A Study of Water Quality and Biodiversity of Aquatic Organisms in the Wat Nam Phut Canal Area, Mueang District, Trang Province, Thailand

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Abstract

Research Title: A Study of Water Quality and Biodiversity of Aquatic Organisms in the Wat Nam Phut Canal Area, Mueang District, Trang Province, Thailand

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Abstract

The study of water quality and biodiversity in the canal behind Wat Nam Phut, Mueang District, Trang Province, Thailand, aimed to investigate the water quality of the canal and the biodiversity of living organisms found in the area. The water quality assessment included measurements of water transparency, pH, water temperature, dissolved oxygen, and cloud cover at three sampling sites. The results showed that water quality at all sites was similar and generally at a fairly good level. The average water transparency was 57.91 ± 0.33, the average pH was 6.0 ± 0.0, the average water temperature was 27.89 ± 0.38 °C, and the average dissolved oxygen was 6.3 ± 0.0 mg/L. The biodiversity study identified a total of seven species of organisms: *Euglena* sp., *Netrium disitus* (Brekissen ex Ralfs), *Tabellaria flocculosa*, *Philodina* sp., *Keratella* sp., *Staurastrum* sp. In addition, cloud cover observations revealed four types of clouds in the study area: Altocumulus with an average value of 35, Nimbostratus with an average value of 35, Stratocumulus with an average value of 70, and Cirrus with an average value of 17.5. Overall, the water quality met the standard criteria of the Surface Water Quality Index, classified as Type 2

Keywords: Water quality, phytoplankton, biodiversity, organisms

Introduction

Water resources are fundamental factors essential to the survival of living organisms and the sustainability of local ecosystems. Freshwater bodies, particularly natural canals, serve as habitats for a wide variety of organisms, especially phytoplankton, which are primary producers and form the base of the food chain in aquatic ecosystems. Changes in water quality parameters, such as pH, water transparency, and temperature, can directly affect the species composition and density of phytoplankton, as well as other organisms inhabiting these water bodies.

Wat Nam Phut Canal, located in Mueang District, Trang Province, is a freshwater canal receiving water from Khao Lak Waterfall. The canal has an average width of approximately 7.2 meters and serves as an important water resource for surrounding communities. It is used for various activities, including agriculture, crop cultivation, livestock farming, and the discharge of wastewater from human activities. These activities may have impacts on water quality and the ecological balance of the canal.

Therefore, this study aims to investigate water quality and the biodiversity of aquatic organisms in Wat Nam Phut Canal, Mueang District, Trang Province, Thailand. The results of this study are intended to provide baseline data for assessing the condition of the water body and to serve as a foundation for future conservation efforts and the mitigation or management of potential environmental problems.

Research Objectives

1. To study the water quality of Wat Nam Phut Canal.
2. To study the biodiversity of organisms in Wat Nam Phut Canal.

Scope of the Study

This study was conducted in Wat Nam Phut Canal, Mueang District, Trang Province. Field sampling was carried out to collect samples for analysis.

Research Questions

Does water quality affect the biodiversity of organisms

research hypothesis

Water quality influences the biodiversity of organisms.

Materials and Methods

1. Microscope
2. Sample bottle
3. pH paper
4. Transparency
5. Beaker
6. Plankton net
7. Microscope slides and cover slips
8. Thermometer
9. tube Dropper

Measurement Principles

Principles of GLOBE Measurement Methods

Water Quality Measurement Principles

Principles of Air Quality Measurement

Study Site Selection

This study investigated water quality and the biodiversity of organisms at three study sites along Wat Nam Phut Canal to evaluate water quality and assess biological diversity.

Research Methods

1) Research preparation stage

1) Identify the research issue and select the topic to be studied.
2) Review and collect relevant literature, knowledge, and theories related to the research.
3) Define the objectives of the study.
4) Determine the sampling points within the study area.

2) Research procedures and data collection

Part 1 Water Sampling and Measurement Based on GLOBE Protocols

1. Survey and determine water sampling locations in Khlong Wat Nam Phut, Mueang District, Trang Province. Three sampling points were established.
2. Measure water transparency by filling the transparency tube with water until the black-and-white pattern on the disk is no longer visible. Record the value, and repeat the measurement three times.
3. Measure pH by rinsing the container with the water sample twice, adding an appropriate amount of the sample, immersing pH paper into the water, comparing the color with the pH scale, and recording the result.
4. Measure water temperature using a thermometer at a depth of 10 centimeters. Wait for 5 minutes, then read and record the temperature
5. Measure dissolved oxygen (DO) by submerging the sample bottle underwater, filling it completely, and capping it while still underwater. Preserve the sample immediately and conduct the analysis within 2 hours. Perform the measurement in triplicate, then read and record the results.

Part 2 Plankton Sampling for Study

1) Collect water samples for the study of aquatic organisms using a plankton net and water sampling bottles. Observe the cloud cover conditions and record the results.
2) Identify and classify organisms by examining the samples under a microscope.

Analysis and Conclusions of the Study

1) Analyze the collected data and compare relationships using statistical methods. The parameters analyzed include water transparency, pH, temperature, and dissolved oxygen.
2) Create graphs to present and compare the mean values of the data.
3) Summarize the experimental results.

Research Findings

Table 1: Geographic Coordinates

Nature Study Trail	Geographic Coordinates	
	Latitude (N)	Longitude (E)
Khlong Wat Nam Phut	7.6976817	99.7008033

Based on Table 1 (Geographic Coordinates), the study was conducted in the area of Khlong Wat Nam Phut, Mueang District, Trang Province, at latitude 7.6976817 and longitude 99.7008033.

Table 2: Water Transparency in the Study Area

Area Where Found	Round 1	Round 2	Round 3	Mean
Area 1	57 cm	58 cm	58 cm	57.81±0.6 cm.
Area 2	58 cm	58 cm	59 cm	58.33±0.6 cm.
Area 3	57 cm	57 cm	59 cm	57.67±1.2 cm.

Based on Table 2, which presents the water transparency in the study area, the results showed that water transparency values across the different sites were relatively similar. Site 2 exhibited the highest mean water transparency at 57.81 ± 0.6 cm, followed by Site 1 with a mean value of 58.33 ± 0.6 cm, and Site 3 with a mean water transparency of 57.67 ± 1.2 cm, respectively.

FIGURE: MEAN WATER TRANSPARENCY IN KHLONG WAT NAM PHUT

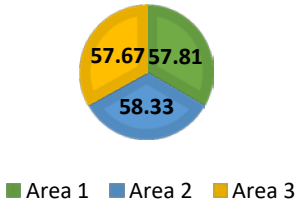


Table 3: pH Values in the Study Area

Area Where Found	Round 1	Round 2	Round 3	Mean
Area 1	6	6	6	6±0.0
Area 2	6	6	6	6±0.0
Area 3	6	6	6	6±0.0

Based on Table 3, which presents the pH values of water in the study area, the results indicated that the pH values at all sites were identical at 6.0 ± 0.0, indicating that the water was slightly acidic.

FIGURE: MEAN PH VALUES OF WATER IN KHLONG WAT NAM PHUT

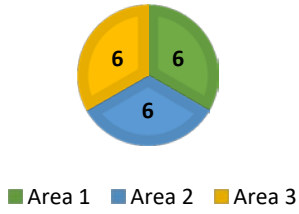


Table 4: Water Temperature in the Study Area

Area Where Found	Round 1	Round 2	Round 3	Mean
Area 1	28 °C	27 °C	28 °C	27.67±0.6 °C
Area 2	27 °C	28 °C	28 °C	27.67 ±0.6 °C
Area 3	29 °C	27 °C	29 °C	28.33 ±1.2 °C

Based on Table 4, which presents water temperature in the study area, the results showed that water temperatures at the different sites were relatively similar. Site 3 recorded the highest mean temperature at 28.33 ± 1.2 °C, followed by Site 1 and Site 2, which exhibited equal mean temperatures of 27.67 ± 0.6 °C, respectively.

FIGURE: MEAN WATER TEMPERATURE IN KHLONG WAT NAM PHUT

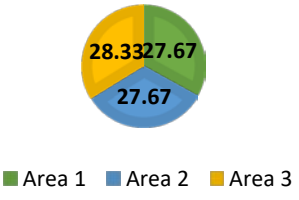


Table 5: Dissolved Oxygen (DO) Values in the Study Area

Area Where Found	Round 1	Round 2	Round 3	Mean
Area 1	6	7	6	6.3±0.0 mg/l
Area 2	6	6	7	6.3 ±0.0 mg/l
Area 3	6	7	6	6.3±0.0 mg/l

Based on Table 5, which presents dissolved oxygen levels in the study area, the results showed that dissolved oxygen concentrations at all three sites were similar. All sites exhibited the same mean dissolved oxygen value of 6.3 ± 0.0 mg/L.

FIGURE: MEAN DISSOLVED OXYGEN IN KHLONG WAT NAM PHUT

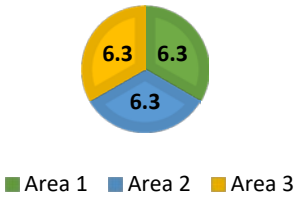
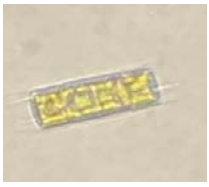


Table 6: Physical Water Quality Analysis

Water Quality	Area 1	Area 2	Area 3	Mean ± SD
Water Transparency	57.81	58.33	57.67	57.91±0.33 cm.
pH	6	6	6	6±0.0
Water Temperature	27.67	27.67	28.33	27.89±0.38 °C
Dissolved Oxygen	6.3	6.3	6.3	6.3±0.0 mg/l

Based on Table 6, which presents the physical water quality analysis, the results indicated that water in Khlong Wat Nam Phut had a mean transparency of 57.91 ± 0.33 cm, a mean pH of 6.0 ± 0.0, a mean temperature of 27.89 ± 0.38 °C, and a mean dissolved oxygen concentration of 6.3 ± 0.0 mg/L.

Table 7: Types of Organisms Identified

No	Representative Image	Scientific Name
1		*Euglena*
2		*Netrium disitus (Brekissen ex Ralfs)* Itzissehn & Rothe
3		*Tabellaria flocculosa*
4		*Philodina* sp.
5		*Keratella* sp.

Based on Table 7, which presents the types of organisms identified, a total of seven species were recorded. These included *Euglena, Netrium disitus (Brekissen ex Ralfs), Tabellaria flocculosa, Philodina sp., Keratella sp.*

Table 8: Cloud Cover

Cloud Type	Area 1			Area 2			Area 3			Mean
	Round 1	Round 2	Round 3	Round1	Round2	Round3	Round1	Round2	Round3	
Altocumulus					30%				40%	35
Nimbostratus		30%				40%				35
Stratocumulus	95%		40%					75%		70
Cirrus				20%			15%			17.5

Based on Table 8, which presents cloud cover, the results showed that four types of clouds were observed in the area behind Wat Nam Phut. These included *Altocumulus* with a mean cloud cover of 35%, *Nimbostratus* with a mean of 35%, *Stratocumulus* with a mean of 70%, and *Cirrus* with a mean of 17.5%.

Discussion of the Results

The study of water quality and biodiversity showed that the average water transparency at all three sampling sites ranged from approximately 57.67 to 58.33 centimeters, with very similar values. This indicates that the turbidity of the water in the studied areas did not differ significantly, due to the similar physical characteristics of the canal and the absence of major sources of sediment or waste entering the water body. The pH values at all sampling sites were identical, at 6.0 ± 0.0, which is classified as slightly acidic. This value remains within a range suitable for most freshwater organisms, indicating that the water had not reached strongly acidic or alkaline conditions. The measured water temperature ranged from 27.67 to 28.33 degrees Celsius, with Site 3 showing a slightly higher average temperature, possibly due to receiving more direct sunlight than the other sites. However, the water temperatures at all three sites were still considered similar. The dissolved oxygen levels were the same at all sites, with an average value of 6.3 ± 0.0 milligrams per liter, which is appropriate for the survival of freshwater organisms. This is consistent with the relatively uniform pH values and water temperatures across the study areas. In addition, cloud cover observations revealed the presence of several cloud types in the study area, including Altocumulus, Nimbostratus, Stratocumulus, and Cirrus. Stratocumulus clouds showed the highest average coverage, which may have reduced the amount of sunlight reaching the water surface. This likely contributed to preventing excessively high water temperatures and helped maintain water quality at an appropriate level.

Conclusion

The study of water quality in the canal behind Wat Nam Phut involved measuring water transparency, pH, water temperature, dissolved oxygen, and cloud cover at three sampling sites. The results showed that water quality at each site was similar and generally at a fairly good level. The average water transparency was 57.91 ± 0.33 cm, the average pH was 6.0 ± 0.0, the average water temperature was 27.89 ± 0.38 °C, and the average dissolved oxygen concentration was 6.3 ± 0.0 mg/L. The biodiversity survey identified a total of seven species of organisms: *Euglena* sp., *Netrium disitus* (Brekissen ex Ralfs), *Tabellaria flocculosa*, *Philodina* sp., *Keratella* sp., and *Staurastrum* sp. Cloud cover observations indicated that four types of clouds were present in the study area: Altocumulus with an average value of 35, Nimbostratus with an average value of 35, Stratocumulus with an average value of 70, and Cirrus with an average value of 17.5. Overall, the water quality met the standard criteria of the Surface Water Quality Index and was classified as Type 2.

References

Neonics Co., Ltd. (2023). *Water quality*. Retrieved December 15, 2025, from https://www.neonics.co.th/water-quality-testing/what-is-water-quality.html

TruePlookpanya Team. (2021). *Biodiversity*. Retrieved January 5, 2026, from https://www.trueplookpanya.com/learning/detail/34030

Badges

I Am a Collaborator

This research was conducted through collaborative scientific teamwork. The process involved joint planning, fieldwork, data collection, and data analysis. Collaboration among team members helped enhance data quality and strengthened teamwork skills. As a result, the research achieved a level of quality suitable for sharing and dissemination.

I Am a Problem Solver

Through the research process, including data collection and experimentation, the results obtained can be used as part of solutions to address water quality issues in the canal. Improving water quality supports the growth and survival of aquatic organisms and allows the water to be utilized effectively for agricultural purposes.

I Am a Data Scientist

This research involved collecting data on water transparency, pH, temperature, and dissolved oxygen. The collected data were used to calculate mean values presented in each table, and the results were subsequently analyzed to assess overall water quality.