Establishment and Operation of a Regional System of Fisheries Refugia in the South China Sea and the Gulf of Thailand

REPORT

COASTAL ENVIRONMENTAL CHARACTERISTIC FOR SHRIMPS (*Penaeus merguiensis* and *P. indicus*) HABITAT SUITABILITY ASSESSMENT OF WEST KALIMANTAN

SOUTHEAST ASIAN FISHERIES DEVELOPMENT CENTER
TRAINING DEPARTMENT

COASTAL ENVIRONMENTAL CHARACTERISTIC FOR SHRIMPS (*Penaeus merguiensis* and *P. indicus*) HABITAT SUITABILITY ASSESSMENT OF WEST KALIMANTAN

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1. Activity objective

The survey activity was conducted to determine the characteristics of the waters environment that supports the life cycle of shrimp species *Penaeus merguiensis* and *P. indicus* shrimp from the coast of West Kalimantan.

2. Time and location

The survey activity to assess the waters quality of shrimp habitat was conducted at the coastal area of West Kalimantan on 11th – 18th of October 2021 (Figure 1).

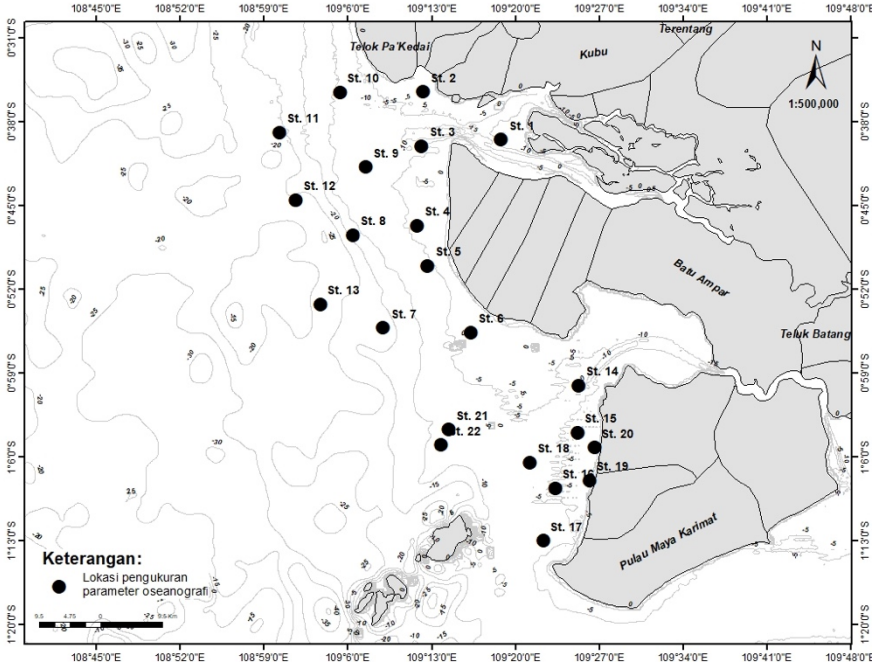

Figure 1 Measuring point stations of environmental waters quality

3. Data Collection Method

Water quality parameters are measured insitu (Table 1). There are 22 research stations, spread across the waters of Padang Tikar (Kubu Raya Regency) and Dusun Besar (North Kayong Regency), West Kalimantan Province. The coordinate points (latitude and longitude) of each research station are recorded.

Table 1 *Measured parameters, research methods and equipments used during survey*

No	Parameter	Unit	Method and Equipments
1	Brightness	Cm	Insitu, secci disk
2	Water temperature	^{o}C	Insitu, Water Quality Checker
3	Dissolved oxygen	mg/l	Insitu, Water Quality Checker
4	Conductivity	mg/l	Insitu, Water Quality Checker
5	ORP (Oxidation Reduction Potential)	mg/l	Insitu, Water Quality Checker
6	pH	Unit	Insitu, Water Quality Checker
7	TDS (Total Dissolved Solids)	sel/l	Insitu, Water Quality Checker
8	Turbidity	ind/l	Insitu, Water Quality Checker
9	Salinty	ppt	Insitu, Hand Refractometer

Using ArcGIS software, water parameters recorded during the survey then mapped to understand their spatial distribution.

4. Result

Water depth

The waters depth of Padang Tikar and Dusun Besar, West Kalimantan, which is estimated as the nursery and feeding ground area for the white shrimp group (*Penaeus* spp.), ranges from 1.5-15 meters, while the water depth is estimated to be the spawning area ranged between 6-20 meters. The distribution of water depths (bathymetry) at the survey location is shown in Figure 2.

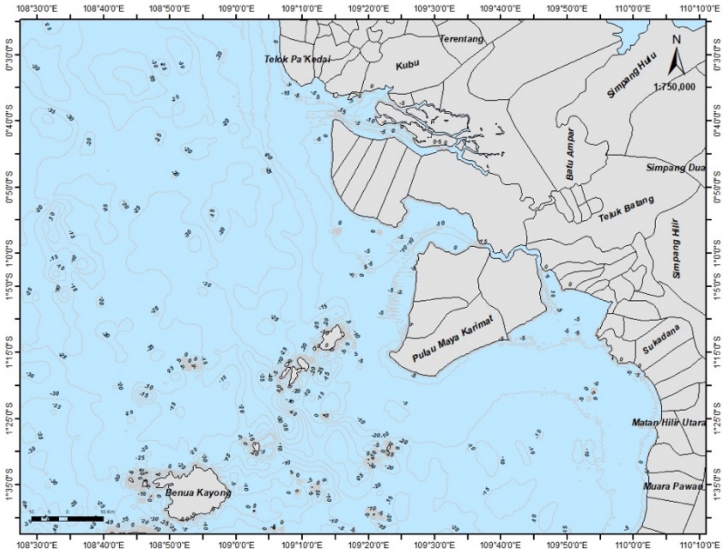

Figure 2 Water bathymetry (m) of Padang Tikar and Dusun Besar waters, West Kalimantan

Water temperature

The value of water temperature in the Padang Tikar and Dusun Besar waters, West Kalimantan, ranged from 29.5-32.9 °C. Based on the average water temperature, the highest temperature value was found at station III (31.1°C), followed by station II (30.2°C), and the lowest was at station I (29.8°C). The distribution of water temperature values in the Padang Tikar and Dusun Besar areas, West Kalimantan is illustrated in Figure 3.

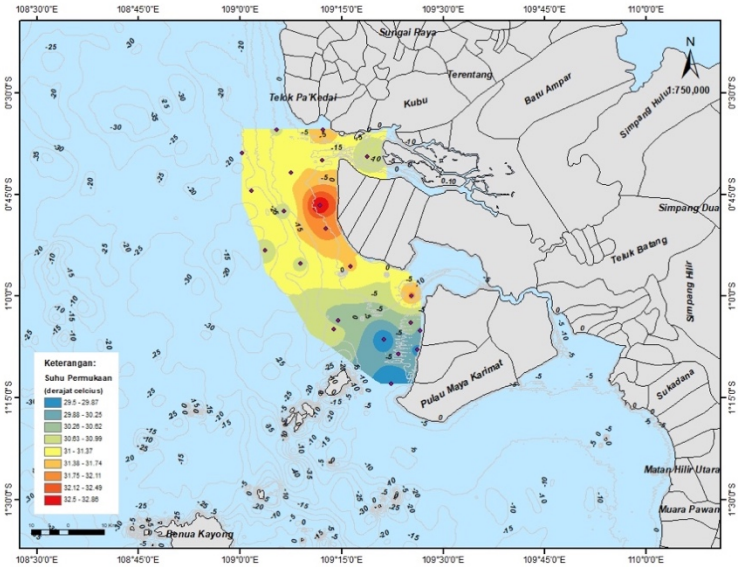

Figure 3 Waters temperature distribution (°C) in the Padang Tikar and Dusun Besar, West Kalimantan

The Dissolved Oxygen (DO) concentration

The dissolved oxygen concentrations in the waters of Padang Tikar and Dusun Besar ranged from 4.41-8.81 mg/L. The distribution of DO concentrations in the waters of Padang Tikar and Dusun Besar is presented in Figure 4. From the 22 study stations, we found that the stations in the Dusun Sub-district had a low DO concentration of 4.41 mg/L.

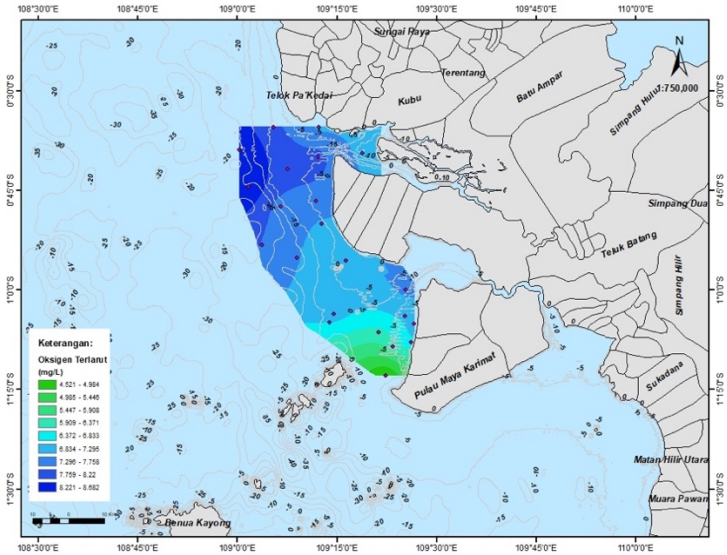

Figure 4 Distribution of DO concentration (mg/L) in Padang Tikar and Dusun Besar waters, West Kalimantan

Salinity

The results of field observations found a significant difference in salinity values between the waters closing to the land and towards the sea. The concentration of salinity values in the area close to the land was less than 20 ‰, while the salinity concentration in the waters towards the sea had a range of values between 25-34 ‰ (Figure 5).

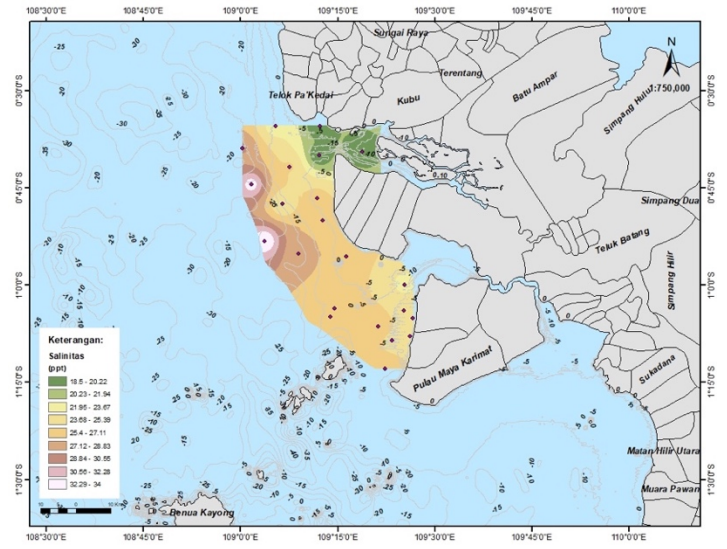

Figure 5. Distribution of waters salinity (‰) in Padang Tikar and Dusun Besar, West Kalimantan

pH

The concentration of pH values in the waters of the Padang Tikar and Dusun Besar areas ranged from 7.51-8.17. The distribution of pH concentrations in the waters in the Padang Tikar and Dusun Besar areas is shown in Figure 6.

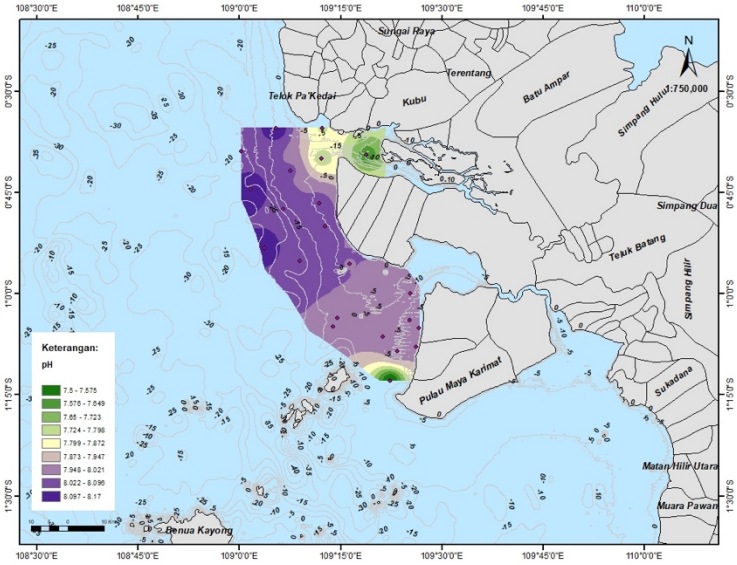

Figure 6. The concentration of waters pH (acidity level) in the Padang Tikar and Dusun Besar areas, West Kalimantan

The waters turbidity

The waters turbidity of Padang Tikar and Dusun Besar ranged from 0.1 to 56.6 NTU. Differences in the turbidity level occurred between the waters of Padang Tikar and Dusun Besar, where high turbidity occurred in the waters of Maya Island. The turbidity of the waters in the Padang Tikar and Dusun Besar areas is mapped in Figure 7.

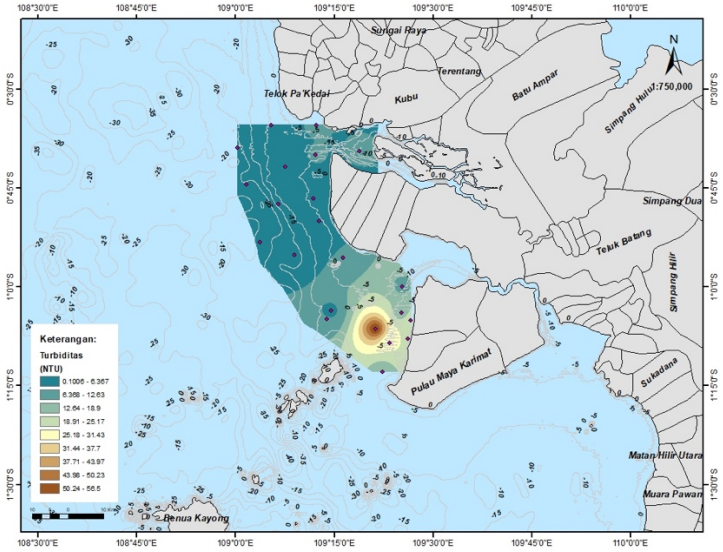

Figure 7. The waters turbidity (NTU) in the Padang Tikar and Dusun Besar areas, West Kalimantan

Water brightness

The results of the brightness level observations at 22 stations in the waters of the Padang Tikar and Dusun Besar areas ranged between 0.1-3.5 meters from a depth value range of 1.5-23.4 meters. The distribution of water brightness values is shown in Figure 8.

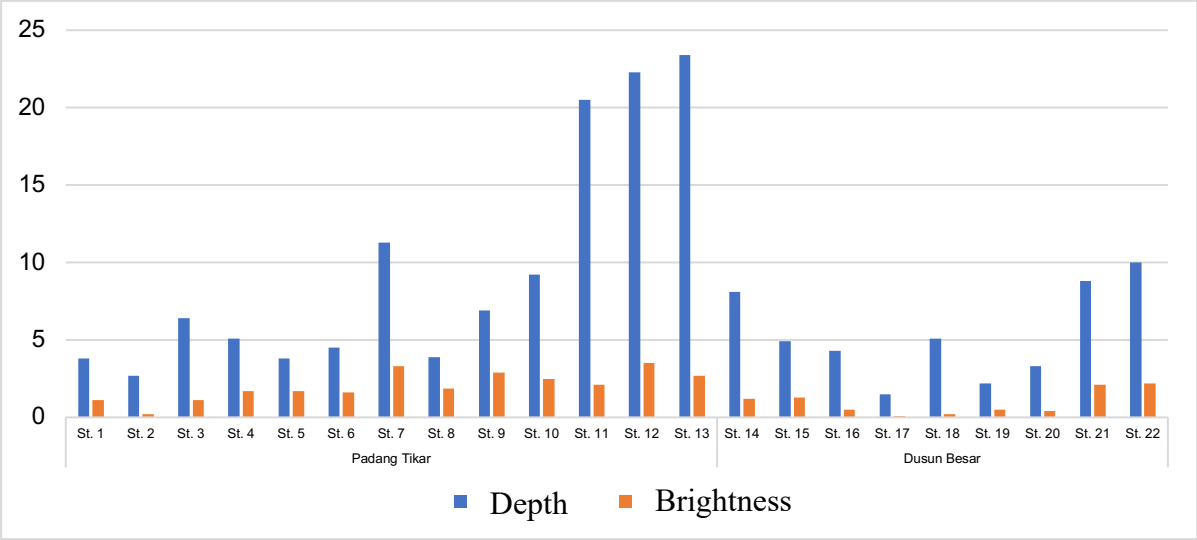

Figure 8. Brightness (m) in the Padang Tikar and Dusun Besar areas, West Kalimantan

Total dissolved solids (TDS) of water

The field observations in the waters of Padang Tikar and Dusun Besar at 22 selected stations resulted in the concentrations of TDS (Total Dissolved Solids) ranging from 7.15-28.4 gr/L. TDS concentration and turbidity positively correlated with TSS levels; increasing TSS will increase turbidity levels in the water column. The distribution of TDS (Total Dissolved Solids) concentrations in the Padang Tikar and Dusun Besar waters is illustrated in Figure 9.

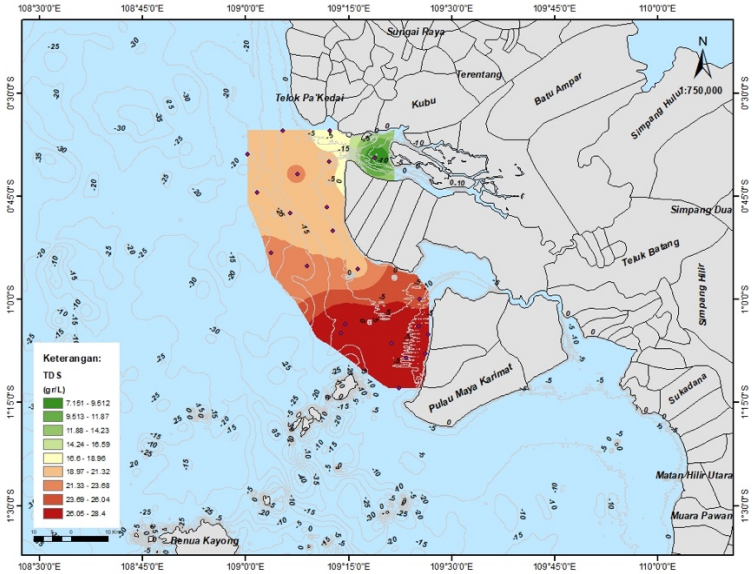

Figure 9. The TDS concentration (gr/L) in Padang Tikar and Dusun Besar areas, West Kalimantan

5. Involved persons

The personnel involved in this activity were divided into two teams; the first team studied the shrimp resource in the Kubu Raya Regency, and the second team studied the shrimp resource in the North Kayong Regency. Both teams surveyed the same water quality parameters in both locations.

The names of personnel involved in the water quality assessment of West Kalimantan waters are as follows:

- Mr. Mujiyanto, Researcher of Research Institute for Fish Resource Enhancement

- Mr. Sukamto, Technician of Research Institute for Fish Resource Enhancement
- Mr. Muhammad Rizky Pratama, Student of Tanjung Pura University
- Mr. Arip Rahman, Researcher of Research Institute for Fish Resource Enhancement
- Mr. Yusuf Nugraha, Technician of Research Institute for Fish Resource Enhancement
- Mr. Dedi Sumarno, Technician of Research Institute for Fish Resource Enhancement
- Mr. Reza Alnanda, Lecture of Pontianak Politehnic

6. Activity Documentation

The using of water quality checker to collect the data of water parameters from survey locations

The salinity concentration measurement using refractometer

The water brightness measurement using sechi disk