelihoods for settled communities to the surroundings. Approximately between 12 and 14 thousand fishermen are directly involved with the fishery in the BRMN, generating between 4 and 6 thousand average tons of white

leg shrimp, which represented close to 55% of the region's annual fishing production, with a value close to 9 million US dollars. The BRMN is located on the western coastal plain of Mexico between the south of the State of Sinaloa and the north of the State of Nayarit within the coast of the Gulf of California and is one of the largest mangrove forests on the northern Pacific coast in America. Although the BRMN is one of the most important mangrove forests ecosystems in Mexico, with a size greater than 133,000 Ha, there are several factors that have generated harmful impacts on this reserve. Among the main problems identified are the construction of protective walls causing physical changes in drainage patterns, the dynamics of aquaculture, overfishing, unauthorized and harmful fishing practices, absence of adequate fisheries management contribute to these negative impacts



**Figure 1.** Location of the Marismas Nacionales Biosphere Reserve and the fishing zones corresponding to the SSCP Ignlogar and SSCP Llano del Tigre cooperatives.

In Mexico, fisheries management is governed by the General Law of Aquaculture and Sustainable Fisheries (LGPAS) (DOF, 2007). The LGPAS establishes the national policy for regulating fisheries through the Official Mexican Standards for Fisheries (NOM-PESC), which describe specific management measures for each species or group of species. The National Fisheries Charter (CNP) is another legally binding instrument used in Mexico for the management of all the country's fisheries, with annual updates (DOF, 2007). The CNP outlines the strategies and actions that must be implemented to regulate fishing in Mexico, including information on fishing sites and gear, the status of stocks, and fishing effort (DOF, 2018). Furthermore, researchers from the Mexican Institute for Research in Sustainable Fisheries and Aquaculture (IMIPAS) develop and update fisheries management plans (PMP). Fisheries management plans include actions aimed at developing fishing activity in a sustainable manner and are based on biological, ecological, environmental, economic, cultural and social knowledge.

In this context, the shrimp fishery is governed by an Official Mexican Standard (DOF, 1993), which establishes the regulations for shrimp harvesting in Marismas Nacionales (National Marshes). Furthermore, there is a Shrimp Fisheries Management Plan for the Mexican Pacific that adheres to the General Law of Sustainable Fisheries and Aquaculture, regulated by Article 27 of the Political Constitution of the United Mexican States. This management plan aims to regulate, promote, and manage shrimp harvesting within the national territory.

## II. Fishery Management

The artisanal shrimp fishery in Marismas Nacionales is carried out in lagoon and estuary systems using small boats (less than 12 m in length) with a gross tonnage capacity of less than one tonnage and outboard motor propulsion. Shrimp fishing takes place five to six days a week. The average crew per fishing trip is two fishermen, and the average trip lasts eight hours. Fishing is done during the nighttime tidal flow, and the catch per trip ranges from 50 to 80 kg.

Fishing gear depends on the fishing area. The most commonly used gear is the cast net, the traditional fishing method. It is constructed with monofilament nylon line between 0.20 and 0.25 mm in diameter and has a maximum height of up to 6 meters (Fig. 2). This is the

legally authorized fishing gear for shrimp in lagoon systems and, according to Mexican Official Standard NOM-002-PESC-93, must have a mesh opening of 1.5 inches (38.1 mm). Another fishing gear used in Marismas Nacionales is the so-called "tapos," a fixed fishing gear constructed from natural materials found in the region, which does not require a boat.



Figure 2. Cast net fishing gear used in the white shrimp fishery in Marismas Nacionales, Nayarit.

To understand the perspectives of fishery resource users on the purpose of the Fisheries Management Plan (FMP), the Ministry of Agriculture and Rural Development, through the Mexican Institute for Research in Sustainable Fisheries and Aquaculture (IMIPAS), conducted seven Participatory Fisheries Planning Workshops (PFPTs). The consultation process carried out in the PFPTs involved the fishing community, as well as various governmental and civil stakeholders related to fishing, and allowed for the integration of a diagnosis of the environmental, social, and economic problems of fishing activity. Based on this assessment, the stakeholders proposed solutions to the different aspects related to the fisheries challenges (DOF, 2018).

In this scheme of active user participation, guidelines were established for action aimed at achieving the objectives of regulating fishing activity, protecting natural resources, and providing social and economic benefits to users, based on the most reliable scientific data available, focused on:

- a) Promote the coordinated participation of all actors related to fishing and aquaculture activity (inclusive), under a scheme that allows adapting, modifying and updating actions and programs according to the needs raised by users and the conditions established by external factors (flexible).
- b) Ensure that fishing and aquaculture activities are carried out within a regulatory framework that promotes the conservation of natural resources and fosters the productive and commercial competitiveness of the sector in order to increase the economic and social benefits of fishermen (sustainable).
- c) Promote training for the fishing production sector in administrative, technological and environmental issues that strengthen users' knowledge and promote their active participation in fisheries management based on the knowledge acquired (participatory).
- d) To promote scientific and technological research to generate knowledge on biological, environmental, technological, economic and social aspects, to support decision-making in fisheries management and allow the sustainable use of fishery resources.

Notes from the fishermen:

1. ¿Qué está sucediendo en la pesquería de Comario en Marismas nacionales?

- Clima no ha llovido, o que llueve de más.
- Mayor Salinidad en la marisma, cambio de dinámica de recambio de agua Salinidad 65-100 PPM
- Menos aporte de los ríos por cambios de cauce
- Aholve de los lagunas
- Pesca inusual en temporada de Veda Incremento en pesca ilegal.
- No hay interés en que los hijos se dediquen a la pesca porque se ve difícil que sea rentable

2. ¿Que necesitamos hacer para revertirlo?

- Hacer equo con el gobierno, pero con las mismas condiciones en Veda y en la temporada.
- Mejorar la vigilancia con apoyo del Gobi. para eliminar la pesca ilegal
- Remover los tapos de forma anual para permitir el flujo de agua y la entrada de juveniles a la zona

3- ¿Qué quisieramos Implementar?

- General acuerdo para levantar y poner tapos que permita flujos de juveniles y aguas
- Vigilancia comunitaria en toda la región de la MANA
- DESA SOLVE (SOLICITAR)
- REFORTACION DE MANGLE (AÑADIR TIERRA) PARCHO VILA
- BUSCAR FONDOS DE GOBIERNO
- MEJORAR ARTES DE PESCA (ASTRANZA Y MATA)
- ACUERDOS DE ASAMBLEA PARTICIPATIVOS

4- Cómo sabemos que funciona?

- ~~TOMAR ACUERDOS~~
- INVOLUCRANDO A LA COMU (AUSIENOS SUAVES)
- ACUERDO CON GOBIERNO PARA LEVANTAR LOS TAPOS
- SOLICITAR DESA SOLVE A COMARSA.
- UNIRNOS CON OTRAS COOP. PARA LA VIGILANCIA.

## Cooperativa de Laureles = 280

### - Situación:

Producción de larva de camarón en el sistema ~~ha~~ se ha mantenido.

o Existe mucho saqueado en la etapa de menas de juveniles - pobla - 300 personas

- Ejem: de 20 personas ahora son 100 los que saquean

De manera diaria los pescadores no regulados (ilegales) van antes de la apertura de la temporada, pescan con purina y extraen entre 20/30 kg diario X Num. de pesc. ilegales

X Purina

### ⊗ Que necesita!

Cordinación de los actores correspondientes para la vigilancia en temporada de veda

- Hemos echo solicitudes para apoyos de la autoridad pero no nos han atendido nuestras necesidades

o Divulgación de la cooperativo, sumando a la

IMI PAs (Investigación)

CONAPESCA (Oficial)

Semar (Apoyo)

### ⊗ Reglamento Interno de la SC

con un tipo de responsabilidades y obligaciones. Además de sanciones y esto tambien a la comunidad no solo la SC.

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Los pescadores de SC. Laureles mencionan que han tenido a otros pescadores de otras comunidades que mencionaron dejemos unidas a ustedes y se puede bajo condiciones de operación con las reglas de las cooperativas.

Estamos colaborando con 1 y nos haria falta sumar/promover otros 3.

Tambien les hemos dado algunos apoyos y les damos a entender que se pueden beneficiar de algun modo.

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### III. Specific objectives of the shrimp fishery

#### **Purposes of the fishery**

**FIN 1:** To contribute to guaranteeing the food supply of shrimp resources in the country.

**FIN 2:** To contribute to guaranteeing the quality and safety of fishery resources for food supply.

**FIN 3:** To contribute to improving the quality of life of fishermen and their families.

#### **Purpose of the fishery**

The shrimp fishing resource of the National Marshes Lagoon Systems is carried out in a sustainable manner.

#### **Components of the fishery**

**C1 :** Highly selective (sustainable) fishing gear implemented .

**C2:** Market for buying and selling the strengthened resource.

**C3:** Strengthened organizational capacity program.

**C4:** Infrastructure for the development of premium products.

**C5:** Strengthened scientific research system

**C6:** Rehabilitated lagoon systems

**C7.** Strengthened fisheries inspection and surveillance

#### Fishery action plan

**Table 1.** Planning matrix with lines of action by component

<b>Component 1:</b> Highly selective fishing gear.	1.1. Evaluate the fishery biology of the populations of the resources exploited. 1.2. Define appropriate selective fishing gear 1.3. Operate a permanent fisheries management program. 1.4. Apply the legal instruments, regulations and internal agreements.
<b>Component 2:</b> Increased economic value of production.	2.1 Improve the marketing of fishery products. 2.2 Develop and evaluate capture, processing and aquaculture technologies. 2.3 Implement strategies to reduce operating costs.
<b>Component 3:</b> Strengthened organizational capacity.	3.1 Operate the Responsible Fisheries Sub-Council . 3.2 Improve the connection with sectors related to fishing. 3.3 To train producers for the proper use of the resource
<b>Component 4:</b> Infrastructure for product development	4.1. Develop infrastructure for product marketing.
<b>Component 5:</b> Strengthened Scientific Research System	5.1 Research for the development of technologies useful for selective fishing gear. 5.2 Strengthening biological monitoring. 5.3 Determination of the optimal fishing gear(s) for fishing

	shrimp resource
<b>Component 6:</b> Rehabilitated lagoon systems	6.1 Implementation of an environmental monitoring program in water bodies. 6.1 Dredging and cleaning of water bodies.
<b>Component 7:</b> Strengthened Fisheries Inspection and Surveillance	7.1 Increase in inspection capacity. 7.2 Strengthen institutional coordination among the three levels of government and producers. 7.3 Organization of fishing activities by region. 7.4 Increased surveillance capacity.

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