

**A Comparative Study of Water Quality and the Correlation Between Physical and Chemical Characteristics of Lentic and Lotic Ecosystems Affecting Aquatic Organisms at Khao Lak Waterfall, Trang Province Nam Phut Subdistrict, Mueang District, Trang Province**



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# Introduction

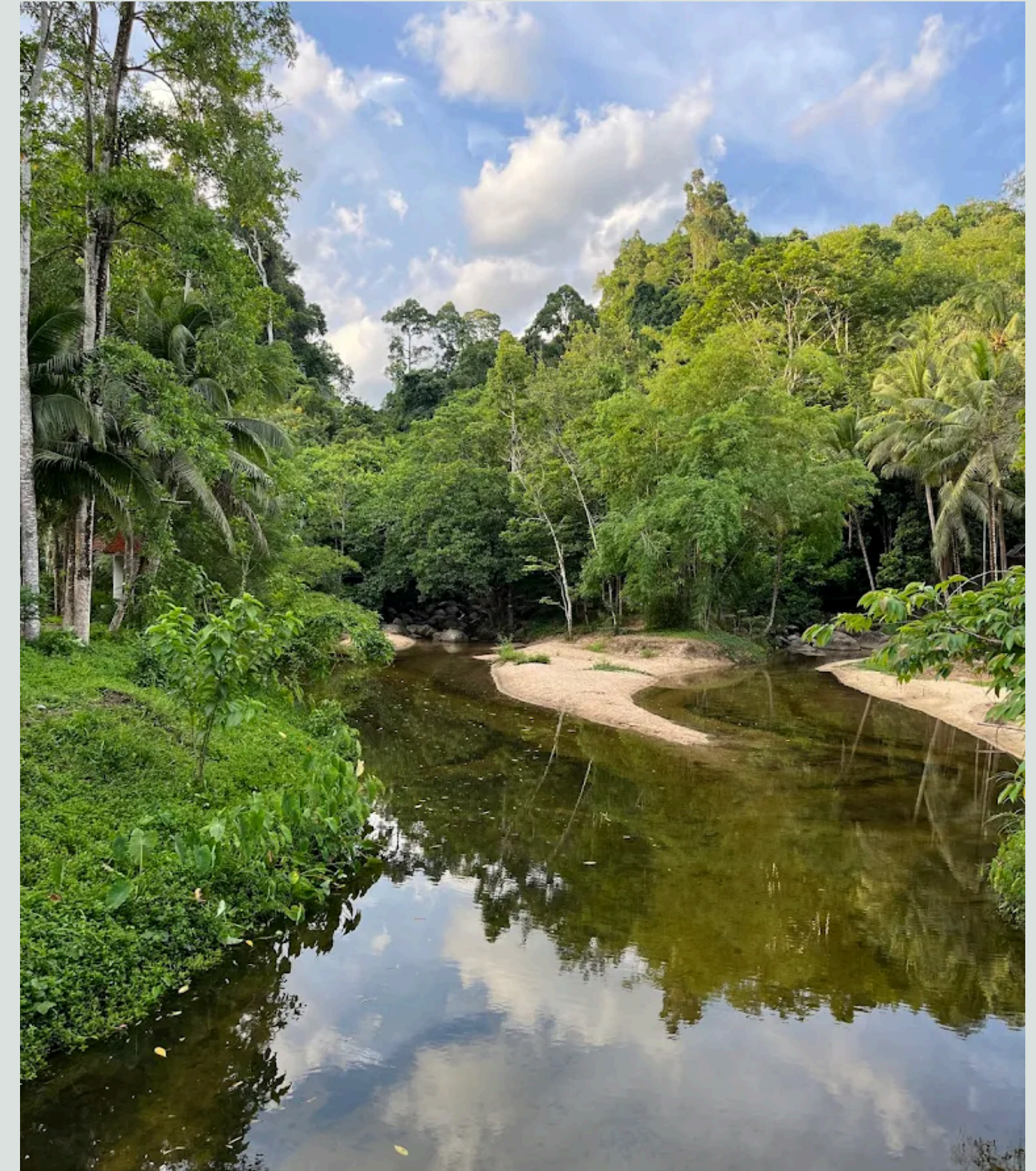


Water resources are fundamental to the survival of all living organisms. Variations in physical and chemical environmental factors, such as temperature and pH, are key determinants of the types and diversity of life in a given area.



# Introduction

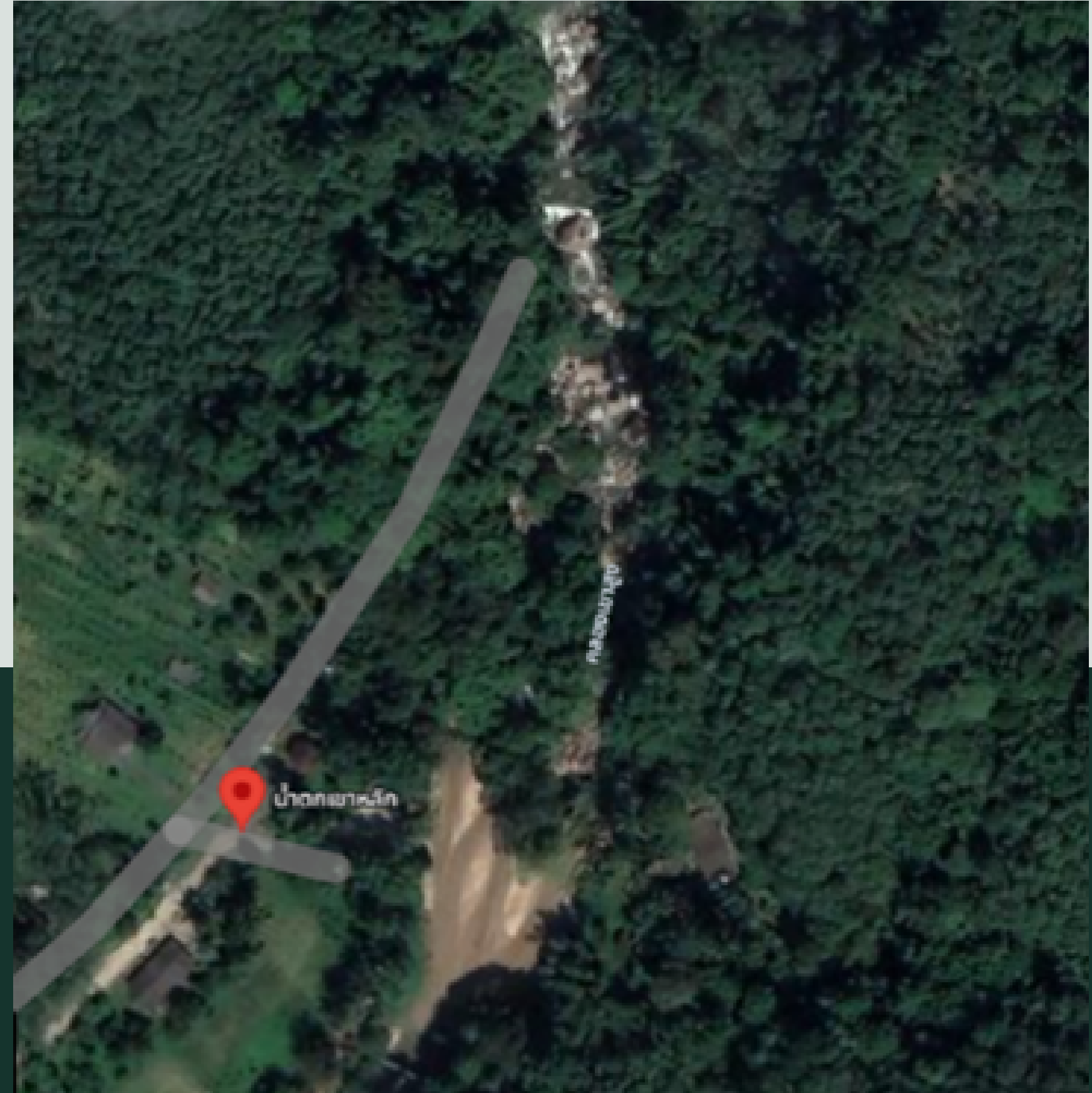
This research aims to comparatively analyze the ecological differences between lotic (flowing) and lentic (still) water systems at Khao Lak Waterfall, Trang Province. By evaluating water quality and surveying local biological diversity.





# Study Site

Khao Lak Waterfall Methodology, Nam Phut Subdistrict, Mueang District, Trang Province (Latitude 7.703630 N, Longitude 99.729242 E).





# Hypotheses

1. Lotic areas will exhibit higher water quality (lower temperature and neutral pH) than lentic areas due to better circulation and oxygenation.
2. Physical and chemical factors (temperature and pH) significantly influence the habitat selection of aquatic organisms



# Physical Water Quality Analysis

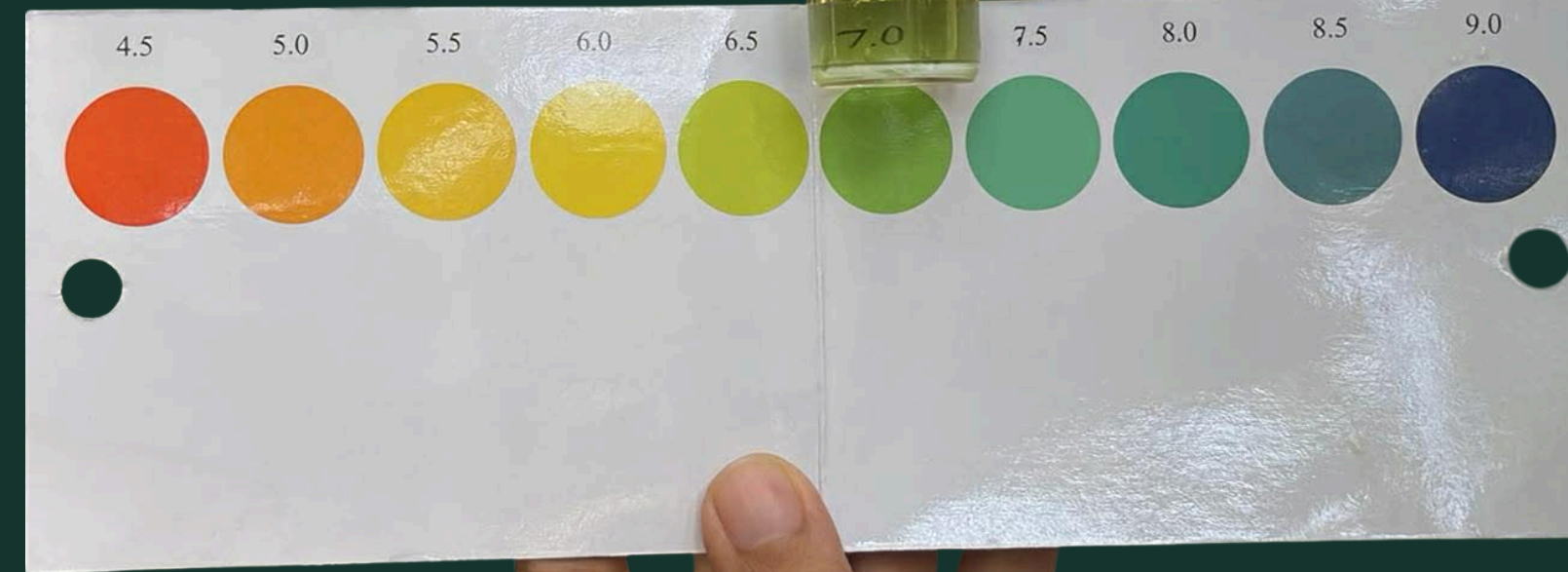
1. Temperature: Measured using a thermometer submerged 10–15 cm below the surface for 2-3 minutes
2. Transparency: Assessed through visual observation of substrate visibility and sediment characteristics.





# Analysis of Chemical Properties of Water

1. pH Level : Determined using a universal indicator test kit.





# Materials and Equipment

- |   |          |
|---|----------|
| 1. Aquatic hand-held dip net                        | (1 unit) |
| 2. Thermometer (0–100°C)                            | (1 unit) |
| 3. Vunique pH indicator test kit (pH range 4.5–9.0) | (1 set)  |
| 4. Specimen observation basin                       | (1 unit) |



# Research findings

**Table 1**

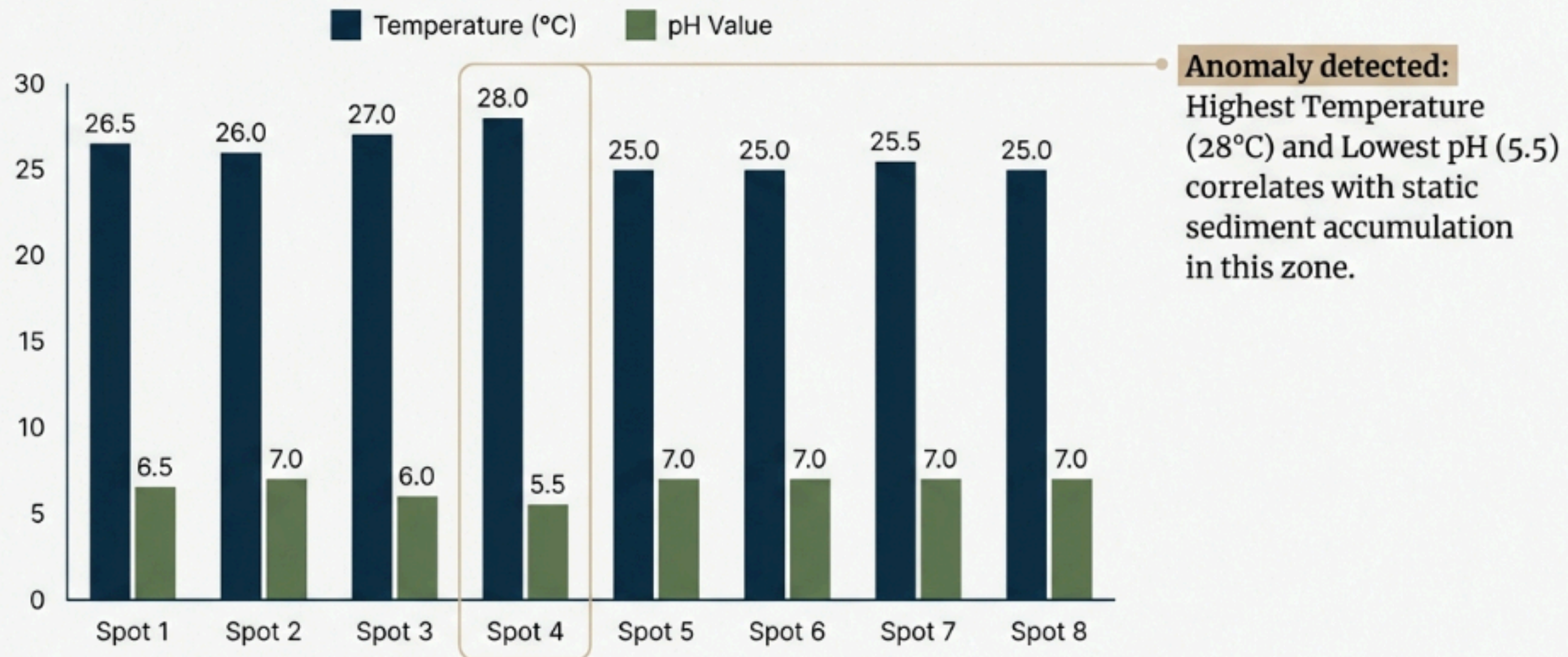
**Substrate composition transitions from muddy sediment in still zones to rocky clearings in flowing currents.**

	Spot #	Area Description	Temp (°C)	pH	Water Color	Transparency	Substrate Characteristics
<b>STILL WATER ZONE</b>	1	Mud / Submerged Wood	26.5	6.5	Clear	High	Rocks with slight algae
	2	Rocks / Sand	26.0	7.0	Clear	Medium	Rocks with slight algae
	3	Water bank / Cliff	27.0	6.0	Pale Yellow	Low	Sand / Mud / Algae
	4	Coarse Sand / Brown sediment	28.0	5.5	Pale Yellow	Medium	Sand / Lots of sediment
<b>FLOWING WATER ZONE</b>	5	Rocks / Gravel / Sand	25.0	7.0	Clear	High	Sand / Leaves
	6	Rocks / Sand	25.0	7.0	Clear	High	Sand / Rocks with slight algae
	7	Edge of bank	25.5	7.0	Clear	High	Coarse sand
	8	Upstream / Green rapids	25.0	7.0	Clear	High	Rocks / Gravel / Sand



# Chart 1: Graph showing a comparison of the physical and chemical characteristics of water at each point in the Khao Lak Waterfall area, Nam Phut Subdistrict, Mueang District, Trang Province

**Physical parameters remain stable, though acidity spikes in sediment-heavy zones.**



**Table 2**

# Comparative Data Summary

Study Factor	Still Water Zone (Lentic)	Flowing Water Zone (Lotic)
<b>1. Physical Characteristics</b>		
Average Temperature	27°C	25°C
Water Color	Clear, Pale Yellow	Clear, Colorless
Transparency	Moderate (Sediment visible)	High (Rock bottom visible)
<b>2. Chemical Characteristics</b>		
pH Value	6.3 (Weak Acid)	7.0 (Neutral)
<b>3. Substrate Characteristics</b>		
Soil & Sediment	Sandy Soil	Coarse Sandstone & Gravel
Other Components	Sediment & Decaying Leaves	Algae



**Table 3**

## Detailed Distribution of Species Across Survey Spots

Species Name	Still Zone				Flowing Zone				Specific Behavior
	Spot 1	Spot 2	Spot 3	Spot 4	Spot 5	Spot 6	Spot 7	Spot 8	
Mayfly Larvae							●		Clinging to rocks
Sumatran Barb						●			Swimming in schools
Ricefish		●				●			Clear water areas
Shrimp							●		Rock crevices / Aquatic plants
Water Scorpion			●						Still water areas
Pond Snail				●					On muddy ground
Freshwater Limpet						●			Attached tightly to objects
Snakehead Fish	●								Buried in mud/soil
Water Strider		●			●	●			Surface of flowing water
Frog Eggs			●						Surface of still water

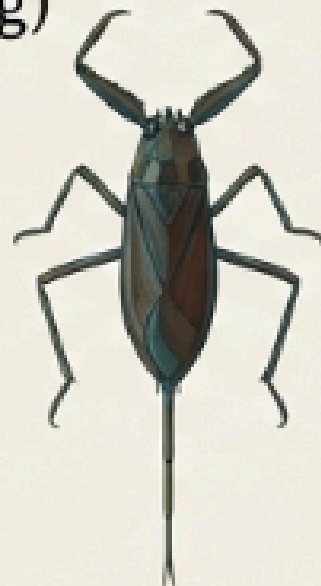


# Biological adaptation follows hydrological conditions.

## STILL WATER AREA

**Observed Behavior:** Clinging to submerged wood debris or inhabiting muddy substrates in calm, stagnant water.

- Water Scorpion (Muan Maeng Pong)
- Ricefish
- Pond Snail
- Snakehead Fish
- Frog Eggs
- Water Strider



## FLOWING WATER AREA

**Observed Behavior:** Distributed in currents, swimming against flow, or adhering tightly to rocks.

- Water Strider
- Mayfly Larvae
- Shrimp
- Sumatran Barb
- Ricefish
- Freshwater Limpet (Shield Snail)





# Discussion

The study demonstrates that water quality in running water (lotic) zones is significantly superior to that in still water (lentic) zones. Lotic zones are characterized by a lower average temperature (25 °C) and a neutral pH (7.0). The constant movement of the water current enhances heat exchange and increases dissolved oxygen levels, creating an ideal habitat for pollution-sensitive species such as mayfly larvae and tiger barbs



# Discussion

In contrast, still water zones exhibit a higher average temperature (27 °C) and slight acidity (pH 6.3). Consequently, these areas are inhabited only by species adapted to low-oxygen environments, such as river snails and water scorpions. In conclusion, the physicochemical characteristics of the water source are the primary factors determining biological diversity in the Khao Lak Waterfall area.



# Lentic Areas



**Snakehead fish**



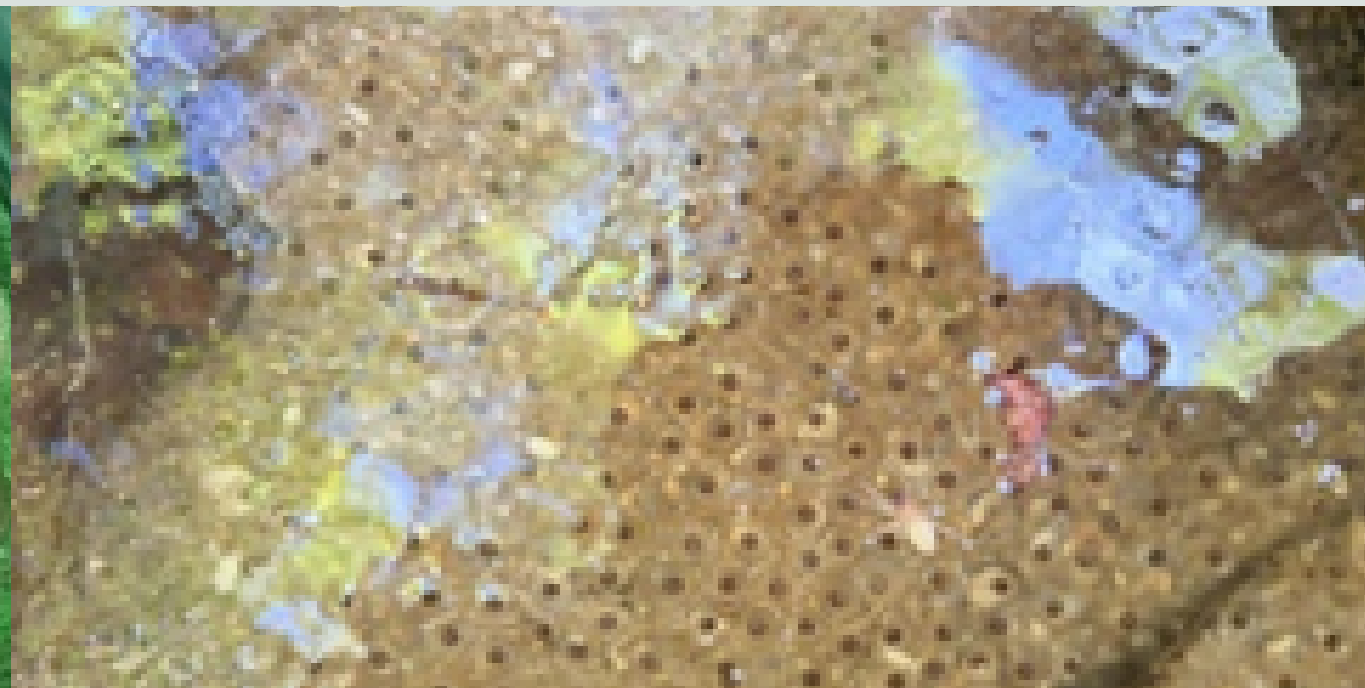
**Water Scorpion**



**Ricefish**



**Freshwater Snail**



**Frog eggs**



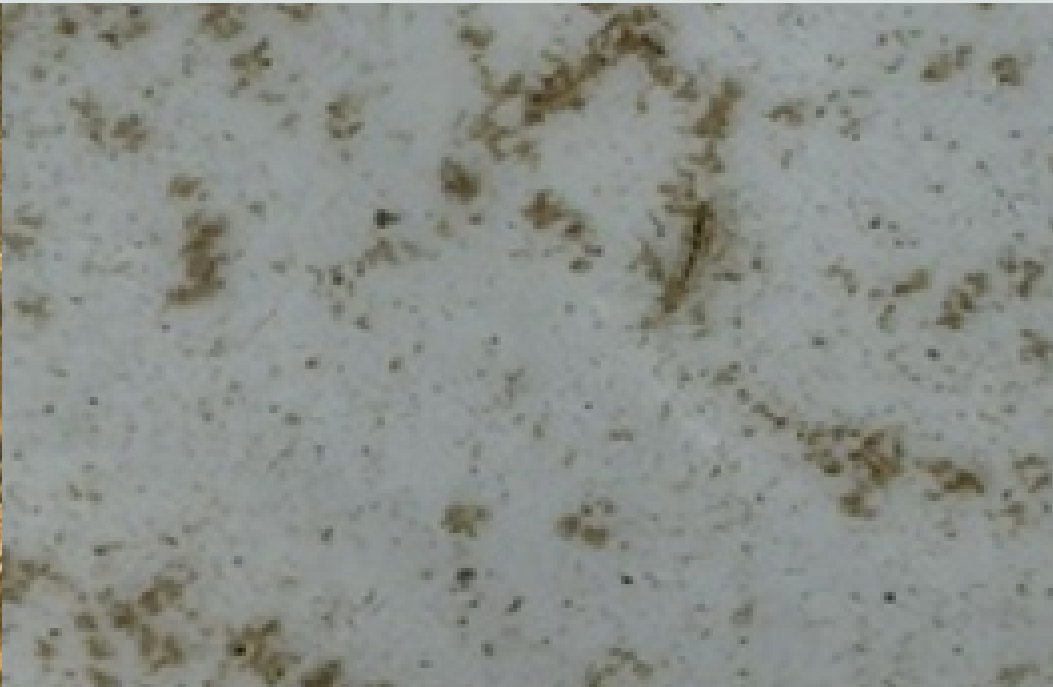
**Water strider**



# Lotic Areas



**Water Strider**



**Swimming Mayfly Nymph**



**Freshwater Shrimp**



**Ricefish**



**Freshwater Limpet**



**Partridge Barb**



# GLOBE DATA ENTRY

## Water Temperature

<b>Measured Date:</b>	2025-12-21
<b>Organization Name:</b>	Sawat Rattanaipimuk
<b>Site ID:</b>	409091
<b>Site Name:</b>	Khao Lak Waterfall Trang
<b>Country Name:</b>	Thailand
<b>Country Code:</b>	THA
<b>Latitude:</b>	7.70363
<b>Longitude:</b>	99.72924
<b>Elevation:</b>	161.5m
<b>Measured At:</b>	2025-12-21T05:05:00
<b>Water Temperature:</b>	26 °C
<b>Water Body State:</b>	normal
<b>Temperature Method:</b>	alcohol-filled thermometer

 [Show on Map](#)

## pH

<b>Measured Date:</b>	2025-12-21
<b>Organization Name:</b>	Sawat Rattanaipimuk
<b>Site ID:</b>	409091
<b>Site Name:</b>	Khao Lak Waterfall Trang
<b>Country Name:</b>	Thailand
<b>Country Code:</b>	THA
<b>Latitude:</b>	7.70363
<b>Longitude:</b>	99.72924
<b>Elevation:</b>	161.5m
<b>Measured At:</b>	2025-12-21T05:05:00
<b>Water Body pH:</b>	7 pH units
<b>Water Body State:</b>	normal
<b>pH Method:</b>	paper
<b>pH Buffer 7:</b>	true

 [Show on Map](#)

**Thank You**