

# DEVELOPMENT OF A REFUGIUM MANAGEMENT PLAN FOR THE MUD SPINY LOBSTER (*Panulirus polyphagus*) AT TANJUNG LEMAN, JOHOR

Presented in RSTC6

Samut Prakan

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# THREATS TO THE LOBSTERS' POPULATION

- ▶ Declining trend since early 2000's had triggered the push towards conserving the lobster population in Malaysia
- ▶ Habitat degradation, illegal fishing activities, and over-fishing are the key drivers that deteriorated the lobster population in the area
- ▶ To deal with this declining resource, recommendations for the implementation of a lobster refugia in Malaysia
- ▶ Present status stock is in overfished area:
  - ▶  $F/F_{msy}$  1.94
  - ▶  $B/B_{msy}$  0.3

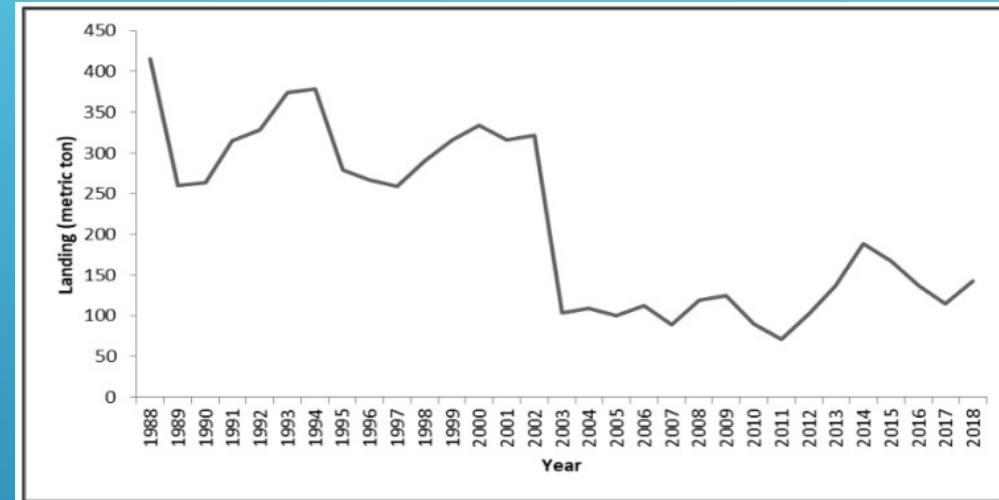


Figure 3: The landing trend of spiny lobsters in the east coast of Peninsular Malaysia during a thirty-year period (1988 – 2018) (Source: Siow et al., 2020)

# THE MANAGEMENT STEERING FRAMEWORK

- 35- Series of number in technical report of network meeting and activities has been done
- Latest report on
  - Development of Refugium management plan for the mud spiny lobster at Tanjung Leman
  - Management plan for the tiger prawn refugia at Kuala Baram

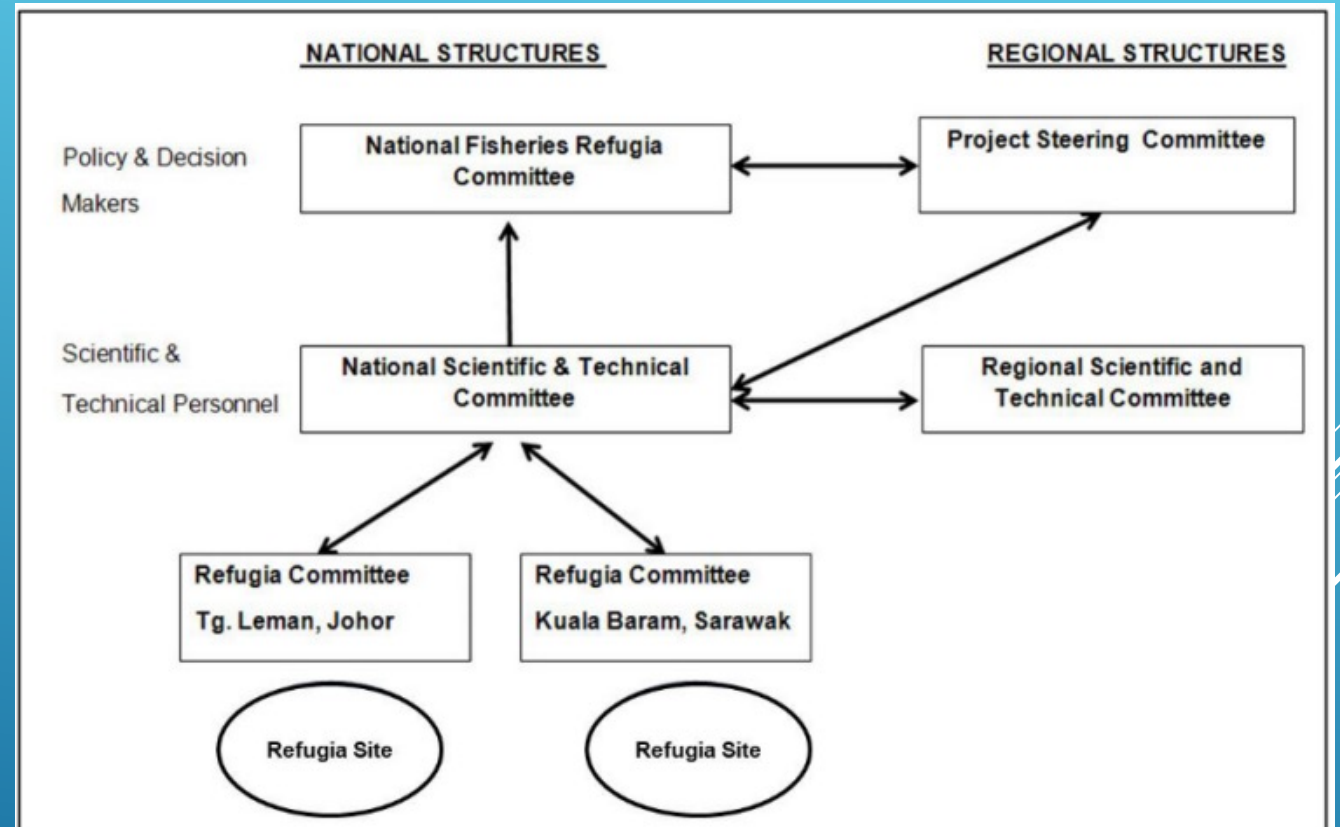
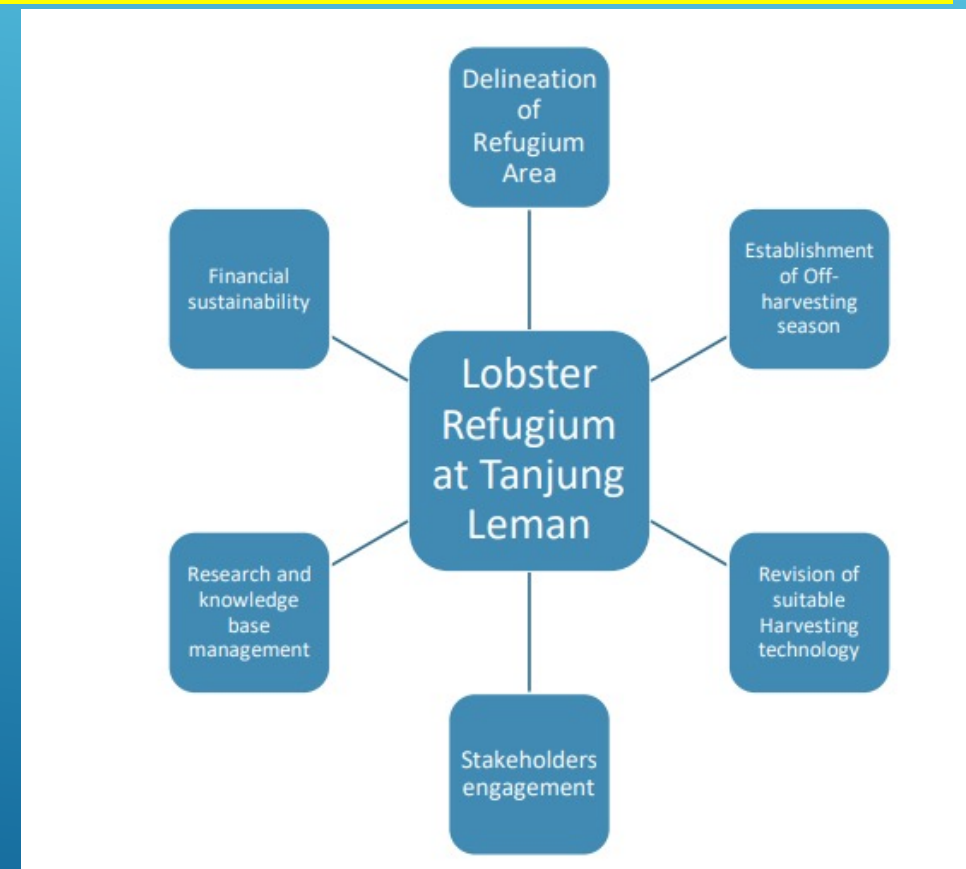


Figure 4: The national and regional coordination mechanism for the execution of Fisheries Refugia in Malaysia (Source: Siow et al., 2020)

# STRATEGIES AND COMPONENT OF REFUGIUM PLAN

To achieve the refugium's objectives, the current management plan endorsed the following strategies to address they key concerns highlighted in the publication. Table and Figure elaborated the key strategies that formed the framework for lobster refugium management plan at Tanjung Leman, Johor

Component for the establishment of lobster refugia	Strategies	Related Outputs	
OTU/ Targeted species	To elaborate lobsters' biology and reproduction cycle	To identify suitable harvesting technique for sustainable fisheries	Financial Sustainability
Establishment of refugium area	To outline potential migration patterns of the spiny lobster  To identify area of potential settlement of the lobster's larvae	To delineate critical area to sustain lobster population in the area	
	To identify target groups for public awareness and dissemination of information	To collect information for public awareness program	
Off-season proposal for lobster refugium	To identify strategic period for closure of lobster fishing ground in the area	To identify critical period/ time/ spawning in a year for the lobster population	
Insufficient scientific data for decision support system	To identify information gaps and method for data collection	To involve fishers in the data collection of sustainable lobster fisheries	

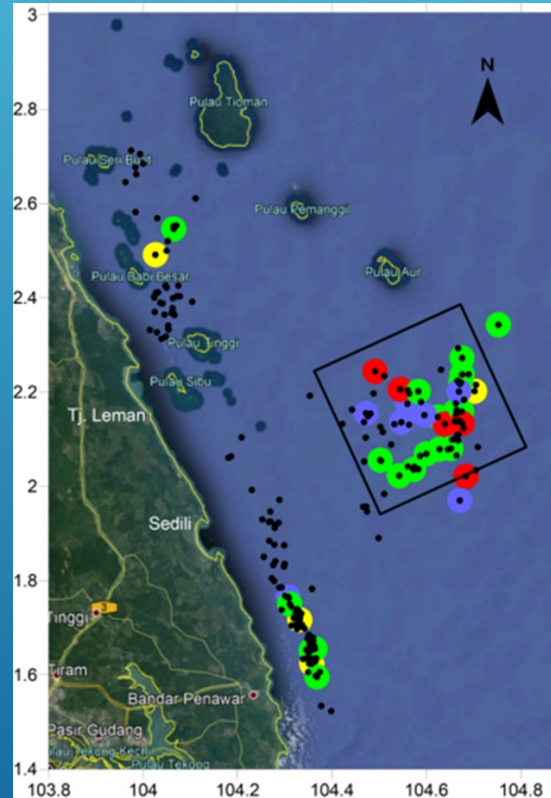


# DELINEATION OF LOBSTER REFUGIUM AT TANJUNG LEMAN

- ▶ The proposed delineation based on the current circulation pattern, habitats and critical area for the migration route as well as sensitive area for the lobster- **PROPOSED A SITE WITH MINOR COORDINATE ADJUSTMENT-**

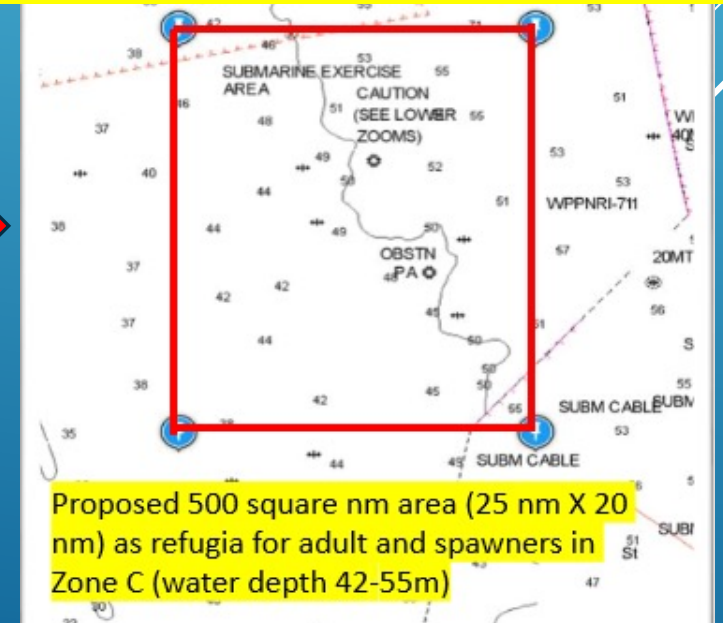
## Justification:

1. Since nursery area in Zone A are also a major fishing grounds for traditional fishers, at initial stage to gazette only spawning ground as refugia in Zone C. Next step will be followed by refugia in Zone B and Zone A after some progress of refugia in Zone C.
2. This strategy is to prevent social conflict with traditional fishers in zone A and at the same time the DOFM has more time for public awareness campaign activities to them.
3. The most potential area to be gazetted as first lobster refugia in zone C. This area was located in was suggested from studied earlier in Zone Southern part of Pulau Aur, in Johor waters and have a high concentration of mud spiny lobsters compared to other areas.
4. This area also has a higher density of adult female lobsters including berried females which are ready to release its eggs.
5. New coordinates is good for management and monitoring purposes during enforcement activity by the DOFM officers and for good memories for fishing vessel skippers



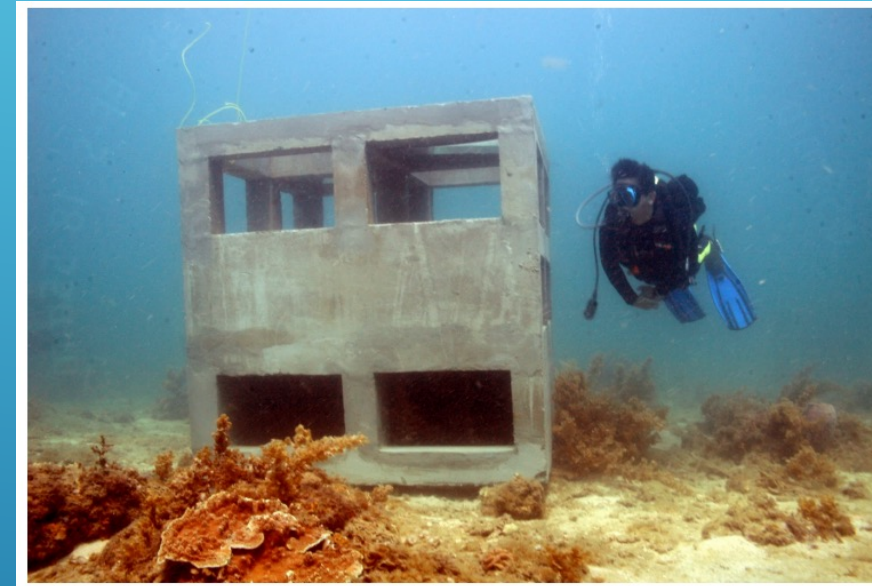
20 x 20 nm = 400 square nm

Position	Latitude	Longitude
Point 1	N 1° 55.000'	E 104° 30.000'
Point 2	N 2° 20.000'	E 104° 30.000'
Point 3	N 1° 55.000'	E 104° 50.000'
Point 4	N 2° 20.000'	E 104° 50.000'



# ARTIFICIAL REEFS FOR LOBSTERS

- ▶ Alternatives to resolve the conflicting issue with in fishes and management is to introduce artificial reefs into the refugium
- ▶ Artificial reefs for Post-larvae, Juvenile and Sub-adult Lobsters
- ▶ Artificial Reefs for Adult Lobsters
- ▶ The artificial reefs can serve two major roles:
  - ▶ 1. Establish new habitats for the lobster in the area. These new "artificial" habitats can potentially be the no take zone within the refugium
  - ▶ 2. To deter operation of bottom trawler within the refugium. Bottom trawling has long known to be destructive to the benthic ecosystem. This destructive method should be phased out in stages and replace with a less destructive fishing method



# ESTABLISHMENT OF OFF-HARVESTING SEASONS

- ▶ The aim of the off-harvesting seasons establishment is to protect this resource during the major spawning period
- ▶ Defined as the prohibition of any activity regarding fishing of spiny lobster within a certain period.
- ▶ Already started in 2021- July to Sept.
- ▶ During the closure, spiny lobster shall not be harvested, possessed, purchased, or sold.



# REVISION OF HARVESTING SIZE AND TECHNOLOGY

- ▶ The main problems that affect the sustainability of spiny lobster resources are the capture of undersized lobster.
- ▶ Undersized lobster is captured and accepted for trading to increase profitability
- ▶ In order to establish guideline for harvesting size and technology, thorough literature related to the size at sexual maturity of spiny lobster and fishing gear in Malaysian coastal waters areas will be accumulated, and a comprehensive literature review will be made to clarify the status of Malaysia spiny lobster and the technical aspect capturing the lobster.
- ▶ The estimated size at maturity for the spiny lobster at the proposed refugia site-This size could be suggested as minimum CL to catch
  - ▶ males was 6.58 cm - 8.18 cm CL
  - ▶ females was 6.75 cm- 7.58 cm (based on CPL).

# STAKEHOLDERS ENGAGEMENT

- ▶ DOFM has carried out several stakeholder engagements/consultations prior to this project
  - ▶ 2017- Consultation with the artisanal fishermen from East Coast of Johor
  - ▶ 2018-Consultation with the trawlers fishermen from Endau dan Sedili and
  - ▶ 2018-Refugia Project Consultation with various stakeholders
  - ▶ 2018-Consultation with the fishers from Pahang and Johor
  - ▶ 2019-Consultation with the fishers from Pahang and Joho
  - ▶ 2021- Engagement session with trawlers
- ▶ Information Center:
  - ▶ To create public awareness and spread information about the fisheries refugia concept to the public
  - ▶ DOFM has established Refugia Information Center (RIC) at Tanjung Leman Ferry Jetty in November 2017 to promote the concept of fisheries refugia to the public.

# FORMULATION OF REFUGIA MANAGEMENT PLAN

- ▶ In preparation of the refugium management for lobster at Tanjung Leman, Johor, the outputs of the six key components as presented in **Strategies and Component of Refugium plan** will be used as the fundamental for the Lobster Refugium Management Plan in Tanjung Leman, Johor
- ▶ The lobster refugium plan, as any other management plans is a dynamic document which should be updated regularly to stay relevant.
- ▶ The management plan will provide guides and key performance indicator for the efficiency of the management in the respective aspect of importance.
- ▶ The key performance indicator will be used as a benchmark for the efficiency of the management plan, which will be review from time to time.
- ▶ The frequency of review shall be based on the efficiency of the plan, as well as changes in the government policy.