



Fisheries Refugium for Mud Spiny Lobster at Tanjung Leman, Johor: Stakeholders Engagement Workshop

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Executive Summary

A two days stakeholders engagement workshop was held on 28-29 September 2022 at Desaru, Johor. The workshop aimed to obtain opinions and feedback from major stakeholders of the fisheries refugium. The key stakeholders comprise government officials, fishermen, wholesalers, retailers, and restaurant operators. The workshop discusses three fundamental aspects i.e. proposal to protect lobster stocks within the refugia, concerns of the stakeholders on the fisheries refugium, and implementation strategies. Among the stakeholders, wholesalers, retailers, and restaurant operators unanimously support no catch of juvenile and berried female lobsters. Instead, they receive the refugium proposal as it contributes positively to their business sustainability. In addition, the market preferred bigger size lobster (>200 g; carapace length >6cm). They purchased juvenile lobster to support the fishermen's livelihood and a long-term business relationship. Compared to the secondary players in the supply chain, there are mixed responses from the fishermen. The establishment of the lobster refugium will impact their incomes. Nevertheless, the fishermen understand the need to conserve the lobster stock. The workshop's output has indicated that manipulating the lobster demand chain is the bridgehead for successfully implementing the Lobster refugium in Johor. Based on the inputs, the lobster refugium could be implemented in a three-tier approach. Firstly, public awareness and campaigns to conserve lobster stock should be the first mover to manipulate the demand chain. Secondly, establishing a lobster council to regulate the price range of lobster. The council has two fundamental functions: controlling the lobster market price and ensuring fishermen are well compensated; monitoring the healthy growth of the value chain (supply and demand). Finally, establishing fisheries regulations to ban catches of juvenile and berried female lobster and a closed season of the sensitive area of the lobster refugia from December to February in the subsequent year. It is important to note that the performance of the lobster refugium shall be monitored regularly by measuring the size and landing of the lobster, as well as watching the lobster puerulus at strategic location.

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Preamble

The mud spiny lobster (*Panulirus polyphagus*) is one of Malaysian's favorite seafood. The *Panulirus polyphagus* is the predominant lobster reported on the east coast of Peninsular Malaysia, from Kelantan in the North to Johor in the South (Alias et al., 2000). The mud-spiny lobster has limited studies compared to the rock lobster (*Jasus edwardsii*) and common spiny lobster (*Panulirus vulgaris*). Nonetheless, Noor Hanis and Siow (2019) reported that this species' landing trend began to decline in the early 2010s, probably associated with the harvesting pressure. The declining landing trend suggested the need to protect the spiny lobster and sustain the lobster fisheries in the area.

Hence, the Department of Fisheries Malaysia has endorsed fisheries refugia to sustain the lobster stock to protect the livelihood of the fishers community in the area. Considering the current fishing practice and the local fishermen's social and economic status, the department has outlined four fundamental approaches to sustain the lobster stock in the area. Firstly, prohibit juvenile lobster catch with a carapace length of less than 6cm or approximately less than 150g. Secondly, ban berried females lobster catch; and, Thirdly, declared off-catch season at the sensitive area from December to February of the subsequent year. **Figure 1** shows Johor's proposed refugium and off-season area of lobster catch. Lastly, artificial lobster reefs were proposed to harbour adult lobster in the area. These fundamental protections would ensure the sustainability of the lobster resources in the area.



Proposed Fisheries Refugium Area for Mud Spinny Lobster at Tanjung Leman, Johor

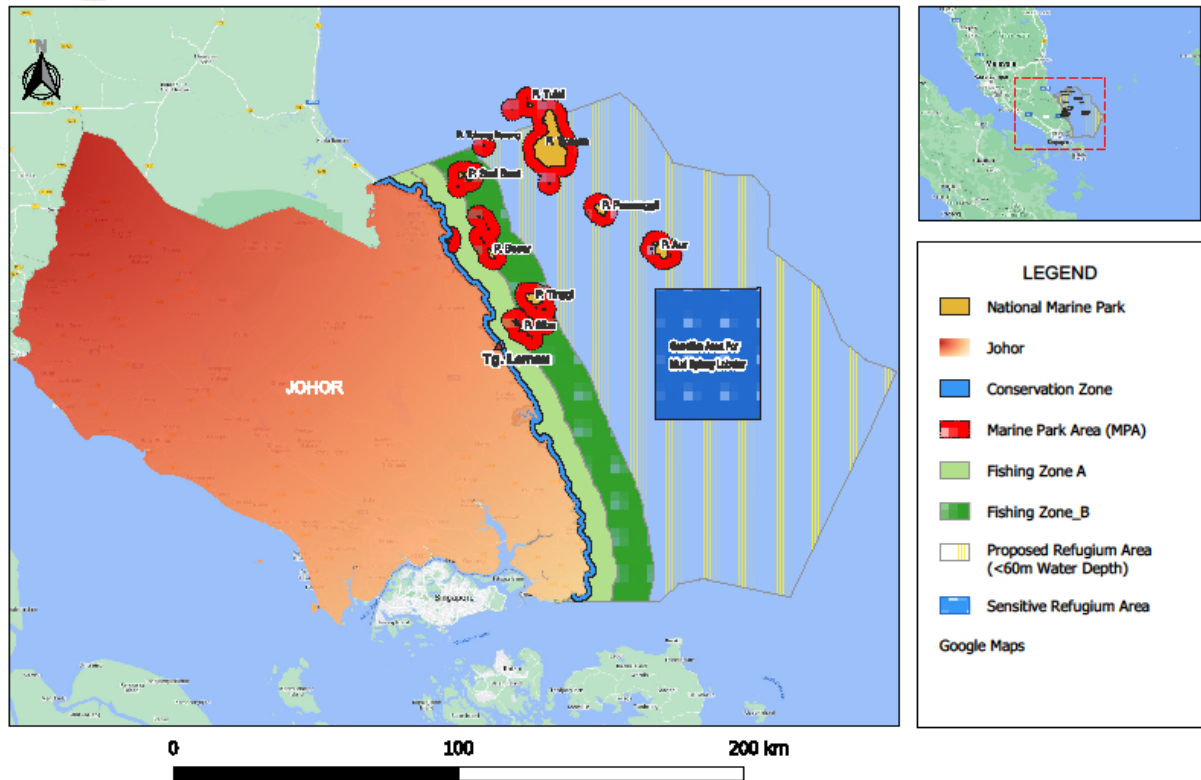


Figure 1: Proposed area of refugium and off-season area for lobster catch

The critical success factor for implementing fisheries refugium is community engagement, as pointed out by (Nasuchon and Charles, 2010). A stakeholder engagement workshop was held on 28-29 September 2022 at Desaru, Johor. The workshop served as a platform to exchange ideas and opinions to sustain lobster fisheries in the area. Besides, the inputs and concerns of stakeholders shall be addressed when executing the refugium management plan.

The objectives of the stakeholder's engagement workshop are:

1. To join forces among stakeholders to develop lobster fisheries in Johor
2. To collect feedback and information from various stakeholders in the lobster refugium Johor
3. To promote awareness of sustainable lobster fisheries in the refugium

Methodology

A stakeholders engagement workshop was held at Lotus Desaru Beach and SPA resort on 28-29th September 2022. The workshop invited government officials, fishermen, retailers, wholesalers, and restaurant operators, the key stakeholders of the lobster refugia. University lecturers and consultants were appointed to facilitate the discussion. The list of participants is attached in Appendix 1, while the workshop program is attached in Appendix 2. The workshop began with a get-together session in the resort. During the get-together session, the researchers explained the situation of lobster stock in Johor, the biology, and the challenges in sustainable lobster fisheries. The lecture was followed by a group discussion guided by a questionnaire (Appendix 3) and interview to attain the concerns and opinions of the stakeholders. The questionnaire is specific towards the following aspects:

1. Price/ Market rate for various sizes of lobster
2. Fishing technique and its efficacy
3. Agreement to release juvenile lobster
4. Agreement to release berried female
5. Interest to involve in fattening juvenile lobster
6. Interest in the premium seafood market
7. Steps to enhance lobster refugium

It is important to note that the survey was not a demographic survey but a targeted exercise to gain feedback on the lobster refugia. The get-together session ended with the presentation on the refugium proposal and the way forwards for sustainable lobster fisheries in the area. The second day was field verification and interaction with stakeholders who could not be present on the first day. In addition, the participants were trained to use the lobster caliper to identify juvenile lobsters. Each participant was provided a prototype to encourage them to start paying attention to the conservation program.



Figure 2: Participants involved in open discussion during day one



Figure 3 Prof. Dr. Ikwardin is demonstrating lobster caliper for juvenile lobsters



Figure 4: Workshop kit for stakeholders' engagement



Figure 5: Interviewing one of the restaurant operators



Figure 6: Dr. Ahmad Ali is sharing the concept of lobster refugium with the participants



Figure 7: Juvenile lobster that remained in the restaurant aquarium, lack of demand

Results and Discussion

Based on the feedback and information gathered during the stakeholders' engagement, the following findings were reported:

1. Price/ Market rate for various sizes of lobster

The market rate for juvenile lobster (<100 g) ranged from RM60 – 95 wholesale to RM100 – 130 for retail, while the adult lobster (>200g) ranged from 80 to RM140, and for those bigger size lobster (>400 g), the price can exceed RM220 to RM550 depends on the size. There is no difference price of the eggs-berried females. The different price ranges of the juvenile and adult lobster indicated that adult lobster catches are more lucrative than juvenile lobster, and manipulating the value chain, could potentially drive the fishermen to release juvenile lobster back into the sea. After all, the market prefers adult lobster to juvenile lobster, although one of the restaurant operators reported the increasing trend of consuming "baby" lobster by foreign tourists. Campaign and awareness programs shall be targeted at consumers to support sustainable fisheries.

2. Fishing technique and its efficacy

Lobster trap is the predominant gear targeting lobster in the area. This fishing technique enables the effort to release juvenile and berried females. Drift net is not targeting lobster, yet lobster was caught and often recorded mortality. Nonetheless, no catch of juveniles and berried females applied on all gears. Therefore, the fishermen must release those juvenile and berried females, even though they are found dead.



Figure 8: Lobster trap used by fishermen



Figure 9: Other types of fishing traps used by local fishermen



Figure 10: Boat and landing jetty for lobster

3. Agreement to release juvenile lobster

Based on the survey, all the fishermen agreed to release juveniles and berried females except one particular individual. Nonetheless, during the verbal interview, many expressed serious concerns about releasing the juvenile and berried females as it would impact their incomes. Two approaches can address the concerns. Firstly, establishing a lobster council that regulates and monitors the supply and demand chains can be used as one of the precursors for market price. The council will manipulate the demand chain toward adult lobster. The other approach is establishing fisheries regulation and, subsequently, strict enforcement.



Figure 11: Use of lobster caliper for identifying juvenile lobster

4. Agreement to release berried female

All fishermen agreed to release the berried female. The willingness to release eggs-berried female lobsters is based on two key factors: i.e. Fishermen are aware of the need to release the females for spawning, and berried females are seldom encountered.

5. Interest to involve in fattening juvenile lobster

All the fishermen are interested in fattening juvenile lobsters, but most lack facilities and knowledge of the fattening process. In reality, they do not practice fattening juvenile lobster. However, if the Department of Fisheries plans to engage the fishermen for fattening juvenile

lobsters, more resources and training shall be allocated to the program, and mixed success is to be expected.

6. Interest in the premium seafood market

All the stakeholders demonstrated interest in being involved in the premium seafood market. However, the state of readiness for the fishermen is low. As a result, restaurant operators and wholesalers are more ready to be involved in the premium seafood market. Therefore, government agencies should encourage restaurant operators and wholesalers to invest into the premium seafood market, where sustainable catch is one of the criteria for the premium market. By promoting the premium seafood market, the harvesting pressure on the juvenile lobster could be reduced, as the demand chain has been driven to the adult lobsters.



Figure 12: Premium lobster imported from Australia

7. Steps to enhance lobster refugium

The participants have identified artificial reefs as the essential measures to enrich lobster stock in the area. Nonetheless, they express concerns about managing and monitoring the artificial reefs. The other suggestion from the fishing community is to register those unlicensed fishers who may threaten the sustainable lobster fisheries in the area.



Figure 13: Lobster Artificial Reefs developed by the Department of Fisheries Malaysia

Conclusion

The workshop has collected feedback and information pertinent to implementing the lobster refugia in the area. Besides, the lobster caliper was distributed to all the workshop participants to identify juvenile lobsters. All the participants expressed support and were optimistic about the lobster refugia. All the feedback and suggestion gathered from the participants will be evaluated and assimilated into the management plan, especially on the sequence and schedule of implementation.

References

Alias, M., Nurhanida, D., Abd Rahman, M. and Rajendran, K. 2000. Distribution, habitat and life cycle of the mud spiny lobster *Panulirus polyphagus* in the east coast of Peninsular Malaysia Nat. Fish. Symp. 31 Oct – 2 Nov 2000 Johor Bahru, Malaysia.

Noor Hanis, A.H. and Siow, R. 2019. Establishment and Operation of a Regional System of Fisheries Refugia in the South China Sea and Gulf of Thailand, Report on Lobster Resources and Fisheries in Sedili, Johor. Southeast Asian Fisheries Development Center, Training Department, Samut Prakan, Thailand; FR/REP/MY16, 10 p

Nasuchon, N., and Charles, A. 2010. Community involvement in fisheries management: Experiences in the Gulf of Thailand countries. *Marine Policy*, 34(1), 163–169.

Appendix 1: List of Participants

1. Razak bin Mahar – Representative of local fisheries association
2. Azlan bin Aziz – Fisherman
3. Edy Hafis Zulaini bin Tamat – Fisherman
4. Nor Malek bin Abd Rahim – Fisherman
5. Khairul Nizam bin Ishak – Fisherman
6. Ahmad bin Aziz – Fisherman
7. Mohd Yazid Jasmin – Fisherman
8. Norrizam bin Amir Hashim – Fisherman
9. Sahroney bin Mohd Noh – Fisherman
10. Mustaffa Kamaruddin bin Mohamed – Fisherman
11. Hussein bin Nahar – Fisherman
12. Lazim b. Tajam – Fisherman
13. Representative Jade Garden Seafood Corner
14. Representative Lotus Seafood Restaurant
15. Representative Warong Lobster
16. Representative Super Lobster Restaurant
17. Ah Too Wholesaler
18. Representative Fresh B & T Trading – Retailer
19. Soon Kiang Sea Product - Retailer
20. Aiman bin Zulkiflee
21. Md Faizul bin Md Fadzil – Officer, State District Office
22. Abdul Fatah Alkhairi b. Mustapa – Officer, Fisheries Development Authority of Malaysia
23. Muhamad Idham bin Legiman – Officer, DOFM
24. Mohd Nizam bin Juanai Officer - DOFM
25. Muhammad Khairul bin Hamdan - Officer, DOFM
26. Mohd Zaki bin Harun - Officer, DOFM
27. Nur Afifah A. Rahim – Officer, DOFM
28. Mohamad Nor Hisyar – Officer, DOFM
29. Mohd Zulkhairie bin Ab Rahman – Officer, DOFM
30. Muhammad Shah Riman bin Abdul Ghani – Officer, DOFM
31. Prof. Dr. Ikwanuddin Abdullah – Researcher, UMT
32. Dr. Ahmad Ali – Researcher
33. Dr. Lim Chuin Siew – Researcher
34. Dr. Hii Yii Siang – Researcher

Appendix 2: Workshop's Tentative Program

Program	Masa
Ucapan alu-aluan	9.00 – 9.10 am
Latar belakang udang karang	9.10 – 9.45 am
<p><u>Sesi 1: Suai Kenal dan Perbincangan</u></p> <p><u>Tajuk:</u> Pasaran dan masa depan industri perikanan Udang Karang di Johor</p> <p><u>Bancian:</u></p> <ol style="list-style-type: none"> 1. Harga dan saiz udang karang 2. Kaedah Penangkapan 3. Kaedah penjualan dan pelanggan utama <p><u>Scenario kejadian:</u> Apakah Impak kepada anda (Pendapatan) sekiranya</p> <ol style="list-style-type: none"> 1. Size udang karang semakin kecil 2. Hasil tangkapan udang karang semakin rendah <p>Ulasan perbincangan</p>	9.45am – 10.30am
Minum Pagi	10.30 am – 11.00 am
<p><u>Sesi 2: Perbincangan</u></p> <p><u>Tajuk:</u> Masa depan industri perikanan udang karang</p> <p><u>Bancian:</u></p> <ol style="list-style-type: none"> 1. Meneroka pasaran makanan laut premium? 2. Memastikan kelestarian stok udang karang 3. Saiz pasaran udang karang 4. Berkerjasama bawah persatuan/ entiti untuk mengawal pasaran 5. Akuakultur sebagai alternatif <p><u>Ceramah:</u> Industri Udang Karang di negara-negara lain. Macam mana industri udang karang diperkembangkan</p>	11.00 am – 1.00 pm
Makan Tengahari	1.00 – 2.30 pm

Program	Masa
<p>Ceramah:</p> <p>Konsep Refugia Perikanan: Kenapa Refugia Perikanan diperlukan?</p> <p>Perbincangan: Cabaran dan kekangan refugia perikanan</p> <p>Demonstrasi Peralatan: Penggunaan kaliper untuk penentuan size juvenil</p> <p>Cabutan Bertuah</p>	<p>2.30 pm – 4.30 pm</p>
<p>Minum Petang</p>	<p>4.30 – 4.45 pm</p>

**BENGGEL PEMBANGUNAN INDUSTRI PERIKANAN BAGI UDANG KARANG
MELALUI REFUGIA PERIKANAN**

Bancian (2)

Apakah Kaedah Penangkapan Udang Karang yang kerap digunakan?

Kaedah	Keberkesanan
	1: Udang karang bukan sasaran dan jarang dapat
	2: Udang karang adalah sasaran
	3: Mudah dapat Udang Karang walaupun udang karang bukan sasaran

Bancian (3)

Bersetuju dengan pelepasan balik udang karang juvenil (<6cm size karapas) semasa operasi

1. Ya
2. Tidak

Bancian (4)

Bersetuju dengan pelepasan balik udang karang yang membawa telur semasa operasi

1. Ya
2. Tidak

Bancian (5)

Adakah Tuan/Puan berminat untuk menggemukkan udang karang juvenil kepada size yang lebih besar?

1. Ya
2. Tidak

**BENGKEL PEMBANGUNAN INDUSTRI PERIKANAN BAGI UDANG KARANG
MELALUI REFUGIA PERIKANAN**

Bancian (6)

Apakah pandangan Tuan/ Puan berkenaan dengan Makanan Laut Premium?

1. Tidak berminat dan tidak ingin mengambil tahu
2. Berminat, tetapi tidak bersedia untuk berubah kaedah penangkapan
3. Berminat dan bersedia untuk berubah kaedah penangkapan sekiranya latihan dan bimbingan diberikan
4. Sedang meneroka industri Perikanan Premium
5. Telah melibatkan diri dalam industri Perikanan Premium

Bancian (7)

Lain – lain pandangan/ idea berkenaan dengan kaedah atau pendekatan untuk melestarikan industri Udang Karang

