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EXPLORING THE TRADITIONAL MARITIME TECHNOLOGY: CLASSIFICATION OF TERENGGANU'S SEA AND RIVER *PERAHU*

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ABSTRACT

Terengganu's rich maritime history has led to the development of various watercraft designs, with local researchers extensively studying the history, types, and decoration of traditional boats, known as perahu. However, the classification of perahu based on their specific usage remains underexplored. Given the scarcity of written records on Terengganu's traditional perahu, this study combines interviews and observations to gather essential data. In line with the Sustainable Development Goal (SDG) 11, the research encourages collaboration between government and private entities, such as the Ministry of Higher Education, Universiti Teknologi Mara Seremban, Politeknik Ungku Omar, Terengganu State Museum, and the Royal Terengganu Institute for Historical and Legal Studies, aligning with SDG 17. The study aims to contribute to existing research by focusing on the classification of Terengganu's traditional perahu according to their specific river and sea applications. Adopting a case study approach, the research observes 15 traditional perahu and one prototype housed at the Terengganu State Museum, while one type is only represented through verbal accounts and is excluded. Interviews with experienced boatbuilders in Kuala Terengganu provide additional insights into the features of river and sea perahu. The study finds that, of the 16 types of perahu examined, five were designed for river navigation, while 11 were intended for the sea. The data were presented to the Maritime Unit at the Terengganu State Museum for validation. The variety of perahu in Terengganu is largely influenced by the region's geography, featuring both rivers and vast coastlines. These findings open avenues for further research into the evolution of Terengganu's traditional perahu.

Keywords: *Malay Traditional watercraft; Malay Heritage; Terengganu traditional perahu; sea perahu; river perahu.*

INTRODUCTION

Terengganu, located along the South China Sea, was home to Syahbandar, a key maritime port during its peak Maritim (2022). As noted by Mohd Yusof (2021), it's no surprise that Terengganu excelled in boatbuilding and design. Historically, the region was also connected by rivers, from Kuala Berang to Kuala Terengganu, and from Kemaman to Kuala Besut. Given the necessity of water transport dating back hundreds, if not thousands, of years, various types of watercraft, known as *Perahu*, were developed to meet the demands of daily life. Water transportation in Terengganu played a critical role in connecting places, such as from Seberang Takir to Bandar Kuala Terengganu. Before the Sultan Mahmud Bridge was constructed, the boat *penambang* was the go-to option for such trips. From the 1960s to the 1970s, ferries were commonly used to travel to Kuala Lumpur. Nine ferry systems operated across different districts, enabling the movement of people and goods Fauzi (2022). Sadly, no ferries have been preserved as historical artifacts for future generations to appreciate. This highlights the deep-rooted connection between Terengganu and water transportation.

Unfortunately, like the ferries, many traditional *Perahu* have disappeared over time as stated by Sabri (personal communication, July 21, 2024) during the personal communication. Some exist only in old photographs, while others survive as prototypes. Tragically, certain types, like the *perahu keci*, are known only through the memories of elders, with no physical evidence left behind. As a result, the *perahu* risks being dismissed as myth or folklore. This study aims to preserve and share the technology of Terengganu's maritime heritage by providing valuable insights into the traditional boat designs of the region. It serves as a resource for researchers, historians, and those interested in safeguarding Terengganu's cultural legacy, contributing to a greater appreciation of its unique maritime identity.

LITERATURE REVIEW

Early Records of Terengganu's Traditional *Perahu*

Currently, there is limited published material on *Perahu*. Most existing literature has centered on the various types of traditional *Perahu* that have existed over time. Alfred (1986); Wallace (1869) identified twelve types of boats used by coastal fishermen in Pahang, while Firth (1990) noted that coastal fishermen in Kelantan and Terengganu utilized nine distinct types. Other researchers, such as Smyth Smyth (1902), Gibson (1949, 1954), Burdon et al. (1954),Ismail Ismail and Muhamad (2019)and Mohd Yusof (2021), have also conducted studies on boats from the East Coast of Peninsular Malaysia. Later studies by Wahab Wahab and Bahauddin (2017), Ramli Wahab and Ramli (2018)et al. (2018) focused on the ornamentation and philosophical aspects of traditional *Perahu* in Terengganu. Additionally, researchers such as Maidin (2003, 2005) Longuet (2009) and Abd Wahab Abd Wahab et al. (2023) explored the boatbuilding teams and construction processes. However, these studies did not specifically address the classification of *Perahu* based on their use in rivers versus the sea.

Perahu within the Context of Terengganu

Perahu, as described by Fraser (2000) is a generic Malay term that refers to traditional native boats or vessels, sometimes including houseboats. In the context of Terengganu, *Perahu*

specifically denotes traditional Malay watercraft that are built using time-honored techniques and operated with oars, sails, and/or a rudder (Maidin, 2005; Mohd Yusof, 2021; Wahab & Ramli, 2023). Any traditional Malay watercraft that uses an engine for propulsion is categorized as a boat. While Gibson (1949, 1954) and Horridge (1978) referred to all traditional vessels as boats rather than *perahu*, Fraser (2000)noted that the term *perahu*, in its various spellings, is commonly used throughout Southeast Asia and the western Pacific. Other variations include prahu, *perau*, *pairau*, *paro*(*e*), *prau*(*h*), *praw*(*e*), and *prau* (Fraser 2000).

For centuries, Terengganu has been a key player in international trade, with water transportation serving as the primary means of travel. According to Mohd Yusof (2021), three significant ports were established in Terengganu as early as the 2nd century: Kole (Kemaman), Perimula (Kuala Terengganu), and Kua Dun Kun (Kuala Dungun). Additionally, Shafie (1999) noted that Kuala Berang, referred to as Fo-lo-an in Chinese historical records, was a prominent international trade hub during the 7th and 8th centuries. These historical accounts provide strong evidence of Terengganu's active engagement in maritime activities.

Gibson (1954) characterized the *perahu* from the east coast as being more robust than those found in other regions of Malaya. He noted that these boats are constructed using carvel methods without seam ribbands or stringers, featuring pointed bows and sterns, equal ends, and a distinct yet shallow keel. He concluded that these local *perahu* are built by Malays for Malays and reflect natural preferences in their decoration and design. The boats are predominantly made of *chengal (Neobalanocarpus heimii)*, with the exception of the pegs and decorative elements (Gibson,1954). Each boat is easily recognizable (Gibson, 1954)by its *linggi* (stem and stern) (Ghawi, 1981; Kamal, 1992; Mohd Yusof, 2021).

Geographical Aspects of Terengganu

Terengganu is located along the coast facing the South China Sea. The presence of Syahbandar, a significant and active port in its prime as stated by Sabri (personal communication, July 21, 2024) underscores the remarkable advancements in boat building and design achieved in Terengganu. This state is positioned on the eastern coast of Peninsular Malaysia and consists of eight districts: Besut, Setiu, Kuala Nerus, Kuala Terengganu, Marang, Dungun, Kemaman, and Kuala Berang. It shares its northern and northwestern borders with Kelantan and its southern and southwestern borders with Pahang.

Terengganu is characterized by its distinctive geographical features, which include a network of rivers and expansive sandy beaches. According to TREVICOSTA (2023), the state is home to 25 rivers and 14 sandy beaches. Furthermore, Terengganu (2023) notes that its sandy coastline extends 225 km from Besut to Kemaman. This unique geographical environment has played a significant role in the development of various *perahu* designs tailored for both river and sea conditions.

The local marine industry is significantly influenced by geographical factors and weather patterns. Smyth (1902) and Gibson (1949, 1954) emphasized the differences between the east coast and other areas of Peninsular Malaysia, particularly concerning the closed and open fishing seasons. Gibson (1949) elaborated that the northeast monsoon (*musim tutup kuala*/shut season) and the coastal formations have allowed local fishermen to dominate the coastal traffic.

Sea and River Traditional *Perahu*

Gibson (1954) and Mohd Yusof (2021) have indirectly classified traditional *perahu* into sea and river *perahu*. The information provided, nevertheless, could be contradictory. Table 1 below summarizes the findings from both researchers' analyses.

The variations in the spelling of *perahu* names can be traced back to the differences in time and location between the two researchers. Gibson (1954) identified eight types of traditional *perahu* from the east coast, specifically including wooden plank *perahu*, locally referred to as *perahu* timbal. Later, Yusof recognized 16 types of traditional *perahu*; however, not all of these pertain to Terengganu traditional *perahu*, which is the primary focus of this research. *Perahu* Hulu is excluded from this study as it is not found in the research area.

Table 1: Classification of traditional *perahu* from literature

Gibson (1954)		**Mohd Yusof (2021)**	
River *perahu*	Sea *perahu*	River *perahu*	Sea *perahu*
Kolek Pengayer	*Perahu* Payang	*Perahu* Jalur	*Perahu* Jongkong
Jalorar	*Perahu* Buatan Barat (Payang Barat)	Setak	Kolek Lincang
	Kolek Lichang	Kajangan	Kolek Kuel
	Kolek Gelibat	*Perahu* Hulu	*Perahu* Payang
	Sekochi	Kolek Pengayer	*Perahu* Payang Barat
	Bedar	*Perahu* Bedar	Kolek Gelibat
Kolek kueh	Kolek kueh	*Perahu* Jalural	*Perahu* Sekoci
		Perahu Haluan Katup	*Perahu* Besar

PROBLEM STATEMENT

The use of traditional Malay boats among fishermen is gradually diminishing due to various factors, as noted by Wahab and Ramli (2018). These include the effects of modernization, difficulties in obtaining timber resources, and the rising costs associated with boat construction Fauzi (2022). As a result, there has been a marked decline in the demand for traditional boat building, leading to reduced income for local artisans. Currently, traditional Malay boats are rarely seen in use by fishermen, with some exceptions in specific regions of Kelantan and Terengganu, as highlighted by Wahab and Ramli (2018). In light of this trend, this study aims to investigate and preserve the traditional technology of the Malay ancestors. This effort aligns with Baba (2010) who call for a comprehensive examination of traditional Malay boats.

Additionally, Awani (2022) reported the ongoing importance of these vessels, particularly in Terengganu, where they have proven to be crucial during rescue operations in major flooding events. Their strength and stability are vital for navigating turbulent waters filled with debris, enabling the evacuation and rescue of flood victims. Maidin (2005) and Longuet (2009) have recommended documenting Terengganu's traditional *perahu* while they are still in existence. This study aims to enhance the understanding of Terengganu's traditional *perahu* by adding to the data on river and sea vessels previously provided by Gibson (1954) and Mohd Yusof (2021). As Gibson (1949) pointed out, creating a comprehensive list of Malay native boats is a challenging task. Therefore, the findings of this research will help fill

knowledge gaps and contribute to a deeper understanding of the wisdom of Malay ancestors in developing suitable types of *perahu* for river and sea use. This study addresses the urgent need to preserve the invaluable maritime traditions and cultural heritage embedded in Malay culture, particularly in Terengganu, while also conveying the importance of these traditional boats to future generations.

RESEARCH METHODOLOGY

The scarcity of written records on this topic has resulted in fragmented and dispersed information. Thus, it is essential to foster collaboration among higher education institutions, such as the Kementerian Pengajian Tinggi, Universiti Malaysia Kelantan, Universiti Teknologi Mara Seremban, and Politeknik Ungku Omar, as well as the government agency Terengganu State Museum, and the private organization Royal Terengganu Institute for Historical and Legal Studies (R-TIHiLS) to collect relevant data. This effort aligns with Sustainable Development Goal 11.4, which focuses on enhancing the protection and preservation of cultural and natural heritage, and Sustainable Development Goal 17, which underscores the importance of cooperation among various institutions.

The study employs a qualitative approach, collecting data through observations and open-ended interviews with three experienced boatbuilders from Pulau Duyong and Pulau Ketam in Kuala Terengganu. To ensure the reliability and validity of the findings, the final data was presented to the Maritime Unit of the Terengganu State Museum for validation.

Measurements of each *perahu* were taken, including length, width, and height. The length is defined as the measurement of the keel or lunas (Ghawi, 1981; Longuet, 2009; Maidin, 2005; Mohd Yusof, 2017, 2021), while the width is determined at the midpoint of the *perahu*, and the height is measured from the midpoint of the lunas to the hull of the *perahu*, as shown in Figure 1. The collected data underwent thorough triangulation and analysis to fulfill the study's objective of identifying the various types of Terengganu Traditional *Perahu* and classifying them based on their use in river and sea environments.

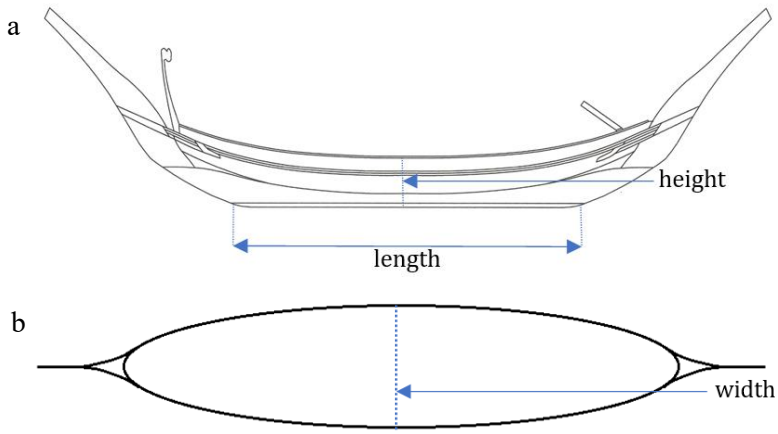

Fig. 1: Dimension of *perahu* based on (a) Elevation; (b) Plan view

RESULTS AND DISCUSSION

Types of Terengganu Traditional *Perahu*

A total of 15 types of traditional *perahu* are on display, along with one prototype and one *perahu* with no physical remains, the *Perahu Keci*. The findings of this study identify 17 distinct types of traditional *perahu* in Terengganu. In addition to these local traditional *perahu*, the *Perahu Sekoci Siam* is also showcased in the museum yard. However, this particular *perahu* is not included in the collection of Terengganu traditional *perahu*, as it was a gift from King Rama V of Siam to Sultan Zainal Abidin III (1881-1918) and was not constructed locally. Therefore, the total number of Terengganu traditional *perahu* stands at 17, as detailed in Table 2.

Table 2: Types and dimension of Terengganu traditional *Perahu*

No.	Picture (Source: Terengganu State Museum, Photographic Unit)	Types and dimension of *Perahu* Timbal	No.	Picture (Source: Terengganu State Museum, Photographic Unit)	Types and dimension of *Perahu* Timbal
1.		Bark boat Length: 4.14m Width: 0.72m Height: 0.18m	2.		*Perahu* Jalur Length: 5.23m Width: 0.67m Height: 0.22m
3.		*Perahu* Jongkong Length: 4.08m Width: 0.85m Height: 0.56m	4.		*Perahu* setak/ *perahu* haluan katup Closed bow boat Length: 3.48m Width: 0.85m Height: 0.36m
5.		*Perahu* Kajangan Roofed boat Length: 7.2m Width: 1.25m Height: 0.46m	6.		*Perahu* Kolek Kuel Length: 4.60m Width: 1.50m Height: 0.64m
7.		*Perahu* Kolek Lincang/ Kolek Tangkul Lincang' dinghy boat Length: 11.90m Width: 1.77m Height: 0.77m	8.		*Perahu* Kolek Gelibat Missing dinghy boat Length: 5.58m Width: 1.73m Height: 0.61m
9.		*Perahu* Payang Dragnet Boat Length: 11.0m Width: 2.27m Height: 0.89m	10.		*Perahu* Payang Barat Dragnet Boat Length: 7.75m Width: 1.73m Height: 0.69m

11.		*Perahu* Sekoci Sloop boat Length: 4.25m Width: 1.17m Height: 0.49m	12.		Sampan *Perahu* Besar *Perahu* Besar Life Saving Boat Length: 4.60m Width: 1.48m Height: 0.70m
13.		Perahu Jalural Length: 10.3m Width: 1.42m Height: 0.60m	14.		Perahu Bedar Length: 3.12m Width: 0.85m Height: 0.38m
15.		Perahu Kolek Pengair Length: 129cm Width: 21cm Height: 10cm	16.	Not applicable	Perahu Keci No information on its dimension. However the record has shown that it voyaged through the ocean to Penang Island as ordered by Sultan Mansur (M.Yusof 2021) Known as Perahu Kichi (Smyth 1902)
17.		Perahu Besar Terengganu Length: 35.15m Width: 8.89m Height: 4.01m			

While there has been some debate regarding the differences between the *Perahu Setak* and *Perahu Haluan Katup*, observations indicate that they are essentially the same type of boat, with variations only in the size of the duck's bill ornamentation on the *linggi* (stem head). This finding is corroborated by interviews with three experienced boatbuilders. Additionally, *Perahu Keci* is excluded from this study's sample due to the scarcity of available records and sources, as well as the absence of physical remains.

Through observations, it has been determined that all traditional Terengganu *perahu* can be categorized into three types: (i) *perahu kulit,* (ii) dug-out, and (iii) *perahu timbal.* These findings also support Gibson (1954) claims that East Coast boats are carvel-built without seam ribbands or stringers, featuring pointed bows and sterns, equal ends, and a distinct but shallow keel. Gibson (1954) further noted that these boats are constructed entirely from *chengal* wood, with pegs and decorations made from *penaga* wood (Manan 1989, Mohd Yusof 2017, M.Yusof 2021) or *penaga laut (Calophyllum inophyllum)*, as mentioned by Gibson (1954). Each boat can be easily identified by its *linggi* (stem, stem head, and stern) (Ghawi 1981, Kamal 1992, Mohd Yusof 2021). However, these observations primarily pertain to *perahu timbal* or wood plank *perahu* and do not include bark boats or dug-out canoes (*perahu jalur* and *perahu jongkong*), which lack planks and *linggi*.

River *Perahu*

Perahu for river transportation is different from boats for the ocean transportation. The features as different so as to cater different nature of both places. As travelling along the river, our forefathers had to consider a few aspects of nature such as timing for high and low tide as noted by the interview respondents. This is in line with discussion by earlier researcher such as Smyth (1902), Burdon et al. (1954) and Gibson-Hill (1949, 1954), who highlighted the local population's ability to understand and adapt to the local climate and nature. Burdon et al. (1954),Gibson (1954) further emphasized that this understanding allowed the local maritime industry to be dominated by the locals, in contrast to the west coast of the peninsula, which was influenced by Chinese boat designs.

Other than that, respondents also noted that river *perahu* were characterized by specific features identified through observations and interviews. Four primary characteristics of river *perahu* emerged: shallow decking, a narrow shape when viewed from above, the use of oars for propulsion, and infrequent use of sails. Notably, both the *Perahu Jalorar* and *Haluan Katup* have a *lesung* (mast step), suggesting that these river *perahu* can also utilize sails. This observation aligns with the illustration of *Perahu Jalorar* in Gibson (1954) and the photograph of *Haluan Katup* in Mohd Yusof (2021). However, no *lesung* was observed on *Perahu Kulit, Perahu Jalur*, or *Perahu Kajangan*, and interviews indicated that sails are seldom employed. This suggests that these boats primarily rely on oars for movement.

The operation of river boats is influenced by tidal conditions, which determine the appropriate times for traveling upstream or downstream, aided by the use of oars. From the 16 samples of Terengganu Traditional *Perahu*, interviews revealed that only five qualify as river *perahu*. A summary of these river *perahu* and their propulsion methods is presented in Table 3 below.

Table 3: Propelling components of traditional river *perahu*

River *perahu*	Oars	Sail	Rudder
Perahu Kulit (Barkboat)	/	X	X
Perahu Jalur (Dugout canoe)	/	X	X
Perahu Jalural	/	/	/
Perahu Haluan Katup/ Setak (Closed Bow Boat)	/	/	/
Perahu Kajangan (Roofed Boat)	/	X	X

Features of Sea *Perahu*

As humans are always full of curiosity, they started to explore the ocean (Edgerton, 1923; Mohd Yusof, 1985). Unlike a river, an ocean is a wide-open space with wavy water that is more challenging as compared to a river. Traditional Watercrafts on the ocean depends on the wind to move and a rudder to tackle the wavy water. Based on observation and interviews, among 16 types of samples *Perahu*, 11 types of which are categorised as sea *perahu*.

Sea *Perahu* can be divided into two categories that also sign the evolution of. The categories are: dug out and *Perahu* Timbal (wood plank boat). Among those, *Perahu* Jongkong is only one categorized as dug out *perahu*. It is believed that this was the first *perahu* invented

to explore the ocean with one sail and without rudder.

Respondents also noted that sea *perahu* hold certain features unlike river *perahu*. Features of sea *perahu* can be summarized as; deep decking, wide in shape (in plan view), rely on oars and sails to move and using rudder to steer. However, *Perahu* Besar is the only type that does not use any oars, instead it relies on sails n rudder to move and propel. Then, among Terengganu Traditional *Perahu*, 11 of them have been identified as sea *perahu* as presented in Table 4 below.

Table 4: Propelling components of traditional sea *perahu*

Sea *perahu*	Oars	Sail	Rudder
Perahu Jongkong	/	/	X
Perahu Kolek Kuel	/	/	/
Perahu Kolek Lincang / Kolek Tangkul	/	/	/
Perahu Kolek Gelibat	/	/	/
Kolek Pengayer	/	/	/
Perahu Payang	/	/	/
Perahu Payang Barat	/	/	/
Perahu Sekoci	/	/	/
Sampan Perahu Besar	/	/	/
Perahu Bedar	/	/	/
Perahu Besar	X	/	/

The study's findings partially contradict the data provided by Gibson (1954) and Mohd Yusof (2021). One possible explanation for this discrepancy lies in the differing perspectives of boatbuilders and historians. Additionally, the usage of *perahu* in Terengganu is quite versatile. For example, some *perahu* like *Kolek Pengayer*, typically used for line fishing, might also be used in rivers despite being designed for sea use. This might occur especially in the coastal of Terengganu bead that is connected to Kuala Terengganu river. This flexibility in application could lead to confusion and differing interpretations.

CONCLUSION

This paper has offered a thorough exploration of the technology and typology of Terengganu traditional *perahu* by identifying and classifying them according to their specific functions in river and sea environments. River *perahu* are distinguished by their shallow decks and streamlined shapes, designed to adapt to the dynamics of water flow and tides—enabling downstream travel during low tide and upstream navigation during high tide. Conversely, sea *perahu* are built to withstand the challenges of ocean conditions, featuring higher decks and employing oars, sails, and rudders for navigation in rough waters.

The findings of this study underscore the significance of examining traditional *perahu* to gain insights into the knowledge and wisdom of our ancestors, strengthen our cultural identity, and preserve traditional maritime practices. Additionally, this research opens avenues for future studies, such as the identification of deep-sea and coastal *perahu*. Just as iconic vessels like the Titanic and contemporary giants like the Icon of The Seas are celebrated, our remarkable traditional *perahu* also merits recognition. It is essential to further investigate the

history and other aspects of these boats to honour our heritage for future generations while promoting sustainable development goals (SDGs) such as safeguarding cultural heritage (SDG 11) and fostering collaborations (SDG 17) among governments, private organizations, and civil society.

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