

# **MANAGEMENT PLAN FOR TIGER PRAWN REFUGIA AT KUALA BARAN MIRI SARAWAK**



**Presented in RSTC6**

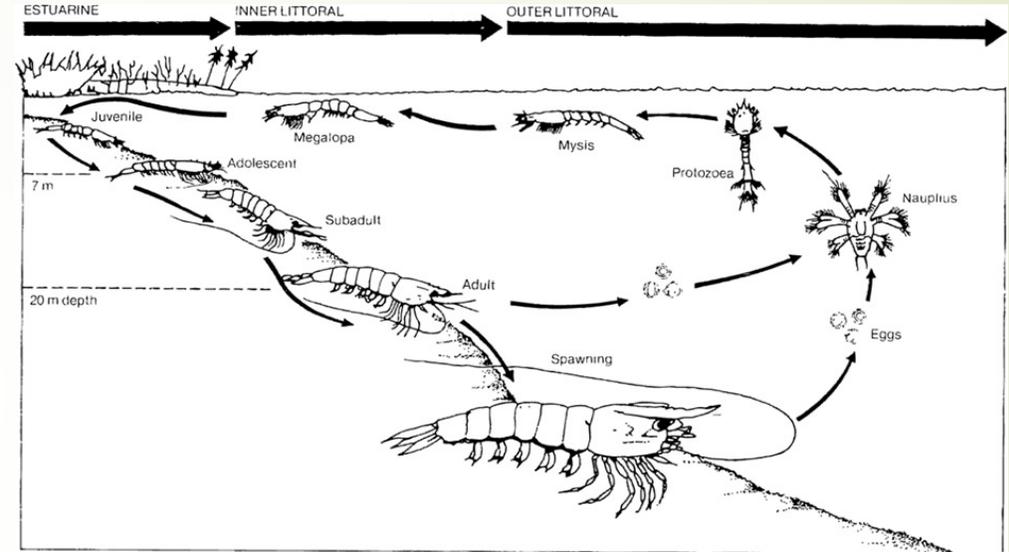
**Samut Prakan**

**Thailand**

**4-6 July 2022**

# Distribution of *P. monodon*

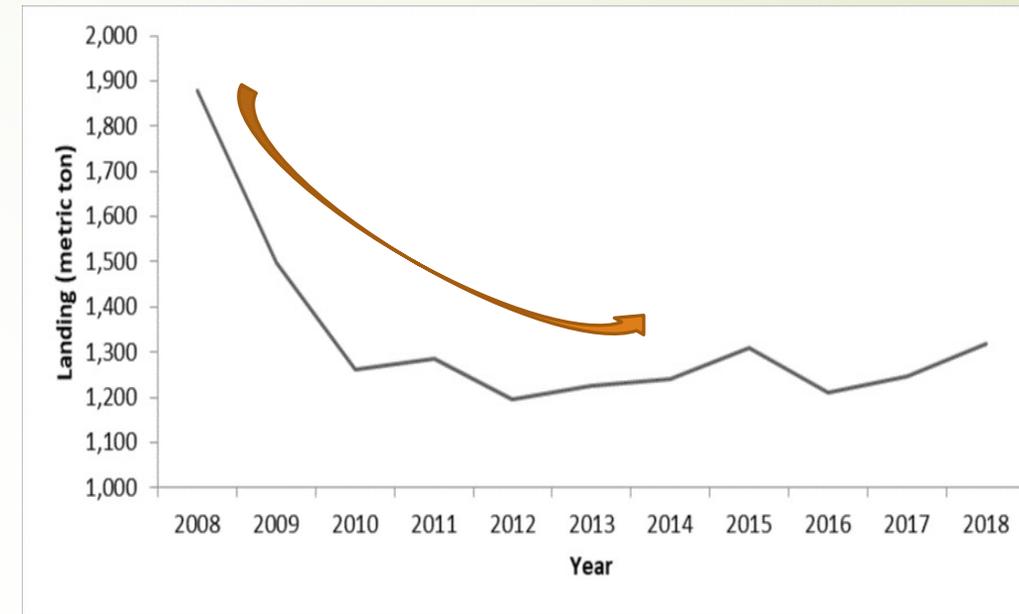
- Ecologically, penaeid shrimps have to go through two major ecosystems: the offshore and the coastal inshore environments in order to complete their life cycle
- Mature penaeids breed in deep water while post-larval and juvenile stages inhabit inland marshes, estuaries, brackish water and mangrove areas, then they migrate back to the sea for maturation and breeding



Life cycle of *P. monodon*

# Current threats to tiger prawn population

- ▶ *P. monodon* has been extensively farmed to meet increasing demand, they were also caught in the wild for production and spawners collection for seed production purposes.
- ▶ The high dependency of wild-caught spawners for seed production thus resulted in over-exploitation of the natural population, affecting the sustainability and biodiversity of fishery resources
- ▶ The declining number of tiger shrimp landing was reported between from 2008 to 2018 due to unrestricted coastal development.
- ▶ The problem of over-exploitation of the tiger prawn resource is aggravated by the deployment of destructive fishing gears such as beam-trawl and mechanized push net in the coastal prawn nursery areas.
- ▶ Prawn nursery area in the riverine ecosystem is also affected by deforestation of mangrove area for development and housing



Present status stock is in recovery area:  
F/F<sub>msy</sub> 0.99  
B/B<sub>msy</sub> 0.96

# 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

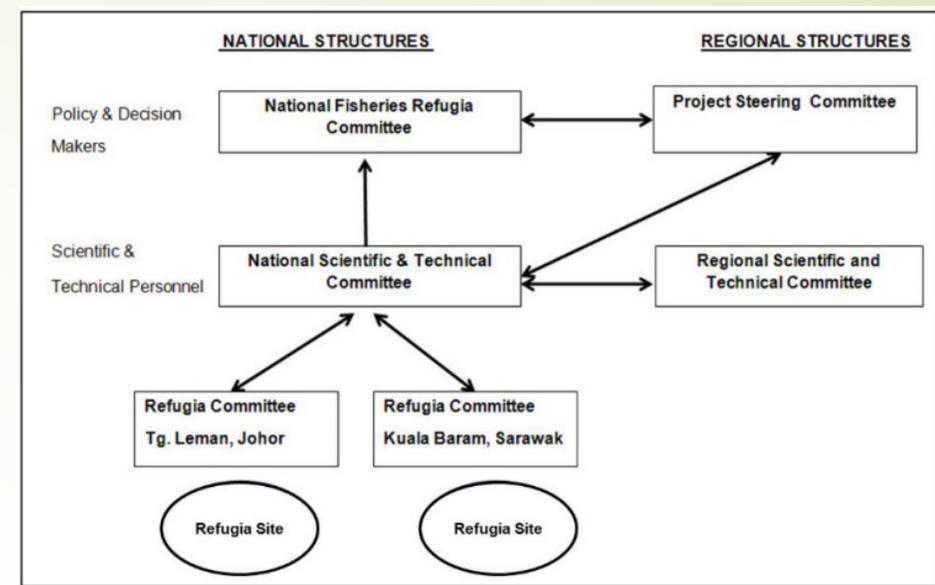


Figure 4: The national and regional coordination mechanism for the execution of Fisheries Refugia

Based on the previous engagement session (Department of Fisheries, Malaysia, 2021),

- All stakeholders agreed with the proposal of the tiger prawn refugia establishment.
- August to October will be regulated as the closed season for tiger prawns.
- This regulation is applicable for all trawlers at Zone C7. All fishing activities by the trawlers must operate at 12 nautical miles from the shoreline.
- 2021 will be the first year of the implementation of this regulation
- The department also encourages the fishermen to comply with this regulation voluntarily for this year. In the year 2023, the department will fully enforce these regulations.
- For tiger prawn, specifically for Kuala Baram, the Close season from August to October will be included as an additional clause in the Vessel License and Fishing Equipment for fishermen's Zone C7.

# Key components and strategies of tiger prawn refugia establishment

Component for tiger prawn refugia establishment	Strategies	Related outputs
<b>Focused area for refugia establishment</b>	To determine the migration pattern of tiger prawn from larvae to adulthood.	Identify potential area for tiger prawn fishing activity and protect vulnerable populations.
<b>Protection of spawners and seasonal closure</b>	To determine the ovarian maturation stages	Preserve spawners population to allow more natural larvae production.
	To determine the length of tiger prawn at maturity	To protect the harvested species and prevent overfishing.
	To propose off-season for tiger prawn	Yearly scheduled area closed for fishing.
<b>Data acquirement for decision support system</b>	To identify information gaps, insufficient data and method	To allow better data collection method and analysis for sustainable tiger prawn fishing plan.
<b>Stakeholders engagement</b>	To facilitate and validate the proposed management with stakeholders	Ensure an accurate representation of information regarding the program from relevant parties.
		For a smooth collaboration setting.
<b>Developing refugia trust fund</b>	Financial model for effective mix of finance solution	For financial sustainability: lower cost, increase capital flow.

# Designated area for refugia

- Fig. 4 showed the location of the proposed tiger prawn refugia site off Kuala Baram (red-dash lines), covering an area of approximately 556 km<sup>2</sup>. (55,600 hectare)
- Adjustment at sea based on having tiger prawn during fishing activities and
- In Mangrove area to protect nursery area of the tiger prawn post-larva and juvenile in the 5 rivers Sg. Pasu, Sg Lutong, Sg. Miri, Sg. Bakam Sg. Sibuti



**Table 3:** Coordinates of proposed area of tiger prawn refugia site.

Point	Longitude	Latitude
A	N 04° 35.000'	E 114° 04.000'
B	N 4° 39.000'	E 114° 03.000'
C	N 4° 46.000'	E 113° 55.000'
D	N 4° 43.000'	E 113° 49.000'
E	N 4° 24.000'	E 113° 59.000'

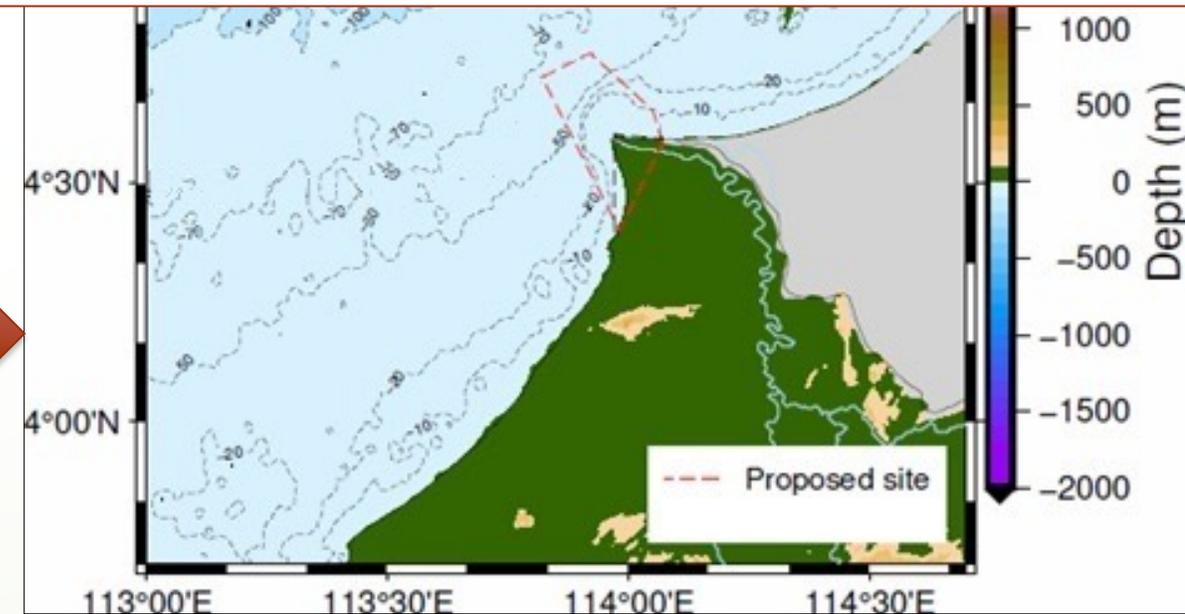


Fig. 4: Proposed tiger prawn refugia site off Kuala Baram

# Population preservation and restoration effort

## ► Population preservation and restoration effort

- **Mangrove buffer zones** of 50 to 100 m facing open seas and 20 to 50 m along riverbanks should be preserved to protect the nursery area of the tiger prawn post larvae and juvenile

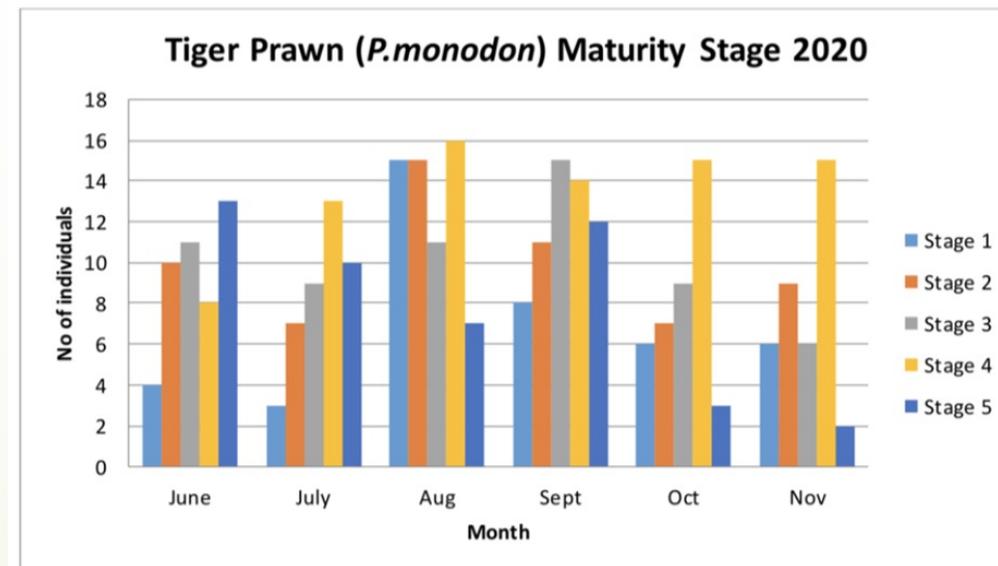
## ► Stock enhancement program

- Whereby prawn fries produced from Kuala Baram spawners in the hatchery are release back into these rivers should be carried out at least twice a year. This is to increase prawn stock in the refugia area as well as the surrounding sea.
- Stock assessment and biological survey for post larvae and juveniles prawn in the area before and after the release program should also be carried out

- **Stock assessment** for the tiger prawn resource in the refugia area is to be carried out once a year to ascertain the success of the demarcation of the area in preserving the stock

# Protection of spawners and seasonal closure

- Numerous studies have shown that environmental factors can directly and indirectly affect prawn's life cycles in many ways
- In the worst-case scenario, a change in the environment can cause the recruitment of prawn to collapse
- In Kuala Baram, all sizes of *P. monodon* and all maturation stages, from immature juveniles to mature adults and berried females, are harvested. This scenario is especially dangerous because it will cause the collapse of a population in near future.
- Base research on ovarian maturation stage finding,
  - **Implement closure or other protective measures in August until October to ensure that females are protected during such a high reproductive output period**



# Revision of harvest methods and gears

## ► Fishing gears and trawling areas

- A total of 112 fishers operating drift net, hook & line, trammel net and trawl net (twin out-rigger) are being used at the coastal waters up to 15NM offshore in Miri.
- The number of licenses by zone: C12-30; C10-1; C7-24 and the rest (57 boats) are traditional operators from zone B and A.
- With the new regulation of shifting the trawling area to 8NM and above, the areas of less than 5 NM are considered protected from trawling activities where the stations of high concentration of tiger shrimp spawners are in the range of 4.47 – 5.76 NM

## ► Harvest strategy- use the Limit Reference Points

- The primary strategy would be to introduce measures that would reduce fishing capacity by 50% through limited access and the use of rights-based approaches in small-scale fisheries.

# Identification and engagement with stakeholders

- Most of the fishermen involved in the harvest of *P. monodon* are small-scale fishers that operate along the coastal zones and utilize traditional gears, although there are also some fishermen that operate trawlers and purse seine in deeper off coastal zones of more than 5 nautical miles.
- The establishment of a refugia requires the combined effort from various stakeholders.
- Public participation and the active involvement of community players are critical to ensure the successful implementation and sustainability of any refugia management plan
- The latest stakeholders' engagement with other relevant stakeholders, including Miri Port Authority, Sarawak Fishing Vessel Association, Department of Marine Fisheries, Sarawak, Sarawak Forestry Corporation, Miri Fishermen Association, Department of Irrigation and Drainage Branch Miri, and Sarawak Rivers Board was held on 23<sup>rd</sup> September 2021 and 21<sup>st</sup> October 2021
- Based on the report, all stakeholders understand the importance of the establishment of *P. monodon* refugia to safeguard the wild *P. monodon* populations at Kuala Baram, Miri, Sarawak.



# Summary



- ▶ The establishment tiger prawn refugia requires careful and detailed representation of important aspects such as their life-cycle followed the determination of their weight-length relationship, environmental conditions and their harvesting methods and gears.
- ▶ The involvements of specific parties; the stakeholders and the government bodies are important for management and financial sustainability throughout the entire refugia plan.
- ▶ According to acquired preliminary data and observable anthropogenic impact, more conservation efforts are required to ensure that the population of tiger prawn at the refugia area are not affected.
- ▶ Furthermore, financial sustainability research is necessary for a long term establishment of tiger prawn refugia.