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Paramaribo – Suriname

Water quality technical report for surface water resources in Suriname

May - September 2023

Hydraulic Research Division

GCCA+
THE GLOBAL CLIMATE CHANGE ALLIANCE PLUS INITIATIVE

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Document: Water quality technical report for surface water resources in Suriname – first report

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Abbreviations

WLA	Hydraulic Research Division
UNDP	United Nations Development Program
GCCA	Global Climate Change Alliance
ILACO	International Land Development Consultants
Temp	Temperature
Cond	Conductivity
Sal	Salinity
Turb	Turbidity
TDS	Total Dissolved Solids
DO	Dissolved Oxygen

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Executive Summary

Overview
This report presents a comprehensive evaluation of water quality in Suriname from May to September 2023, focusing on surface water sources. The study assessed water quality in several districts, including Nickerie, Coronie, Saramacca, Commewijne, and Marowijne, analyzing key parameters such as pH, temperature, dissolved oxygen (DO), total dissolved solids (TDS), turbidity, conductivity, and salinity.

Key Findings

- **Water Quality Analysis**: The assessments revealed significant seasonal fluctuations in water quality. Despite these variations, the overall water quality remains generally acceptable for various purposes, including sustaining aquatic life and supporting recreational activities.
- **Data Limitations**: The absence of established water quality standards for surface water in Suriname was noted as a critical limitation. Current assessments rely on on-site measured parameters due to the lack of a chemical laboratory for comprehensive testing.

Conclusions
The collected data provide a better understanding of the current state of water quality in Suriname, serving as a basis for improving water management and supporting evidence-based decision-making regarding surface water. Continuous monitoring and adaptable management plans are essential to address changes in water quality effectively.

Recommendations

1. **Strengthening Capacity and Expertise**: Invest in training and capacity building within the Hydraulic Service to enhance monitoring, data analysis, and policy formulation capabilities.
2. **Development of Local Solutions**: Encourage research and implementation of local solutions tailored to the specific geographical and ecological characteristics of Suriname.
3. **Public Participation and Awareness**: Actively involve local communities in water resource management and raise awareness about the importance of clean water and sustainable water use.
4. **Collaboration with International Partners**: Work with international organizations and neighboring countries to share expertise, resources, and best practices for managing shared water resources and addressing transboundary water pollution.

This report highlights the importance of continuous efforts to monitor, protect, and improve water quality in Suriname's surface water sources to ensure their sustainability for future generations.

Foreword

We are excited to present this comprehensive report on water quality in Suriname, with a special focus on our surface water sources. This document is the result of extensive collaboration among various stakeholders, and we are proud to share its findings and recommendations with you.

Our sincere gratitude goes to the Global Climate Change Alliance (GCCA+) phase 2 project, funded by the European Union (EU) and United Nations Development Programme (UNDP) Suriname for their continuous (financial and technical) support and cooperation in our efforts to improve water quality in our country.

We especially wish to acknowledge Dr. Jonathan Cox for his invaluable training, which has significantly enhanced our understanding of water quality analysis. Furthermore, we extend our thanks to the Water Forum Suriname for their dedication over six months (in 2022) of collaboration in collecting and analyzing water quality data in Coronie and Nickerie.

Thank you for your interest in this report. We hope that the findings and recommendations herein will contribute to a deeper understanding and improvement of water quality in Suriname.

1. Introduction

The Hydraulic Research Division (WLA) plays an essential role in managing the hydrological and water quality data of our surface water sources. WLA falls under the Research and Services Directorate of the Ministry of Public Works. The department consists of three main sections: Scientific Research, Basic Measurement & Logistics, and Administration. Scientific Research is mainly responsible for processing, storing, and analyzing the collected measurement data and its publication, as well as conducting scientific research. Basic Monitoring Network and Logistics is mainly responsible for the preparation and implementation of fieldwork, data collection and processing, and the service's logistics facilities.

The stakeholders of the Hydraulic Research Division (WLA) are:

- Water Forum Suriname (WFS)
- Anton de Kom University (A.D.E.K.)
- Agricultural Research Suriname (Celos)
- Ministry of Health (Central Laboratory)
- Ministry of Agriculture, Livestock, and Fisheries (L.V.V.)

This report presents the findings of a comprehensive evaluation of water quality in Suriname, with a specific focus on surface water sources. In the course of this evaluation, water quality assessments were conducted between May and September 2023 in various districts, including Nickerie, Coronie, Saramacca, Commewijne, and Marowijne. The primary objective of these assessments was to analyze the current water quality of the main rivers in our country, identify potential sources of pollution, and determine the suitability of water sources for various purposes. Additionally, it is important to note that this report builds upon a previous pilot project conducted in collaboration with ILACO/Water Forum Suriname. This pilot project, carried out between July and December 2022, involved monitoring the water quality network in the Coronie and Nickerie districts.

A standardized procedure was employed to monitor water quality, utilizing the advanced instrument Hydrolab 7. Careful measurements determined crucial parameters such as pH, temperature, dissolved oxygen (DO), total dissolved solids (TDS), turbidity, conductivity, and salinity. These data are invaluable for understanding the dynamics of our water sources and for developing appropriate strategies for water management and preservation. The following chapters of this report will delve deeper into the measurements and findings regarding specific rivers, including the Corantijn, Nickerie, Coppename, Suriname, Commewijne, and Marowijne. With this report, we aim to provide better insight into the water quality of Suriname and contribute to measures to protect and preserve our water sources.

Findings: This report offers a comprehensive analysis of water quality in Suriname, with specific attention to surface water sources.

Conclusions: The presented data and analyses contribute to a better understanding of the current state of water quality in Suriname in the corresponding reporting period and can serve as a basis for further measures to improve water management and support evidence-based decision making with regards to surface water in Suriname.

1.1 Limitations

There are no established water quality standards for surface water that have been laid down in policy. Water quality standards are crucial for ensuring the cleanliness and safety of our surface water. They are part of national policies for environmental protection and public health and should be practical and specific, tailored to local conditions and water bodies. The aim is to protect both public health and the ecosystem by preventing pollution, such as wastewater or toxic discharges.

To effectively assess water quality, we need data on various parameters, including physical-chemical, bacteriological, and toxicological characteristics. While laboratory tests are currently limited, the available water quality data are collected based on on-site measured parameters such as pH, temperature, dissolved oxygen (DO), total dissolved solids (TDS), turbidity, conductivity, and salinity.

Currently, WLA isn't able to conduct laboratory tests due to the absence of a chemical laboratory. The proposed water quality standards in this document are a first step and should be revised and expanded in the future as more data become available.

2. Proposed International Water Quality Guidelines

Global standards for water quality

Water quality standards are established guidelines that define the desired condition of water bodies such as rivers, lakes, or coastal areas. These standards encompass various parameters to evaluate water suitability for different purposes, forming the foundation for water management and regulatory frameworks. Water quality standards primarily aim to uphold surface water quality, safeguard public health, preserve the environment, and facilitate diverse water uses like drinking, recreation, and industry.

The recommended water quality standards given by Water Forum Suriname in their report "1.2 WFS-Technical Report #2_Proposed WQ standards" for different water bodies include:

1. Standards for freshwater, including recreational use.
2. Standards for irrigation water intended for agricultural use.

The water quality standards of two international organizations, the United States Environmental Protection Agency (US EPA) and the Food and Agriculture Organization (FAO), are selected for further application. USEPA standards describe guidelines for human health, water consumption, and organism health, while FAO standards describe guidelines for water use in agriculture.

Table 1: *Gives an overview of the proposed international standards for the selected physical parameters.*

Parameters	Irrigation water, agriculture (FAO)	Freshwater (US EPA)
Temperature	-	-
Conductivity	<3000 uS/cm	0 – 1500 uS/cm
Turbidity	-	-
Salinity	-	-
Total Dissolved Solids	<2000 mg/L	<500 mg/L
Dissolved Oxygen	-	> 6 mg/L
pH	6.0 - 8.5	5.0 – 9.0

The measured values in this report are compared to the international standards of the US EPA and FAO to determine if the collected data falls within the predefined ranges for agricultural and recreational usage.

3. The Corantijn River

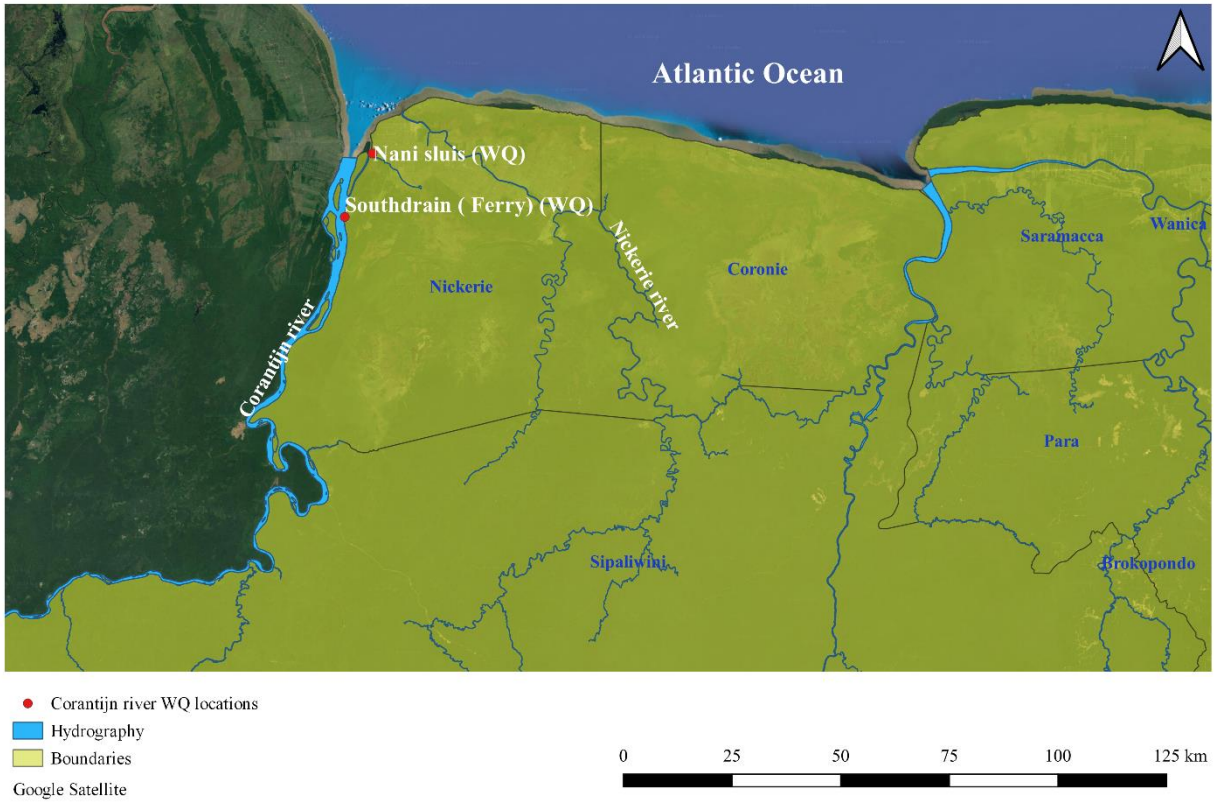


Figure 1: Water quality locations along the Corantijn River

The Corantijn River is located in northern South America and forms the border between Guyana and Suriname. It acts as a vital lifeline for the surrounding communities. In addition to facilitating the regular ferry service between Moleson Creek and South Drain, this river is also utilized for fishing activities and daily tasks of the local population, such as bathing, washing, and cultural events.

The river originates from two headstreams, with the Boven-Corantijn or Nieuw River with its source in the Acarai Mountains in the west near the border with Brazil. The river basin covers an area of approximately 67,600 km^2. In Wakay, on the right bank of the river, a pumping station is established to

provide fresh irrigation water to rice fields, especially during dry seasons. However, the use of river water may lead to increased intrusion of saltwater, posing a concern for water quality and agriculture.

Upstream in the river, towards the inland areas of Suriname, the flow generally slows down as the river moves further inland and widens. Conversely, downstream towards the river's mouth in the Atlantic Ocean, the flow can be stronger, especially during high tide. The width and depth of the river varies depending on tides and rainfall, making it a significant waterway for navigation and transportation. This river supports a diverse ecosystem and is of great importance to both local communities and biodiversity in the district, with its management and preservation being crucial for sustainable development.

Table 2: In Nickerie district: overview of locations along the Corantijn River and their use of river water, including coordinates

River	Location	Water use	Coordinates
Corantijn	Nani sluice	- Transportation - Agriculture activities (irrigation)	5°52'55.3"N 57°04'39.5"W
	Ferry Canawaima (Southdrain)		05°51'29.53" N 056°51'05.90" W

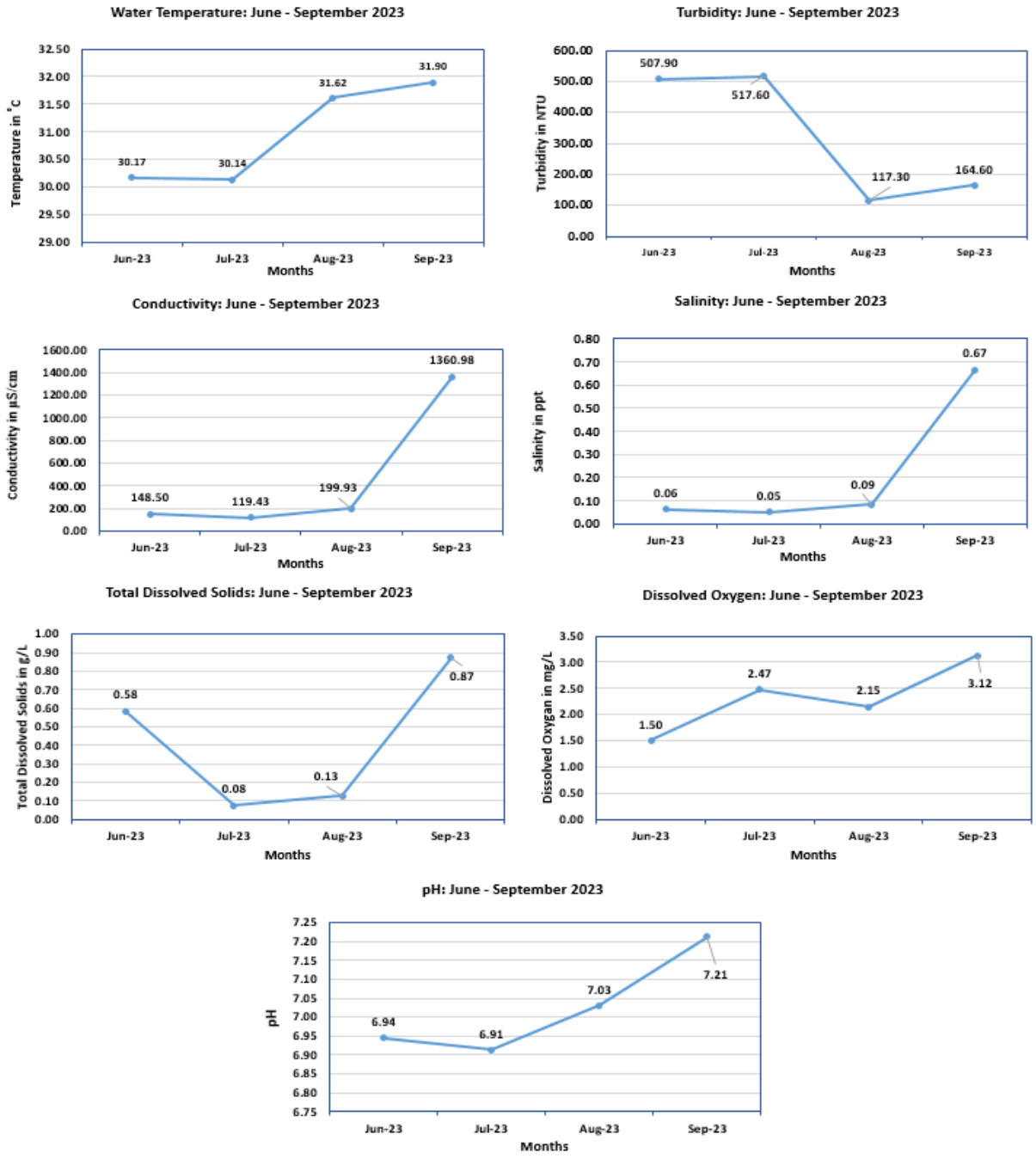


Figure 2: Graphical representation of water quality parameters at Nani sluice

Notes figure 2:

- June and July fall within the rainy season, August and September fall within the dry season.
- **Temperature:** Gradual increase due to seasonal changes and agricultural practices.
- **Turbidity:** Decrease during the rainy season due to higher precipitation, leading to increased sediment runoff. Conversely, drier months exhibit lower turbidity.
- **Conductivity:** Gradual increase due to natural processes like soil erosion and transition from rainy to dry season.
- **Salinity:** Increase due to reduced precipitation, higher evaporation, and agricultural practices.
- **Total Dissolved Solids (TDS):** Fluctuations due to seasonal changes and human activities, such as agricultural practices.
- **Dissolved Oxygen (DO):** Varies with influencing factors such as seasonality, water movement, and human activities like agriculture and industry.
- **pH:** Increasing trend due to reduced acid precipitation, increased alkalinity and possible reduction of organic contamination.

Table 3: Water Quality Measurements and Standards Comparison for Nani sluice

Water quality standards	Date	Time (H)	Weather	Depth	Temp (°C)	Turb (NTU)	Cond (µS/ cm)	Sal (ppt)	TDS (g/L)	DO (Mg/L)	pH
	Jun-23	9:17	Sunny	0.90	30.17	507.90	148.50	0.06	0.58	1.50	6.94
	Jul-23	17:45	Cloudy	0.81	30.14	517.60	119.43	0.05	0.08	2.47	6.91
	Aug-23	13:30	Sunny	0.89	31.62	117.30	199.93	0.09	0.13	2.15	7.03
	Sep-23	14:00	Sunny	0.88	31.90	164.60	1360.98	0.67	0.87	3.12	7.21
Freshwater (US EPA)	-	-	-	-	-	-	0 - 1500	-	<500	> 6.00	5.00 - 9.00
Irrigation water (FAO)	-	-	-	-	-	-	0 - 3000	-	0 - 2000		6.00 - 8.50

Notes table 3:

- The measured parameters fall within the required water quality standards for freshwater and irrigation water usage, except for the DO levels.

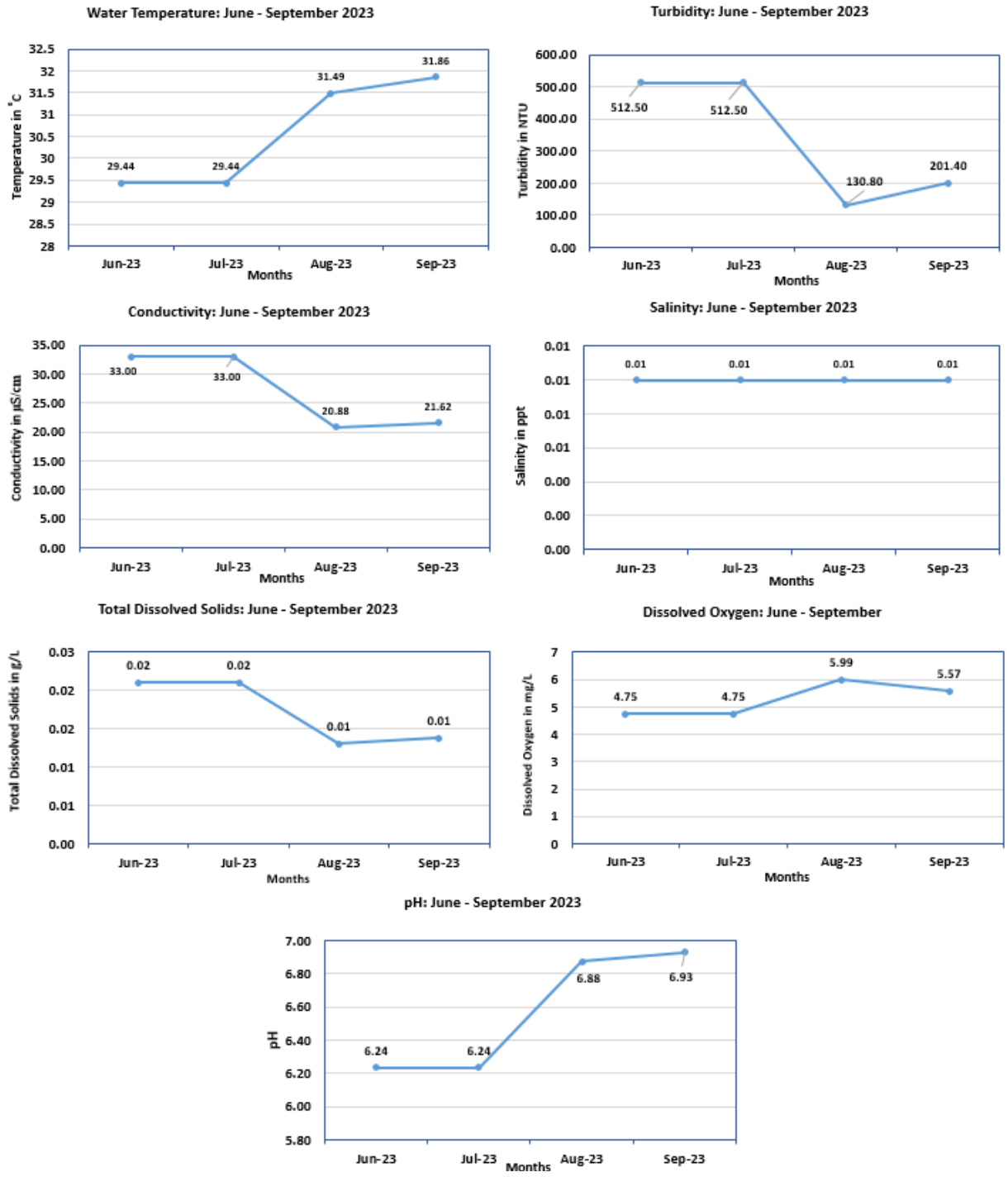


Figure 3: Graphical representation of water quality parameters at Ferry Canawaima (Southdrain)

Notes figure 3:

- June and July fall within the rainy season, August and September fall within the dry season.
- **Temperature**: Exhibits a gradual increase, influenced by seasonal changes and agricultural practices.
- **Turbidity:** Declines notably from June to September due to increased rainfall causing sediment runoff.
- **Conductivity:** Fluctuates due to seasonal weather changes and human activities like agriculture and wastewater runoff.
- **Salinity:** remains constant, indicating a stable freshwater environment.
- **Total Dissolved Solids (TDS):** Values fluctuate without a clear pattern, influenced by seasonal changes and human activities.
- **Oxygen:** Shows a gradual increase, affected by seasonal variations and water temperature changes.
- **pH**: Gradually rises over time, potentially due to seasonal transitions and decreased acidity from rainfall washing contaminants.

Table 4: Water Quality Measurements and Standards Comparison for Canawaima Ferry (Southdrain)

Water quality standards	Date	Time (H)	Weather	Depth	Temp (°C)	Turb (NTU)	Cond (µS/ cm)	Sal (ppt)	TDS (g/L)	DO (Mg/L)	pH
	Jun-23	12:00	Sunny	0.35	29.44	512.50	33.00	0.01	0.02	4.75	6.24
	Jul-23	16:20	Rainy	1.43	29.44	512.50	33.00	0.01	0.02	4.75	6.24
	Aug-23	12:00	Sunny	1.29	31.49	130.80	20.88	0.01	0.01	5.99	6.88
	Sep-23	12:30	Sunny	1.32	31.86	201.40	21.62	0.01	0.01	5.57	6.93
Freshwater (US EPA)	-	-	-	-	-	-	0 - 1500	-	<500	> 6.00	5.00 - 9.00
Irrigation water (FAO)	-	-	-	-	-	-	0 - 3000	-	0 - 2000	-	6.00 - 8.50

Notes table 4: The measured parameters fall within the required water quality standards for freshwater and irrigation water usage, except for the DO levels.

4. The Nickerie River

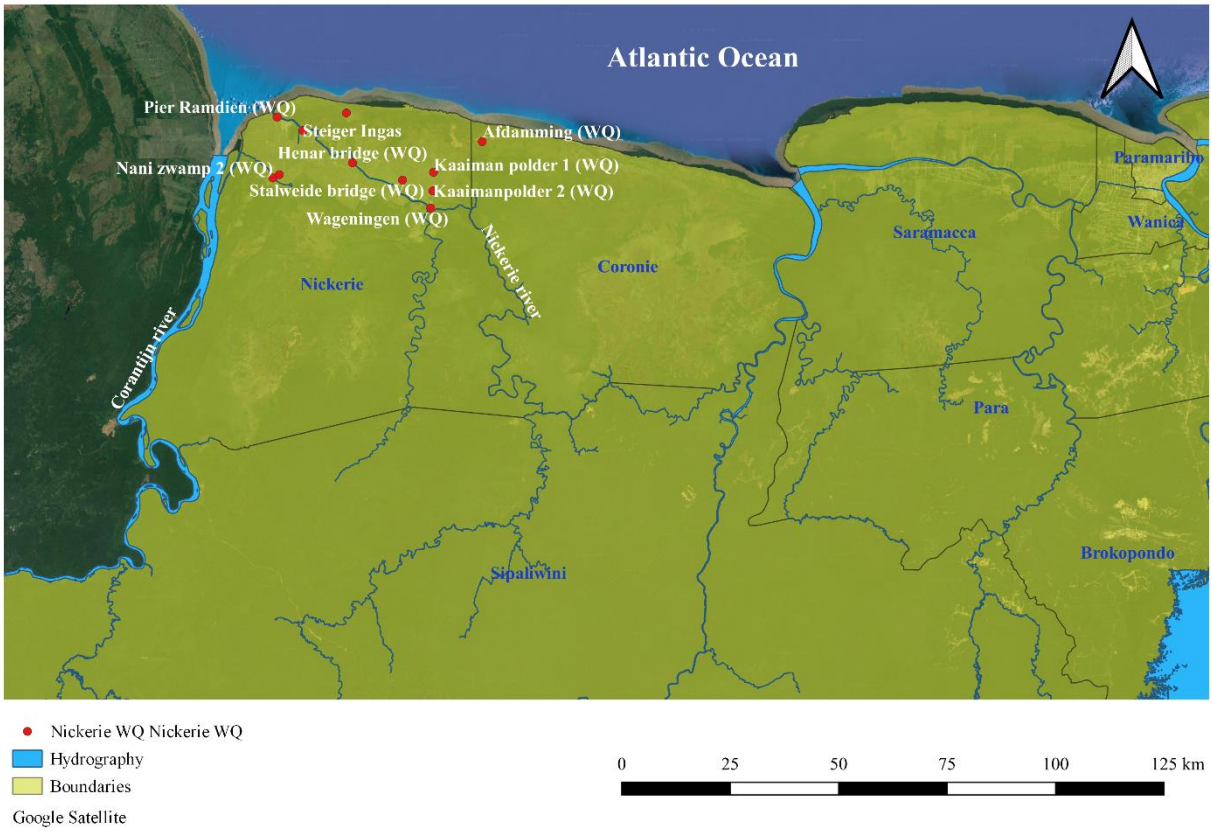


Figure 4: Water quality locations in district Nickerie

The Nickerie River, located in the northwest of Suriname, is crucial for various activities, including irrigation and drainage of rice paddies and other agricultural areas. Local communities also rely on the river for daily needs such as bathing, washing clothes and dishes, transportation, cultural activities, and fishing.

Originating from the Bakhuis Mountains, the river primarily flows northward, serving an area of approximately 10,100 km². The watershed can be divided into three parts: the lower part with rice paddies and settlements, the middle part with marshy areas, and the upper part outside the tidal zone. The width of the Nickerie River varies from about 50 meters to 150 meters at the mouth, with an average depth of around 20 meters.
This river supports rice cultivation, with farmers using water from the river for irrigation. Riverboats are used for transporting rice and other goods, while the port of Nieuw-Nickerie serves as a major export

point. In addition to economic activities, the Nickerie River offers opportunities for recreation and tourism, such as boat trips and birdwatching along the banks.

The water level is influenced by tidal movements from the Atlantic Ocean, with saltwater able to penetrate far inland during the dry season, affecting the ecosystem. Preserving the water quality and ecosystem of the Nickerie River is essential due to its economic and ecological value. Measures for careful management and sustainable development are needed to mitigate pollution and excessive use.

Table 5: In Nickerie district: overview of locations along the Nickerie River and their use of river water, including coordinates

River	Location	Water use	Coordinates
Nickerie	Nani swamp	- Agriculture activities (irrigation) - Recreation (swimming) - Fishery	05°50'01.94" N 057°00'13.41" W
	Stalweide bridge	- Agriculture activities (irrigation) - Fishery	05°45'23.84" N 056°41'10.71"W
	Kaaimanpolder bridge	- Fishery	5°50'18.0"N 56°40'55.3"W
	Bigi pan	- Tourism & recreation - Fishery	5°57'43.0"N 56°51'48.5"W
	Ramdien pier	- Fishery	5°57'12.4"N 57°00'28.0"W
	Scaffold Ingas	- Fishery	5°55'31.7"N 56°57'14.0"W
	Henar bridge	- Navigation - Transportation - Fishery	5°51'28.5"N 56°51'02.4"W
	Wageningen	- Livelihood (washing of clothes and dishes etc.) - Agriculture activities - Fishery	05°45'43.87" N 056°41'12.00" W
	Afdamming	- Fishery - Hunting	05°54'07.75" N 056°34'49.58" W

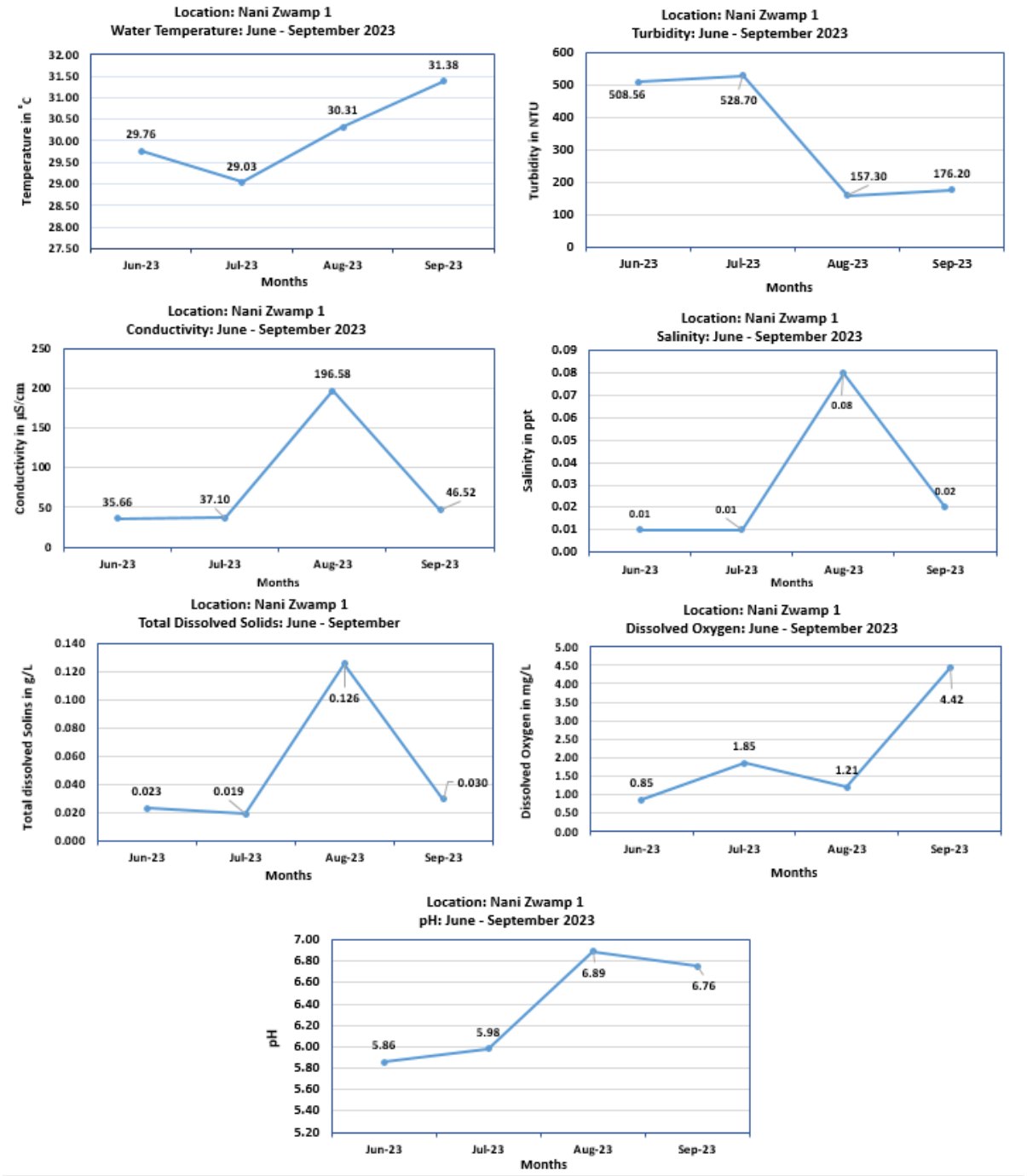


Figure 5: Graphical representation of water quality parameters at Nani swamp Bridge 1

Notes figure 5:

- June and July fall within the rainy season, August and September fall within the dry season.
- **Temperature:** Gradual increase from June to September, typical for transitioning from rainy to dry season.
- **Turbidity:** Decrease from June to September due to reduced sediment during drier months.
- **Conductivity:** Fluctuates due to seasonal changes, rainfall, and human activities affecting organic matter input.
- **Salinity:** Fluctuates with weather; August may see spikes due to increased evaporation and variability, while September's stability and occasional rainfall can normalize salinity.
- **Total Dissolved Solids (TDS):** Peaks in August due to dry season conditions and possible human activities introducing solutes.
- **Oxygen:** Fluctuations influenced by aquatic plant photosynthesis, water movement, temperature, and biological activity.
- **pH:** Gradual increase towards neutrality, possibly due to biological processes, decrease in acid rain, and human influences like chemical discharges.

Table 6: Water Quality Measurements and Standards Comparison for Nani swamp bridge 1

Water quality standards	Date	Time (H)	Weather	Depth	Temp (°C)	Turb (NTU)	Cond (µS/ cm)	Sal (ppt)	TDS (g/L)	DO (Mg/L)	pH
	Jun-23	17:30	Rainy	1.75	29.76	508.56	35.66	0.01	0.02	0.85	5.86
	Jul-23	13:56	Rainy	1.07	29.03	528.70	37.10	0.01	0.02	1.85	5.98
	Aug-23	9:30	Sunny/cloudy	1.76	30.31	157.30	196.58	0.08	0.13	1.21	6.89
	Sep-23	10:01	Sunny	1.62	31.38	176.20	46.52	0.02	0.03	4.42	6.76
Freshwater (US EPA)	-	-	-	-	-	-	0 - 1500	-	<500	> 6.00	5.00 - 9.00
Irrigation water (FAO)	-	-	-	-	-	-	0 - 3000	-	0 - 2000	-	6.00 - 8.50

Notes table 6:

- The measured DO levels do not meet the required standards for freshwater and irrigation water usage.
- The pH levels measured in June and July meet the required standard for freshwater usage but not for irrigation water usage.

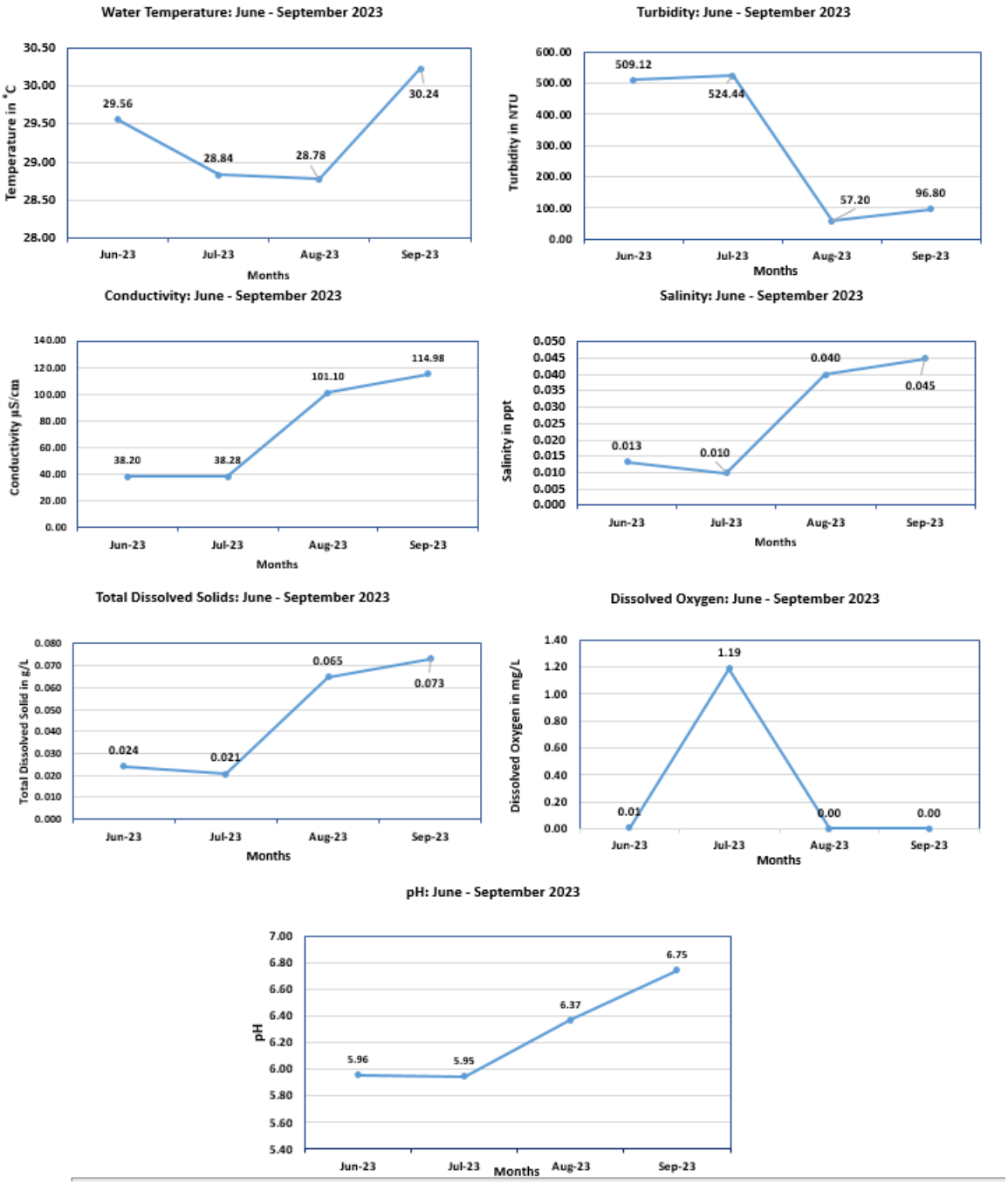


Figure 6: Graphical representation of water quality parameters at Nani swamp bridge 2

Notes figure 6:

- June and July fall within the rainy season, August and September fall within the dry season.
- **Temperature:** Fluctuations are observed due to the transition from wet to dry seasons.
- **Turbidity:** Decreases from June to September correlate with reduced rainfall.
- **Conductivity**: Gradual increase attributed to natural processes like soil minerals, seasonal precipitation changes, erosion, and sedimentation.
- **Salinity:** Increase possibly due to reduced precipitation, higher evaporation, and agricultural practices.
- **Total Dissolved Solids (TDS):** Variation over months linked to natural factors like evaporation, erosion, as well as human activities such as agriculture and industry.
- **Oxygen:** Values for August and September registering zero might indicate a technical issue, but speculation on June and July suggests variations due to seasonal changes.
- **pH:** Gradual increase from moderately acidic to nearly neutral attributed to biological processes like photosynthesis and reduction in acidic components due to decreased acid rain.

Table 7: Water Quality Measurements and Standards Comparison for Nani swamp bridge 2

Water quality standards	Date	Time (H)	Weather	Depth	Temp (°C)	Turb (NTU)	Cond (µS/ cm)	Sal (ppt)	TDS (g/L)	DO (Mg/L)	pH
	Jun-23	18:15	Sunny	1.53	29.56	509.12	38.20	0.01	0.02	0.01	5.96
	Jul-23	14:45	Rainy	1.84	28.84	524.44	38.28	0.01	0.02	1.19	5.95
	Aug-23	11:00	Sunny	1.09	28.78	57.20	101.10	0.04	0.06	0.00	6.37
	Sep-23	11:00	Sunny	0.73	30.24	96.80	114.98	0.05	0.07	0.00	6.75
Freshwater (US EPA)	-	-	-	-	-	-	0 - 1500	-	<500	> 6.00	5.00 - 9.00
Irrigation water (FAO)	-	-	-	-	-	-	0 - 3000	-	0 - 2000		6.00 - 8.50

Notes table 7:

- The Dissolved Oxygen measurements do not meet the required water quality standards for freshwater and irrigation water use.
- The pH levels in June and July meet the required standard for freshwater usage but not for irrigation water usage.

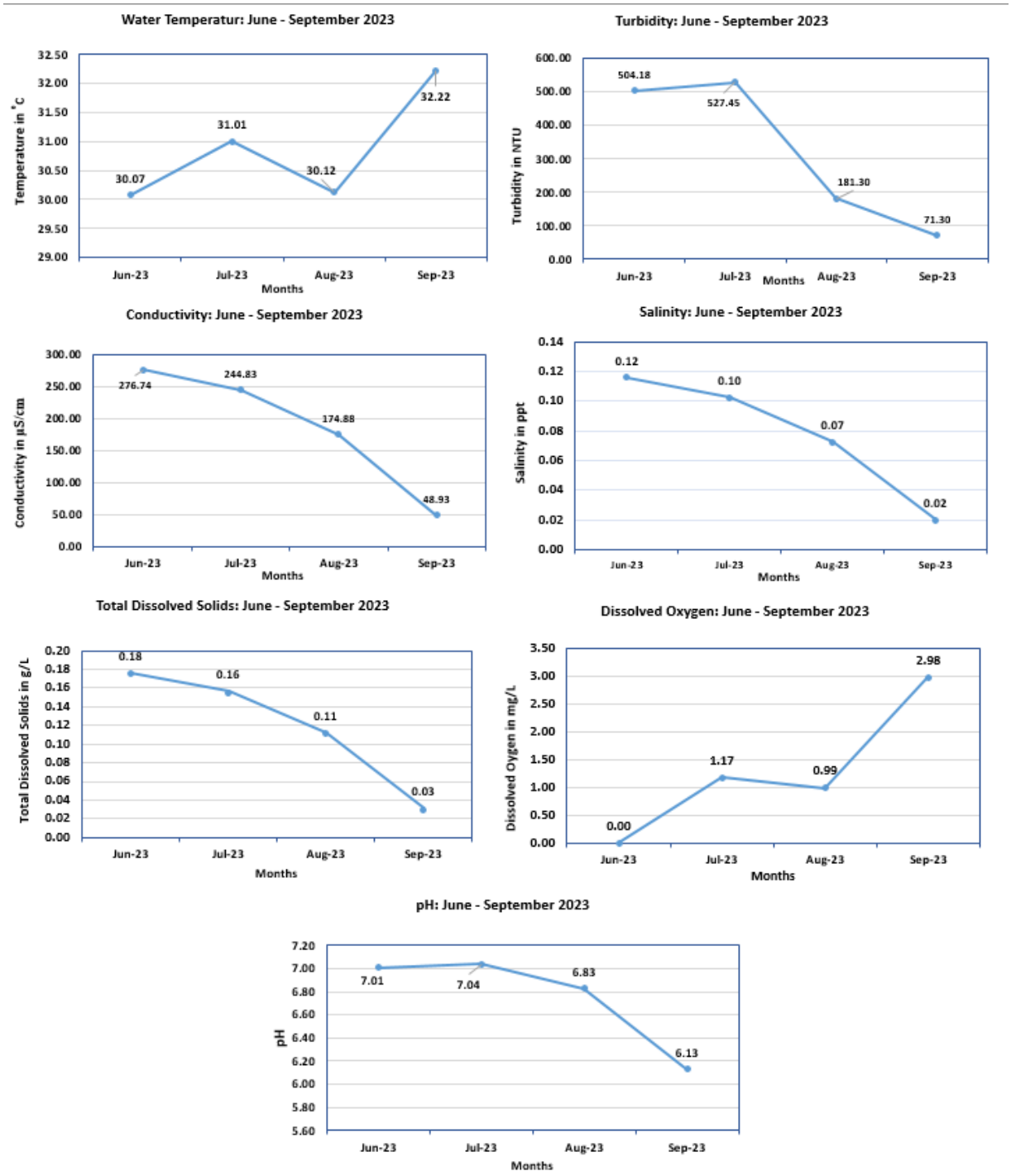


Figure 7: Graphical representation of water quality parameters at Stalweide bridge

Notes figure 7:

- June and July fall within the rainy season, August and September fall within the dry season.
- **Temperature:** Fluctuations in temperature are observed due to seasonal changes, with higher temperatures in July and September correlating with minimal rainfall and warmer days.
- **Turbidity:** There is a significant decrease in turbidity from June to September, due to higher rainfall in the rainy season and lower values during drier months.
- **Conductivity:** Gradual decrease in conductivity is noted, with higher values in June and July due to increased rainfall, and lower values during the drier months of August and September.
- **Salinity:** Salinity values gradually decrease, indicating seasonal changes likely influenced by precipitation patterns between rainy and dry seasons.
- **Total Dissolved Solids (TDS):** TDS shows a gradual decline during the months, with increased precipitation in June and July causing dilution, and drier months possibly leading to slight concentration increases, although the graph shows continued decrease.
- **Oxygen:** Fluctuations in dissolved oxygen levels are observed, with low levels in June possibly due to high temperatures and limited biological activity, while increased levels in August and September are attributed to heightened biological activity like photosynthesis by aquatic plants and algae.
- **pH:** A slight increase in pH from June to July followed by a decrease in August and September is noted, potentially influenced by the transition from wet to dry seasons.

Table 8: Water Quality Measurements and Standards Comparison for Stalweide bridge

Water quality standards	Date	Time (H)	Weather	Depth	Temp (°C)	Turb (NTU)	Cond (µS/ cm)	Sal (ppt)	TDS (g/L)	DO (Mg/L)	pH
	Jun-23	11:07	Sunny	0.84	30.07	504.18	276.74	0.12	0.18	0.00	7.01
	Jul-23	19:23	Rainy	1.07	31.01	527.45	244.83	0.10	0.16	1.17	7.04
	Aug-23	6:58	Sunny	0.72	30.12	181.30	174.88	0.07	0.11	0.99	6.83
	Sep-23	18:30	Sunny	0.72	32.22	71.30	48.93	0.02	0.03	2.98	6.13
Freshwater (US EPA)	-	-	-	-	-	-	0 - 1500	-	<500	> 6.00	5.00 - 9.00
Irrigation water (FAO)	-	-	-	-	-	-	0 - 3000	-	0 - 2000	-	6.00 - 8.50

Notes table 8:

- The DO values do not meet the required standards for freshwater and irrigation water usage.

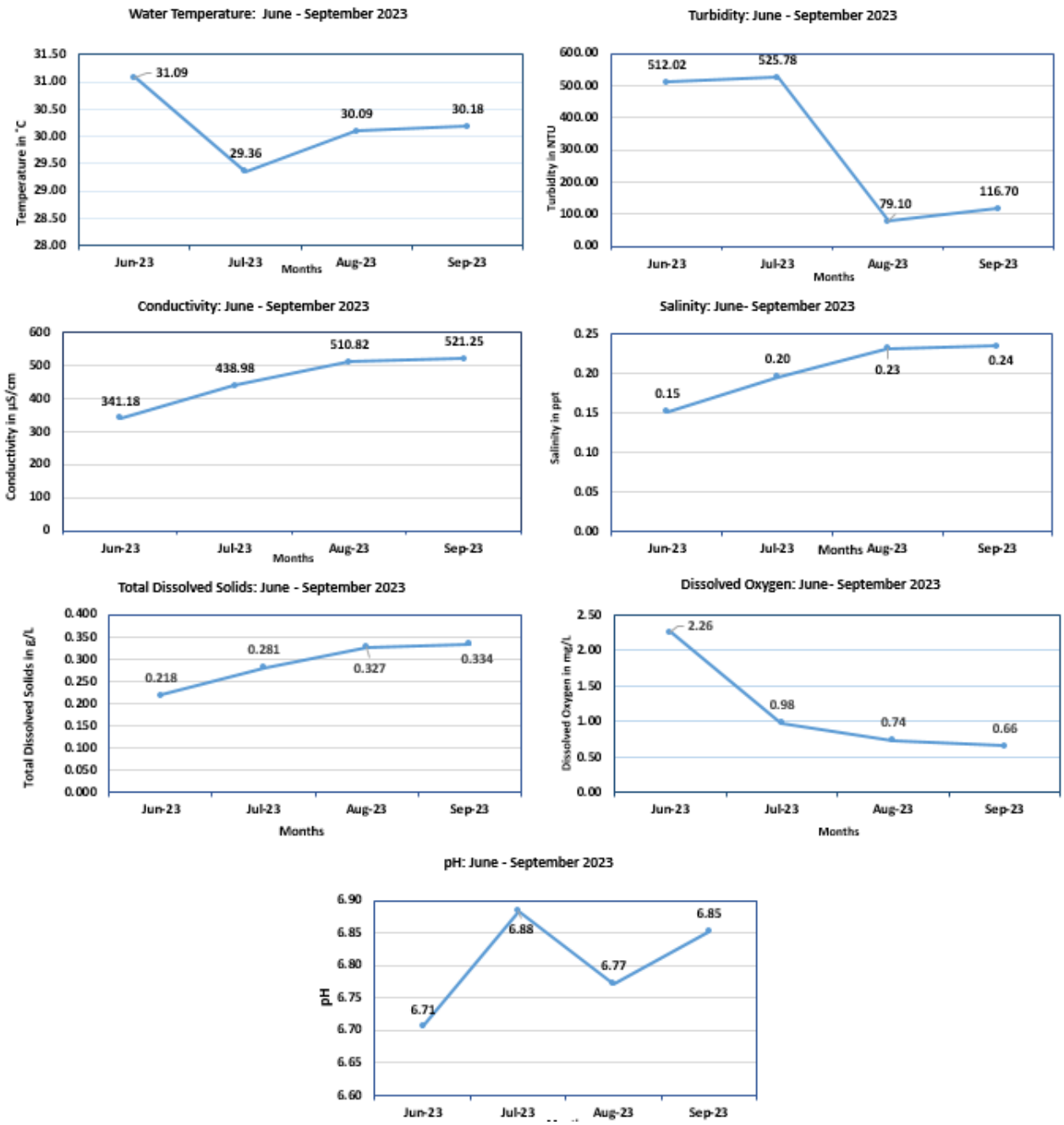


Figure 8: Graphical representation of water quality parameters at Kaaimanpolder bridge 1

Notes figure 8:

- June and July fall within the rainy season, August and September fall within the dry season.
- **Temperature:** Shows a pattern of increase in June, August, and September due to sun intensity, with a decline in July likely due to sunset measurements.
- **Turbidity:** Significant fluctuations observed, with higher values in June and July possibly influenced by agricultural activities like irrigation, while lower values in August and September due to dry fields during harvest.
- **Conductivity, Salinity, and Total Dissolved Solids (TDS):** All show gradual increases from June to September, reflecting seasonal changes from wet to dry season.
- **Oxygen:** Gradual decrease in dissolved oxygen (DO) levels attributed to increased salinity and temperature. Fluctuations observed between months due to weather season changes.
- **pH:** Ranges from 6.7 to 6.9, indicating near-neutral conditions. Fluctuations attributed to various factors like biological activity, seasonal changes, and carbon dioxide absorption.

Table 9: Water Quality Measurements and Standards Comparison for Kaaimanpolder bridge 1

Water quality standards	Date	Time (H)	Weather	Depth	Temp (°C)	Turbidity (NTU)	Cond (µS/ cm)	Sal (ppt)	TDS (g/L)	DO (Mg/L)	pH
	Jun-23	12:55		1.05	31.09	512.02	341.18	0.15	0.22	2.26	6.71
	Jul-23	18:15		1.52	29.36	525.78	438.98	0.20	0.281	0.984	6.884
	Aug-23	15:00		1.51	30.09	79.10	510.82	0.23	0.327	0.736	6.772
	Sep-23	15:45		0.90	30.18	116.70	521.25	0.24	0.33	0.66	6.85
Freshwater (US EPA)	-	-	-	-	-	-	0 - 1500	-	<500	> 6.00	5.00 - 9.00
Irrigation water (FAO)	-	-	-	-	-	-	0 - 3000	-	0 - 2000	-	6.00 - 8.50

Notes table 9:

- The measured parameters fall within the required water quality standards for freshwater and irrigation water usage, except for the DO values.

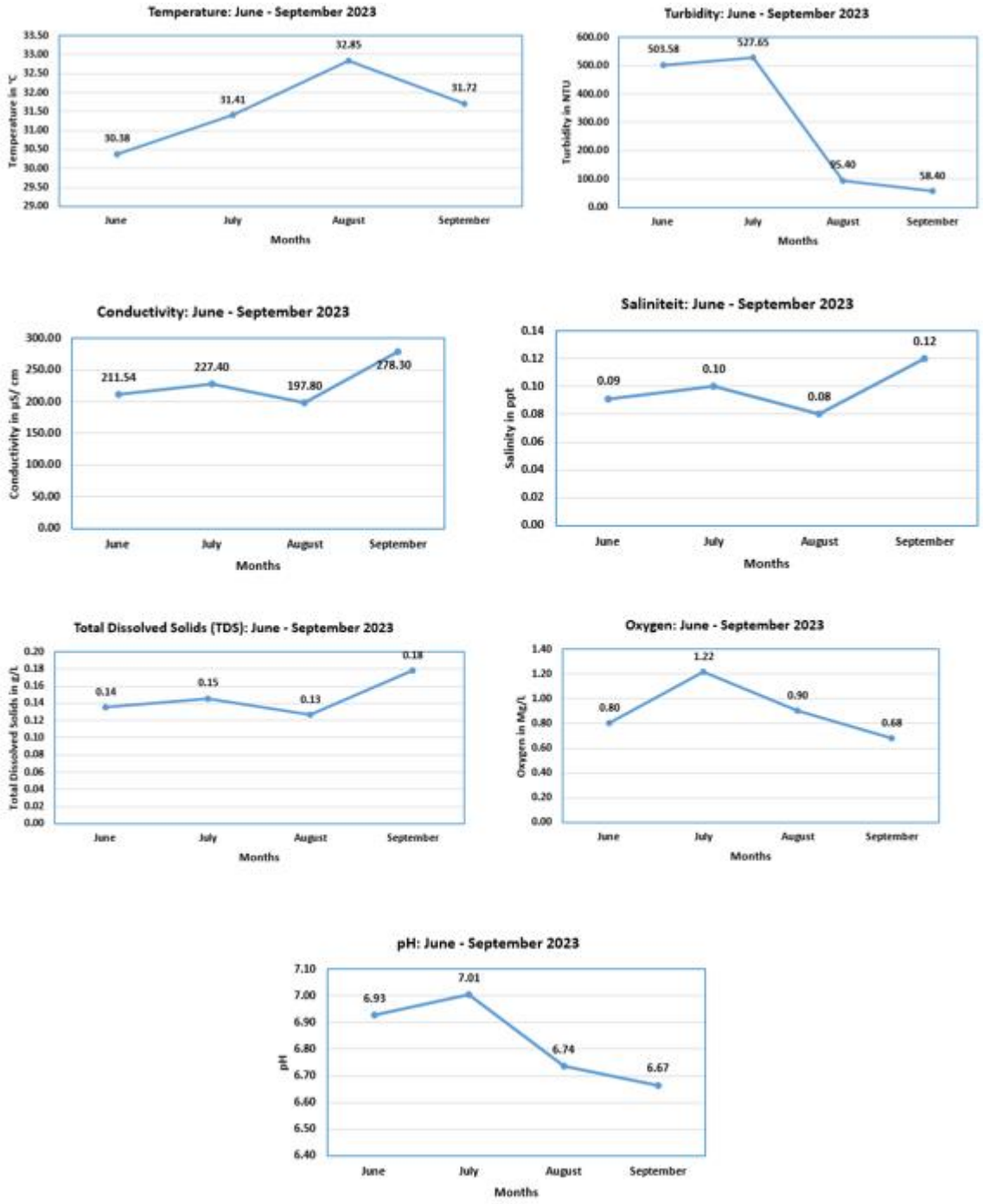


Figure 9: Graphical representation of water quality parameters at Kaaimanpolder bridge 2

Notes figure 9:

- June and July fall within the rainy season, August and September fall within the dry season.
- **Temperature:** Increases steadily from June to September due to the transition from wet to dry season.
- **Turbidity:** Peaks in June and July due to agricultural activities, particularly irrigation from rice fields, but decreases in August and September during the harvest season.
- **Conductivity:** Generally, increases over the months, with a slight decrease in August possibly due to reduced rainfall and surface runoff.
- **Salinity:** Gradually increases from June to September, following the wet to dry season transition.
- **Total Dissolved Solids (TDS):** Shows a gradual increase over the period, also related to the seasonal change.
- **Oxygen (DO):** Decreases with rising salinity and temperature, with a gradual decline from June to September. This decrease affects aquatic life and algae growth.
- **pH:** Exhibits variability, with fluctuations attributed to seasonal changes and possibly carbon dioxide absorption from the atmosphere.

Table 10: Water Quality Measurements and Standards Comparison for Kaaimanpolder bridge 2

Water quality standards	Date	Time (H)	Weather	Depth	Temp (°C)	Turb (NTU)	Cond (µS/cm)	Sal (ppt)	TDS (g/L)	DO (Mg/L)	pH
	Jun-23	10:25		0.54	30.38	503.58	211.54	0.09	0.14	0.80	6.93
	Jul-23	18:55		0.49	31.41	527.65	227.40	0.10	0.15	1.22	7.01
	Aug-23	16:00		0.28	32.85	95.40	197.80	0.08	0.13	0.90	6.74
	Sep-23	16:35		0.43	31.72	58.40	278.30	0.12	0.18	0.68	6.67
Freshwater (US EPA)	-	-	-	-	-	-	0 - 1500	-	<500	> 6.00	5.00 - 9.00
Irrigation water (FAO)	-	-	-	-	-	-	0 - 3000	-	0 - 2000	-	6.00 - 8.50

Notes table 10: The measured parameters fall within the required water quality standards for freshwater and irrigation water usage, except for the DO levels.

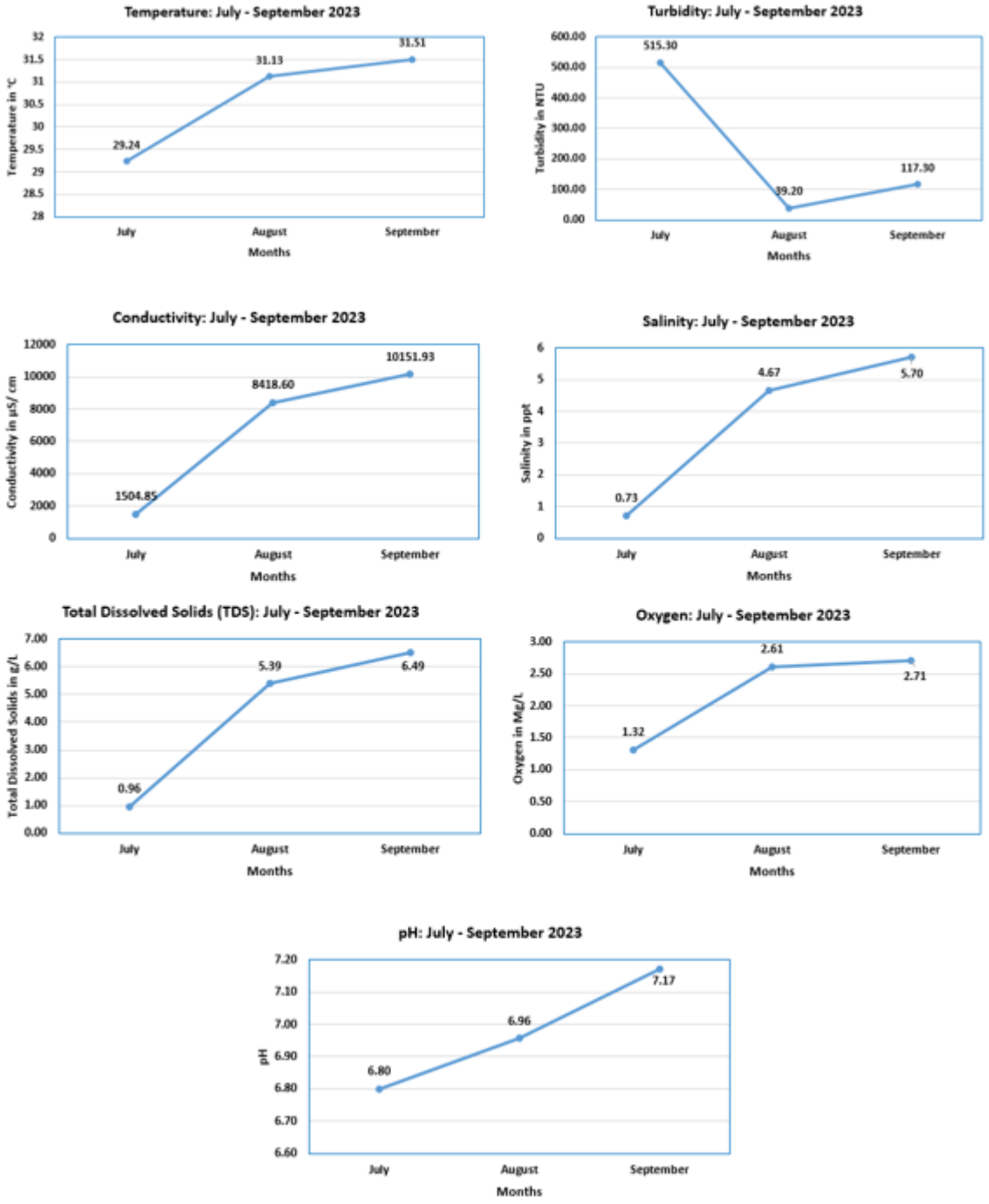


Figure 10: Graphical representation of water quality parameters at Ramdien pier

Notes figure 10:

- July falls within the rainy season, August and September fall within the dry season.
- **Temperature:** Gradually increases, due to factors like decreasing precipitation, increasing solar radiation, and changing water flows during the dry season.
- **Turbidity:** Shows fluctuations, likely due to seasonal changes and human activities such as fishing boat presence, influencing sediment discharge and water supply.
- **Conductivity:** Increases due to seasonal changes and human activities like fishing boat presence, leading to higher concentrations of dissolved solids.
- **Salinity:** Increases from June to September due to reduced rainfall during the dry season and human activities like wastewater discharge and chemical usage.
- **Total Dissolved Solids (TDS):** Shows a remarkable increase, influenced by seasonal changes with higher precipitation leading to dilution of solutes and reduced precipitation causing water to become more concentrated.
- **Oxygen:** Slightly increases, possibly due to the influence of rainy and dry seasons.
- **pH:** Gradually increases, attributed to seasonal changes, biological activity like photosynthesis, reduced organic load during drier months, and possible human influences such as industrial or agricultural discharges altering pH levels.

Table 11: Water Quality Measurements and Standards Comparison for Ramdien pier

Water quality standards	Date	Time (H)	Weather	Depth	Temp (°C)	Turb (NTU)	Cond (µS/ cm)	Sal (ppt)	TDS (g/L)	DO (Mg/L)	pH
	Jun-23	16:00	Sunny	0.80	29.37	502.20	258.98	0.10	0.15	1.53	6.24
	Jul-23	18:40	Sunny	0.16	29.24	515.30	1504.85	0.73	0.96	1.32	6.80
	Aug-23	17:00	Sunny	0.93	31.13	39.20	8418.60	4.67	5.39	2.61	6.96
	Sep-23	16:20	Sunny	0.64	31.51	117.30	10151.93	5.70	6.49	2.71	7.17
Freshwater (US EPA)	-	-	-	-	-	-	0 - 1500	-	<500	> 6.00	5.00 - 9.00
Irrigation water (FAO)	-	-	-	-	-	-	0 - 3000	-	0 - 2000	-	6.00 - 8.50

Notes table 11:

- The conductivity level in July meets the required standard for irrigation water usage but not for freshwater usage. The conductivity levels in August and September do not meet the required standards for freshwater and irrigation water usage.
- The measured DO levels do not meet the required standard for freshwater and irrigation water usage.

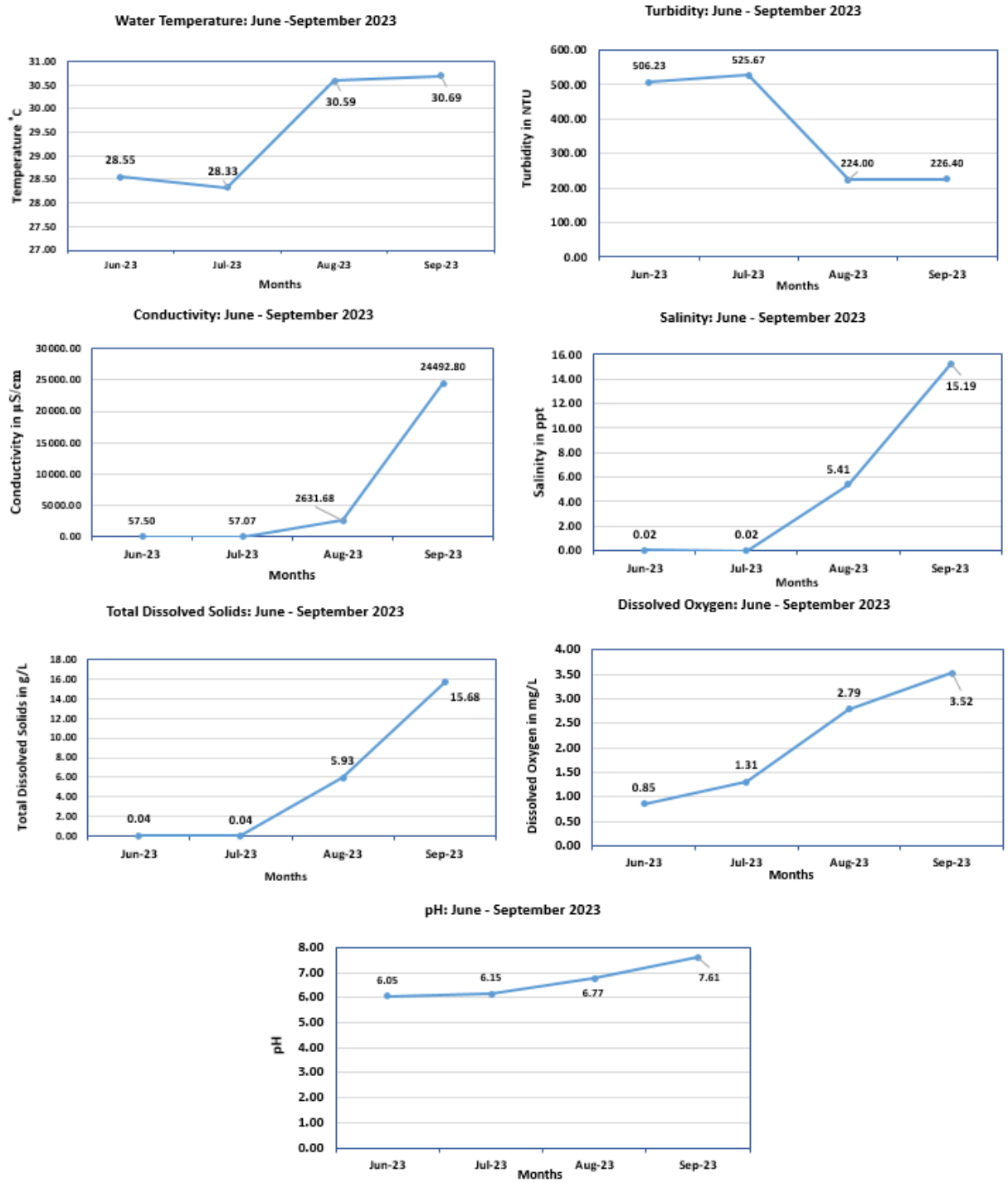


Figure 11: Graphical representation of water quality parameters at Scaffoled Ingas

Notes figure 11:

- June and July fall within the rainy season, August and September fall within the dry season.
- **Temperature**: Shows a gradual increase from June to September due to seasonal changes and water depth affecting warming rates.
- **Turbidity**: Initially higher in June to July, possibly due to rainfall and erosion, decreasing in August and September with reduced precipitation and erosion. Human activities like gas bomb filling can impact turbidity.
- **Conductivity**: Gradual increase from June to September, attributed to seasonal changes and increased concentration of dissolved minerals in the dry season. In August and September, when the dry season reaches its peak, reduced precipitation leads to a sharp increase in minerals in the water, significantly increasing conductivity.
- **Salinity**: Shows a gradual increase due to seasonal changes (transition from wet to dry season).
- **Total Dissolved Solids (TDS)**: Gradual increase possibly due to evaporation, reduced water drainage, and human activities like gas bomb filling introducing dissolved substances.
- **Oxygen**: Increases from June to September due to seasonal factors and deep water sites which are better aerated.
- **pH**: Gradual increase attributed to dilution effects during rainy season and increased biological activity like photosynthesis, reducing carbon dioxide and raising pH.

Table 12: Water Quality Measurements and Standards Comparison for Scaffold Ingas

Water quality standards	Date	Time (H)	Weather	Depth	Temp (°C)	Turb (NTU)	Cond (µS/cm)	Sal (ppt)	TDS (g/L)	DO (Mg/L)	pH
	Jun-23	17:25	Sunny	3.76	28.55	506.23	57.50	0.02	0.04	0.85	6.05
	Jul-23	10:44	Sunny /cloudy	3.38	28.33	525.67	57.07	0.02	0.04	1.31	6.15
	Aug-23	15:30	Sunny	3.22	30.59	224.00	2631.68	5.41	5.93	2.79	6.77
	Sep-23	15:10	Sunny	3.93	30.69	226.40	24492.80	15.19	15.68	3.52	7.61
Freshwater (US EPA)	-	-	-	-	-	-	0 - 1500	-	<500	> 6.00	5.00 - 9.00
Irrigation water (FAO)	-	-	-	-	-	-	0 - 3000	-	0 - 2000	-	6.00 - 8.50

Notes table 12:

- The measured parameters fall within the required water quality standards for freshwater and irrigation water usage, except the conductivity levels measured in August and September which meet the required standard for irrigation water usage but not for freshwater usage.
- The measured DO levels do not meet the required standards for freshwater and irrigation water usage.

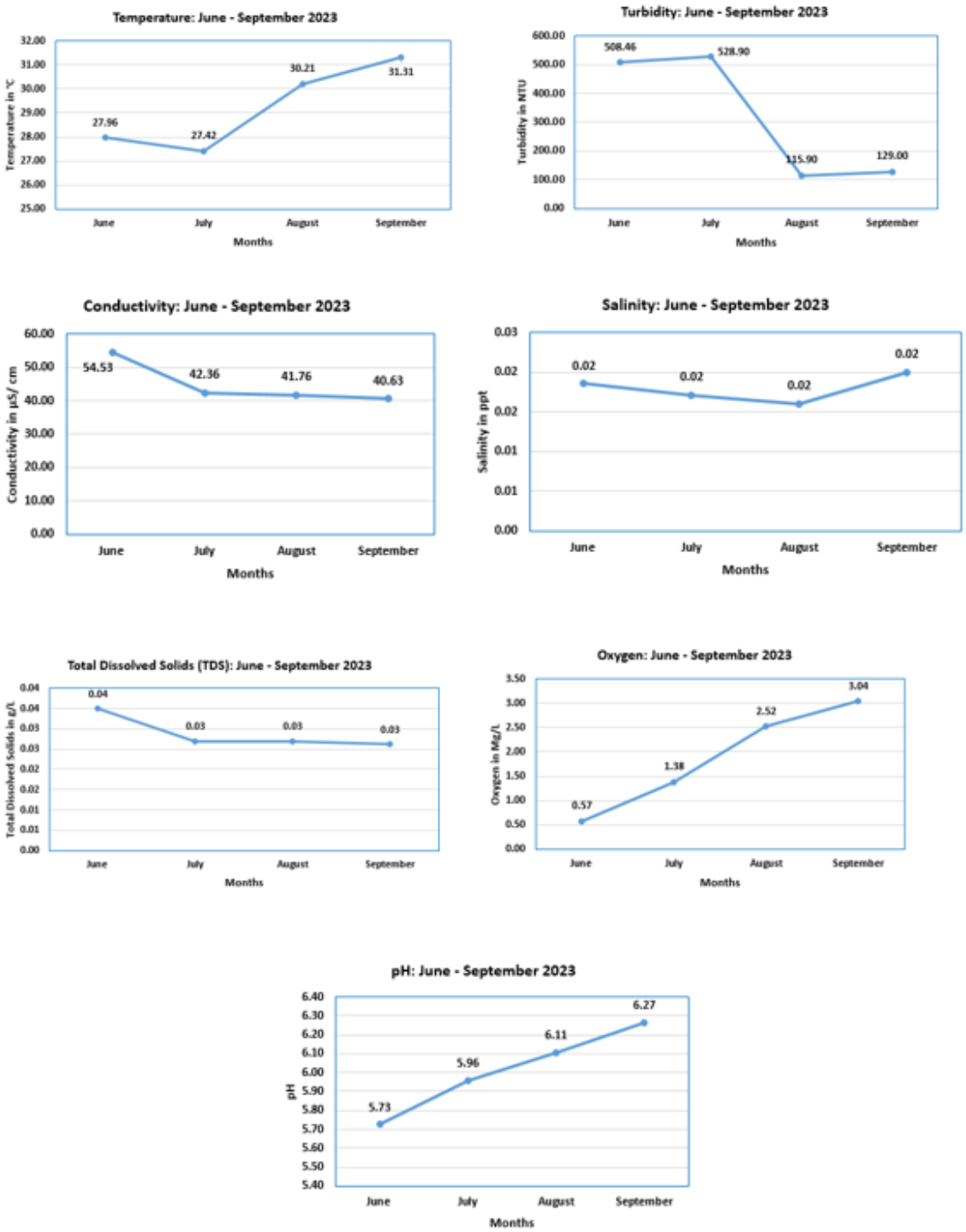


Figure 12: Graphical representation of water quality parameters at Henar bridge

Notes figure 12:

- June and July fall within the rainy season, August and September fall within the dry season.
- **Temperature:** The graph depicts a gradual rise in water temperature, influenced by seasonal variations and environmental factors like rainfall and solar radiation.
- **Turbidity:** Variations are seen from June to September, with high turbidity in June and July possibly due to sedimentation from rainfall and agricultural activities. A notable drop in August and September could be from rainfall.
- **Conductivity:** The graph shows a gradual decline, indicating a decrease in dissolved substances. The significant drop between June and July may result from rainfall diluting solutes.
- **Salinity:** Salinity varies due to seasonal changes like rainfall and human activities such as agriculture and industrial wastewater discharge.
- **Total Dissolved Solids (TDS):** A consistent decrease is observed, likely due to seasonal influences like precipitation changes leading to dilution.
- **Oxygen:** A gradual increase is noted, attributed to factors like increased photosynthesis, higher temperatures, and reduced organic load from precipitation.
- **pH:** The graph shows a gradual increase, possibly indicating a restoration of pH balance or changes in environmental factors. pH fluctuations can impact aquatic life and water quality.

Table 13: Water Quality Measurements and Standards Comparison for Henar bridge

Water quality standards	Date	Time (H)	Weather	Depth	Temp (°C)	Turb (NTU)	Cond (µS/ cm)	Sal (ppt)	TDS (g/L)	DO (Mg/L)	pH
	Jun-23	10:30	Sunny	1.76	27.96	508.46	54.53	0.02	0.04	0.57	5.73
	Jul-23	12:41	Rainy	2.41	27.42	528.90	42.36	0.02	0.03	1.38	5.96
	Aug-23	8:00	Cloudy	1.66	30.21	115.90	41.76	0.02	0.03	2.52	6.11
	Sep-23	13:01	Sunny	2.45	31.31	129.00	40.63	0.02	0.03	3.04	6.27
Freshwater (US EPA)	-	-	-	-	-	-	0 - 1500	-	<500	> 6.00	5.00 - 9.00
Irrigation water (FAO)	-	-	-	-	-	-	0 - 3000	-	0 - 2000	-	6.00 - 8.50

Notes table 13:

- The pH levels measured in June and July meet the required standard for freshwater use but not for irrigation water use.
- The measured DO levels do not meet the required standards for freshwater and irrigation water usage.

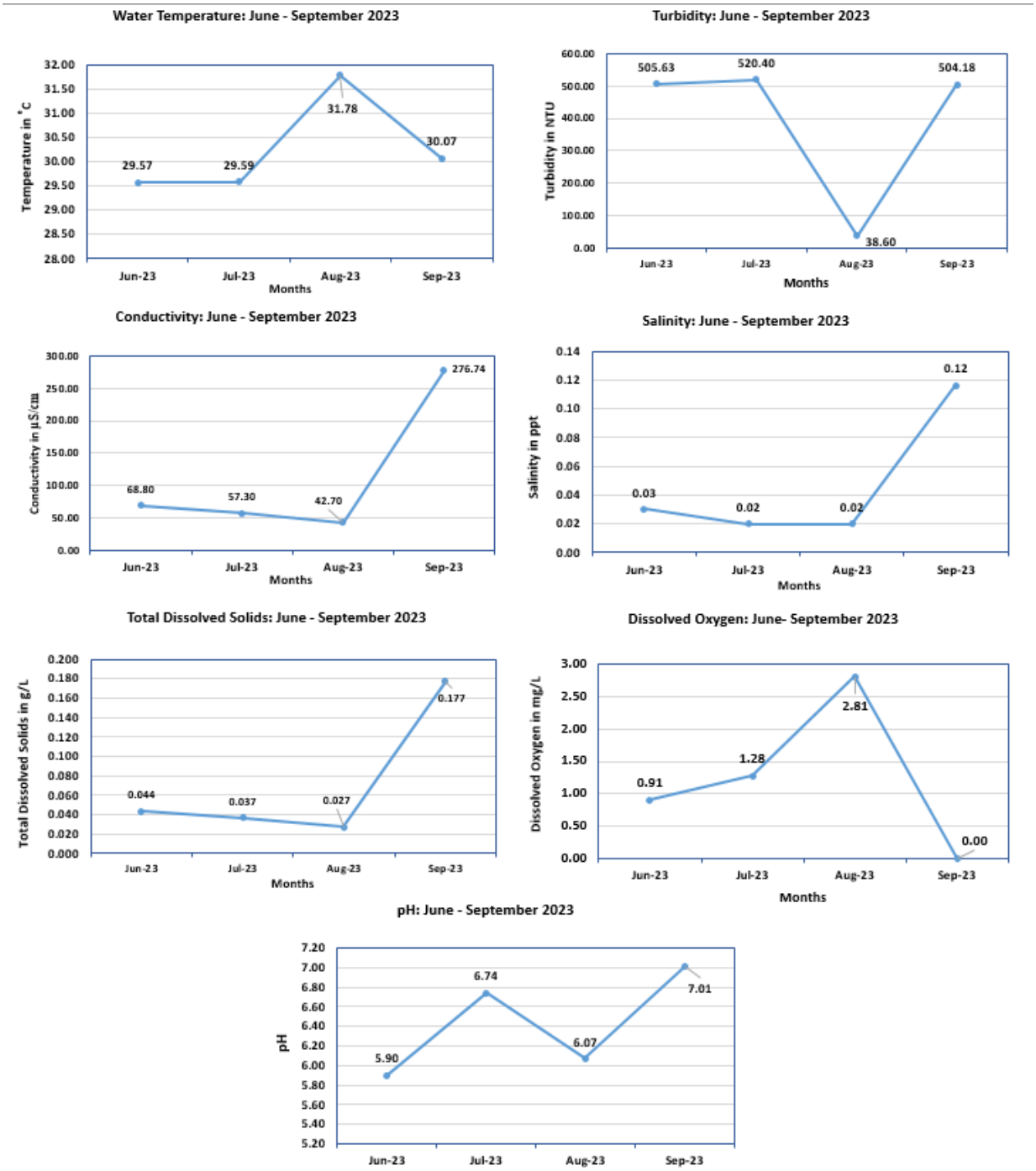


Figure 13: Graphical representation of water quality parameters at Wageningen

Notes figure 13:

- June and July fall within the rainy season, August and September fall within the dry season.
- **Temperature:** The graph shows variations from June to September. In September a decrease is measured due to seasonal changes.
- **Turbidity:** Fluctuations due to seasonal/ weather changes.
- **Conductivity:** Gradual decline from June to August, notable increase September. Factors: July-Aug rainfall dilutes solutes, dry season reduces precipitation. September increase due to increased discharge.
- **Salinity:** Gradual decline from June-August, notable increase in September. Causes: seasonal changes, dry season evaporation, rainfall dilution.
- **Total Dissolved Solids (TDS):** Fluctuations from June-August, notable increase in September. Decreases due to rainfall, solute reduction. Increase due to reduced rainfall, higher evaporation, agricultural practices.
- **Oxygen:** Moderate increase in June and July, a peak in August due to summer photosynthesis, biological activity, improved circulation. September decrease due to reduced photosynthesis, increased organic matter, reduced circulation.
- **pH:** Slight increase from June-August, slight increase in September, generally close to neutral pH. Variations due to seasonal/ weather changes.

Table 14: Water Quality Measurements and Standards Comparison for Wageningen

Water quality standards	Date	Time (H)	Weather	Depth	Temp (°C)	Turb (NTU)	Cond (µS/ cm)	Sal (ppt)	TDS (g/L)	DO (Mg/L)	pH
	Jun-23	13:20	Sunny	0.31	29.57	505.63	68.80	0.03	0.04	0.91	5.90
	Jul-23	14:00	Sunny	-	29.59	520.4	57.30	0.02	0.04	1.28	6.74
	Aug-23	16:50	Sunny	-	31.78	38.60	42.70	0.02	0.03	2.81	6.07
	Sep-23	11:07	Sunny	0.84	30.07	504.18	276.74	0.12	0.18	0.00	7.01
Freshwater (US EPA)	-	-	-	-	-	-	0 - 1500	-	<500	> 6.00	5.00 - 9.00
Irrigation water (FAO)	-	-	-	-	-	-	0 - 3000	-	0 - 2000	-	6.00 - 8.50

Notes table 14:

- The pH level measured in June meets the required standard for freshwater use but not for irrigation water use.
- The measured DO levels do not meet the required standards for freshwater and irrigation water usage.

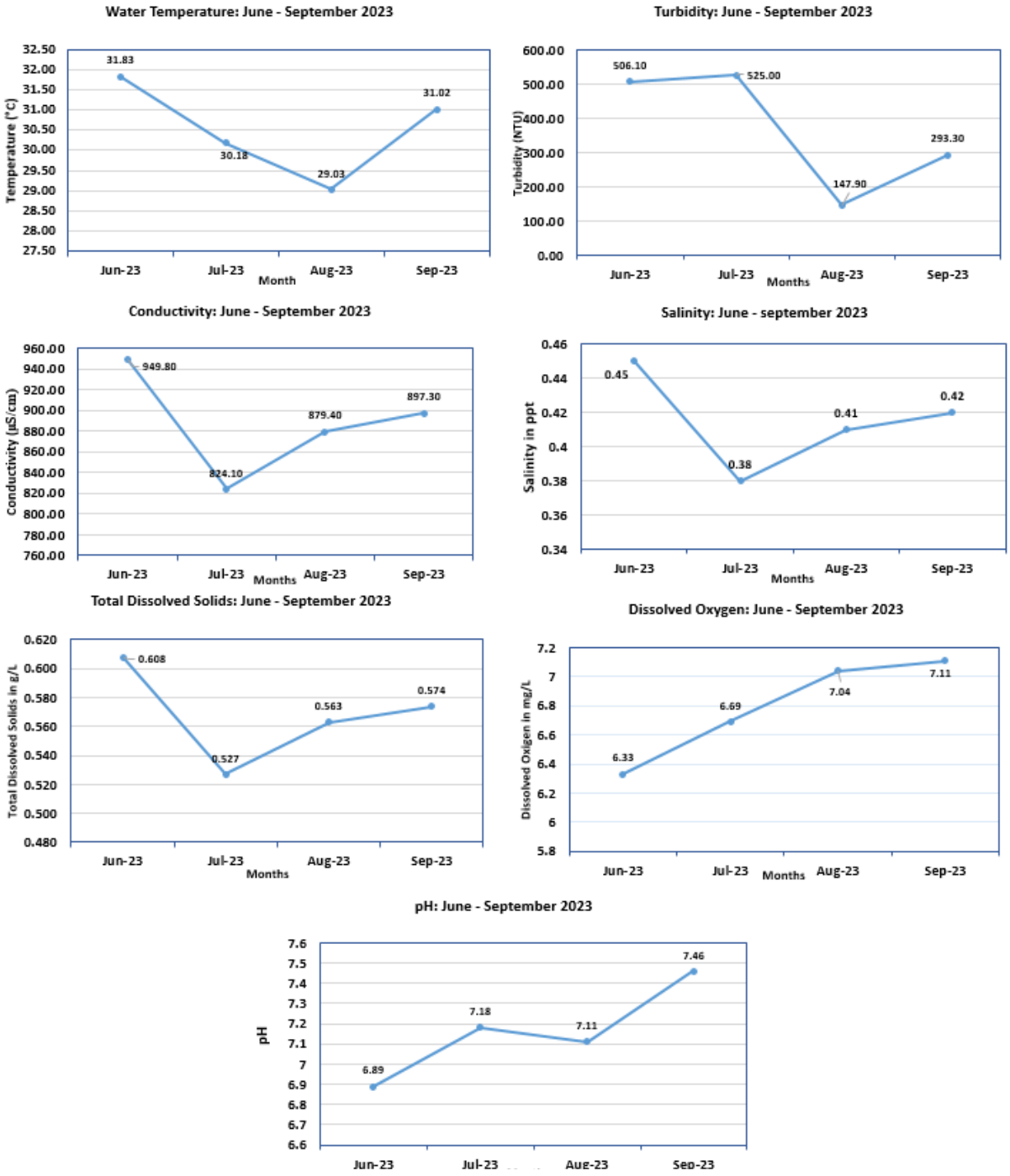


Figure 14: Graphical representation of water quality parameters at Afdamming 1

Notes figure 14:

- June and July fall within the rainy season, August and September fall within the dry season.
- **Temperature**: Shows an increase in June due to strong solar radiation, followed by a decrease in July and August. September sees another increase possibly due to weather changes and variations in air temperature.
- **Turbidity**: Fluctuates notably, with higher values in June and July possibly influenced by agricultural activities like irrigation. Less precipitation and reduced currents in August and September lead to decreased sediment discharge.
- **Conductivity**: Decreases from high values in June to lower values in July, possibly due to changed water sources (transition from the wet to the dry season). Moderate increase in August and September due to less rainfall and less dilution of dissolved substances.
- **Salinity**: Fluctuations due to the transition from the wet to the dry season.
- **Total Dissolved Solids (TDS)**: Variations influenced by seasonal factors (transition from the wet to the dry season)
- **Dissolved Oxygen (DO)**: Shows a positive trend with a gradual increase attributed to warmer weather, increased sunlight promoting photosynthesis, and healthy growth of aquatic plants.
- **pH**: Fluctuations due to weather changes and biological activity like algae photosynthesis.

Table 15: Water Quality Measurements and Standards Comparison for Afdamming 1

Water quality standards	Date	Time (H)	Weather	Depth	Temp (°C)	Turb (NTU)	Cond (µS/ cm)	Sal (ppt)	TDS (g/L)	DO (Mg/L)	pH
	Jun-23	12:30	Sunny	-	31.83	506.10	949.80	0.45	0.61	6.33	6.89
	Jul-23	17:30	Cloudy	-	30.18	525.00	824.10	0.38	0.53	6.69	7.18
	Aug-23	13:30	Sunny	-	29.03	147.90	879.40	0.41	0.56	7.04	7.11
	Sep-23	14:20	Sunny	-	31.02	293.30	897.30	0.42	0.57	7.11	7.46
Freshwater (US EPA)	-	-	-	-	-	-	0 - 1500	-	<500	> 6.00	5.00 - 9.00
Irrigation water (FAO)	-	-	-	-	-	-	0 - 3000	-	0 - 2000	-	6.00 - 8.50

Notes table 15:

- All measured parameters meet the required standards for freshwater and irrigation water usage.

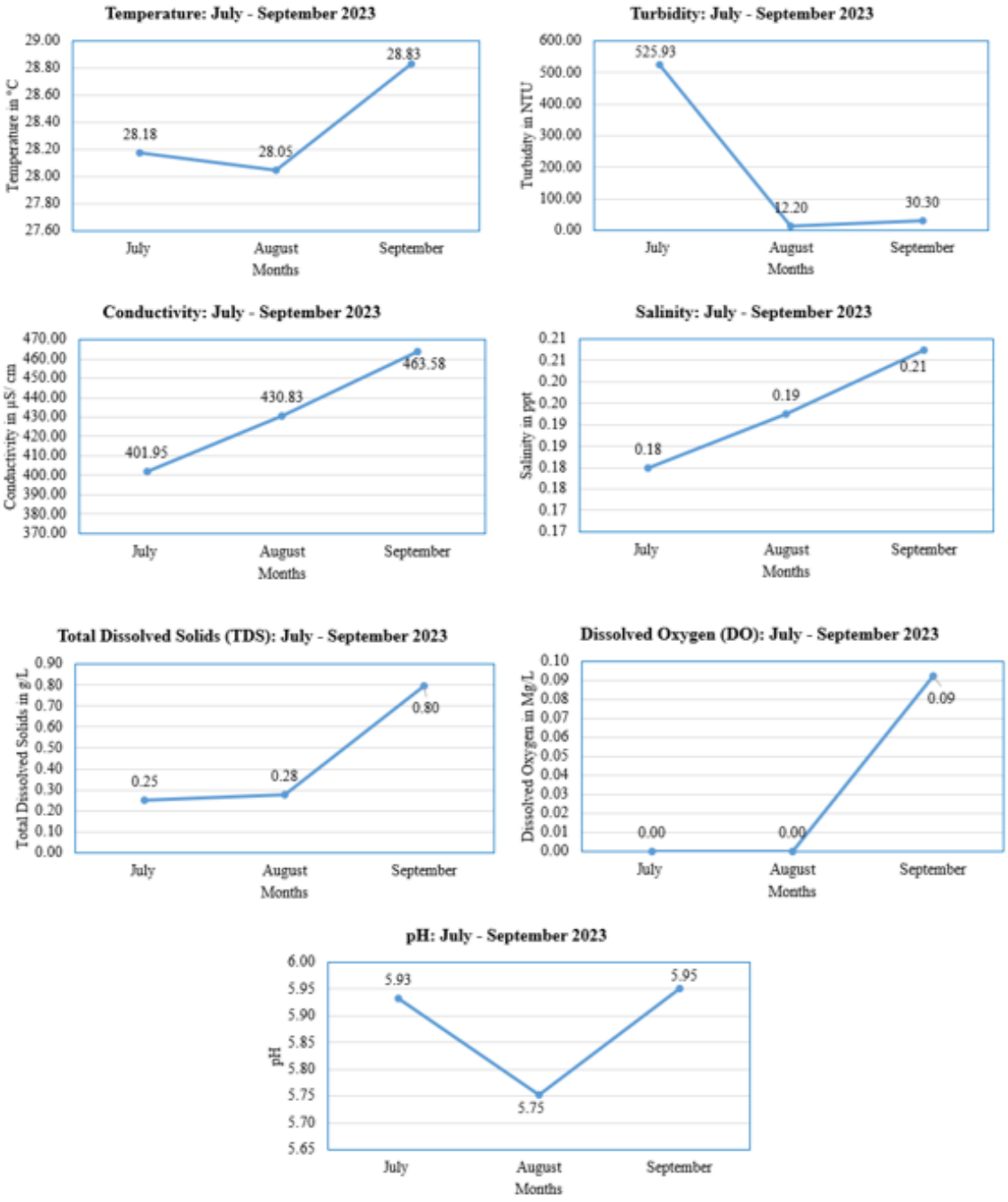


Figure 15: Graphical representation of water quality parameters at Afdamming 2

Notes figure 15:

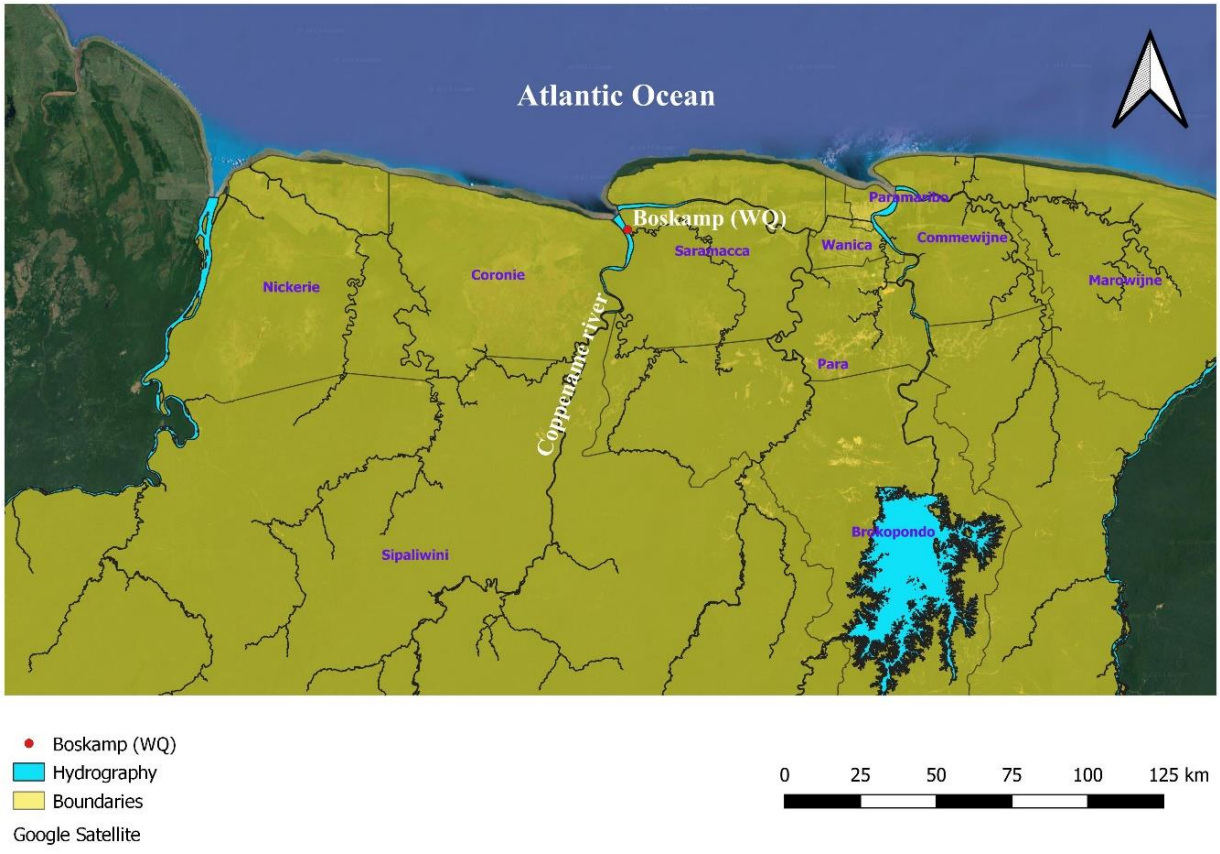
- July falls within the rainy season, August and September fall within the dry season.
- **Temperature:** Overall stability with minor fluctuations indicating a consistent, warm environment beneficial for aquatic life.
- **Turbidity:** Fluctuations suggest variations in water clarity, possibly due to sedimentation or reduced rainfall.
- **Conductivity:** Predominantly stable with temporary decreases attributed to rainfall and increases possibly linked to seasonal or environmental changes.
- **Salinity:** Consistently low, staying within the freshwater range throughout the measurement period.
- **Total Dissolved Solids (TDS):** Values remain within acceptable limits, with a notable increase in September likely due to reduced precipitation and increased evaporation.
- **Oxygen (DO):** Consistent zero values in June, July, and August may indicate technical issues, followed by an increase in September.
- **pH:** Slight fluctuations towards the acidic side, influenced by natural factors like organic material breakdown and weather conditions such as precipitation and temperature changes.

Table 16: Water Quality Measurements and Standards Comparison for Afdamming 2

Water quality standards	Date	Time (H)	Weather	Depth	Temp (°C)	Turb (NTU)	Cond (µS/ cm)	Sal (ppt)	TDS (g/L)	DO (Mg/L)	pH
	July	17:45	Sunny	-	28.18	525.93	401.95	0.18	0.25	0.00	5.93
	August	14:00	Sunny	-	28.05	12.20	430.83	0.19	0.28	0.00	5.75
	September	14:50	Sunny	-	28.83	30.30	463.58	0.21	0.80	0.09	5.95
Freshwater (US EPA)	-	-	-	-	-	-	0 - 1500	-	<500	> 6.00	5.00 - 9.00
Irrigation water (FAO)	-	-	-	-	-	-	0 - 3000	-	0 - 2000	-	6.00 - 8.50

Notes table 16:

- Significantly low levels of DO were measured.
- The pH levels meet the required standard for freshwater usage but not for irrigation water usage.



5. The Coppename River

The Coppename River in Suriname is vital for the local economy and communities along its banks. Covering an area of 21,700 square kilometers, it offers a variety of activities.

The lower tidal area is largely undeveloped and characterized by extensive marshlands. Upstream, the river is used for daily activities such as bathing, washing, and transportation. Here, the river is calmer and less affected by tides.

Figure 16: Water quality location Boskamp along the Coppename River

Water levels are influenced by tides and can flow far inland during high tides. The river provides not only livelihood but also navigation and transportation.

With an average discharge of 500 m^3/s at the mouth and natural attractions like the Raleigh Falls, the Coppename River remains invaluable to Suriname.

Table 17: In Saramacca district: overview of locations along the Coppename River and their use of river water, including coordinates

River	Location	Water use	Coordinates
Coppename	Boskamp	- Navigation - Transportation - Fishery	05°46'31.68" N 055°53'30.29" W

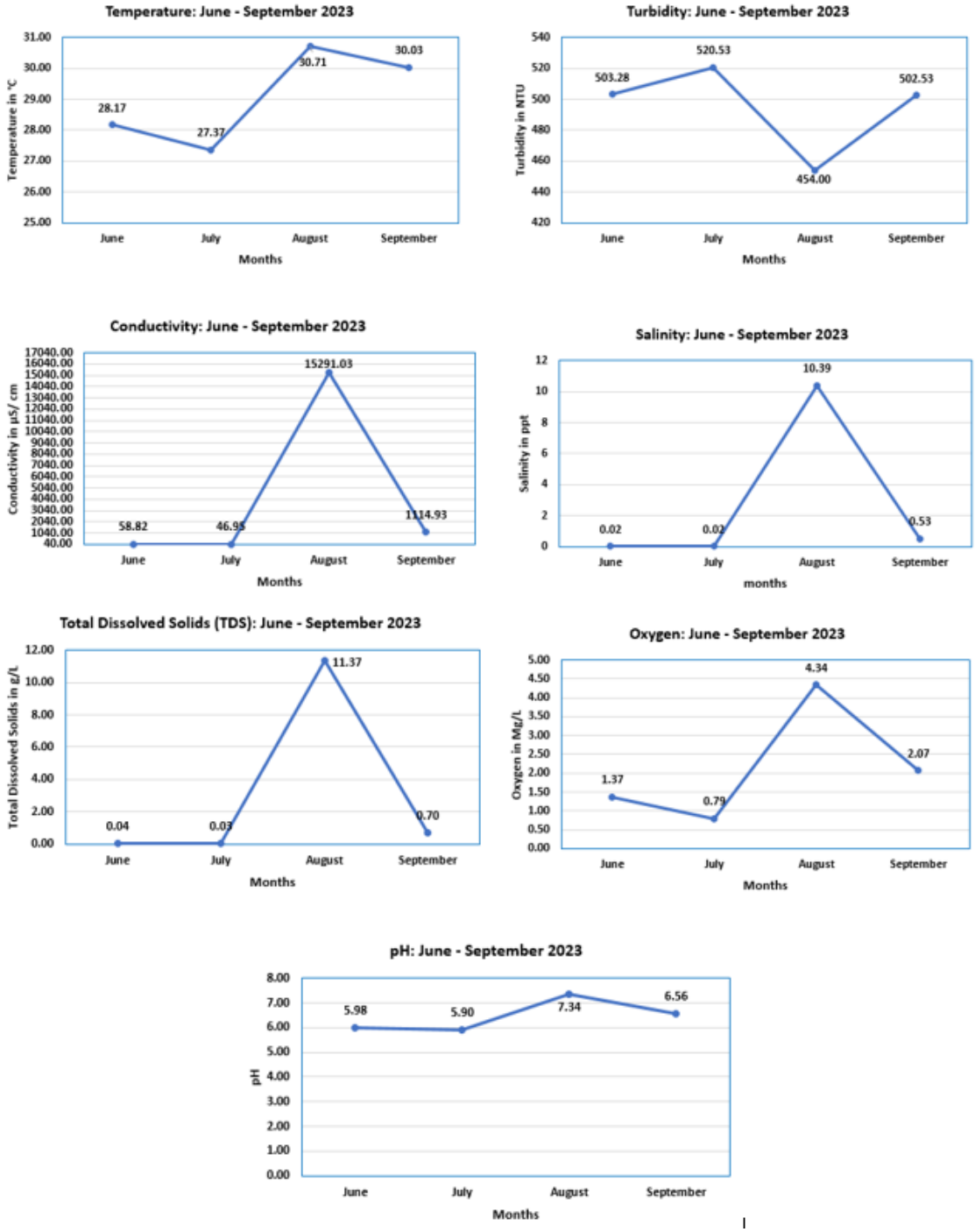


Figure 17: Graphical representation of water quality parameters at Boskamp

Notes figure 16:

- June and July fall within the rainy season, August and September fall within the dry season.
- **Temperature and Conductivity**: Temperature increases in August, while turbidity decreases, likely due to the shift from the rainy to the dry season. Conductivity rises notably during the dry season, possibly influenced by natural changes and human activities like industrial operations.
- **Salinity**: Salinity shows a significant increase during the dry season due to increased evaporation and decreased water flow, exacerbated by human activities such as fishing.
- **Total Dissolved Solids**: There's a notable increase in dissolved solids, with higher precipitation in June and July leading to dilution and lower precipitation in August and September causing concentration.
- **Dissolved Oxygen**: A slight increase in dissolved oxygen levels suggests stable water quality and sufficient oxygen for aquatic life, although the fluctuation could still affect some organisms.
- **pH**: pH levels show a gradual increase, indicating potential changes in the water environment. Fluctuations outside the optimal range could harm aquatic life, but the gradual increase may suggest a restoration of pH balance or environmental changes.

Table 18: Water Quality Measurements and Standards Comparison for Boskamp

Water quality standards	Date	Time(H)	Weather	Depth	Temp (°C)	Turb(NTU)	Cond (µS/ cm)	Sal (ppt)	TDS (g/L)	DO (Mg/L)	pH
	Jun-23	10:00	Sunny	0.73	28.17	503.28	58.82	0.02	0.04	1.37	5.98
	Jul-23	8:43	Sunny	0.62	27.37	520.53	46.95	0.02	0.03	0.79	5.90
	Aug-23	8:10	Sunny	1.18	30.71	454.00	15291.03	10.39	11.37	4.34	7.34
	Sep-23	8:30	Sunny	1.67	31.03	510.00	8299.94	5.65	6.46	3.64	7.73
Freshwater (US EPA)	-	-	-	-	-	-	0 – 1500	-	<500	> 6.00	5.00 - 9.00
Irrigation water (FAO)	-	-	-	-	-	-	0 - 3000	-	0 - 2000	-	6.00 - 8.50

Notes table 17:

- The measured conductivity in August meets the required standard for irrigation water usage but not for freshwater usage.
- The measured conductivity in September does not meet the required standards for freshwater and irrigation water usage.
- The measured DO levels do not meet the required standards for freshwater and irrigation water usage.

6. The Suriname River

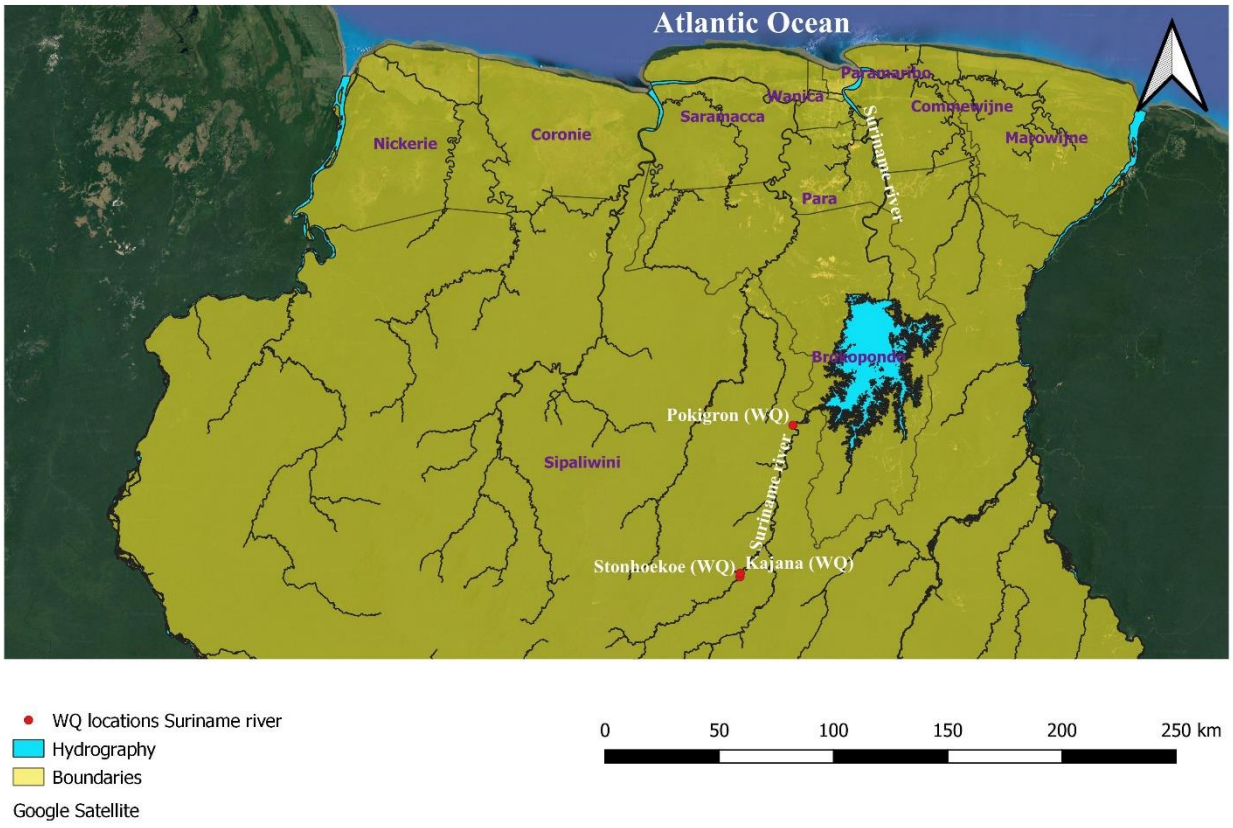


Figure 18: Water quality locations along the Suriname River

The Suriname River, with a length of 480 km, is of inestimable value to Suriname, serving as a lifeline for various purposes. Its 16,500 km² catchment area includes three main areas:

The lower part, which extends from the mouth to the artificial Lake Brokopondo, is influenced by tides from the Atlantic Ocean. Important cities such as Paramaribo are located here, and dredging work is being carried out to maintain the waterway depth.

Brokopondo Lake, with an area of approximately 1600 km², is an important source of hydropower and recreation. However, gold mining in this area can affect water quality.

The upper part of the basin, around Pokigron, supports local communities for their daily needs and cultural activities. Despite challenges such as tidal movements and human activities, the Suriname River remains a source of life and prosperity. Her protection and care are essential for future generations.

Table 19: In Sipaliwini district: overview of locations along the Suriname River and their use of river water, including coordinates

River	Location	Water use	Coordinates
Suriname	Pokigron	- Fishery - Drinking Water - Household Use - Transportation - Navigation - Agricultural Irrigation - Cultural Activities	4°29'18.6"N 55°21'54.4"W
	Kajana		3°54'09.0"N 55°34'21.0"W
	Stonhoekoe		3°53'20.3"N 55°34'19.6"W

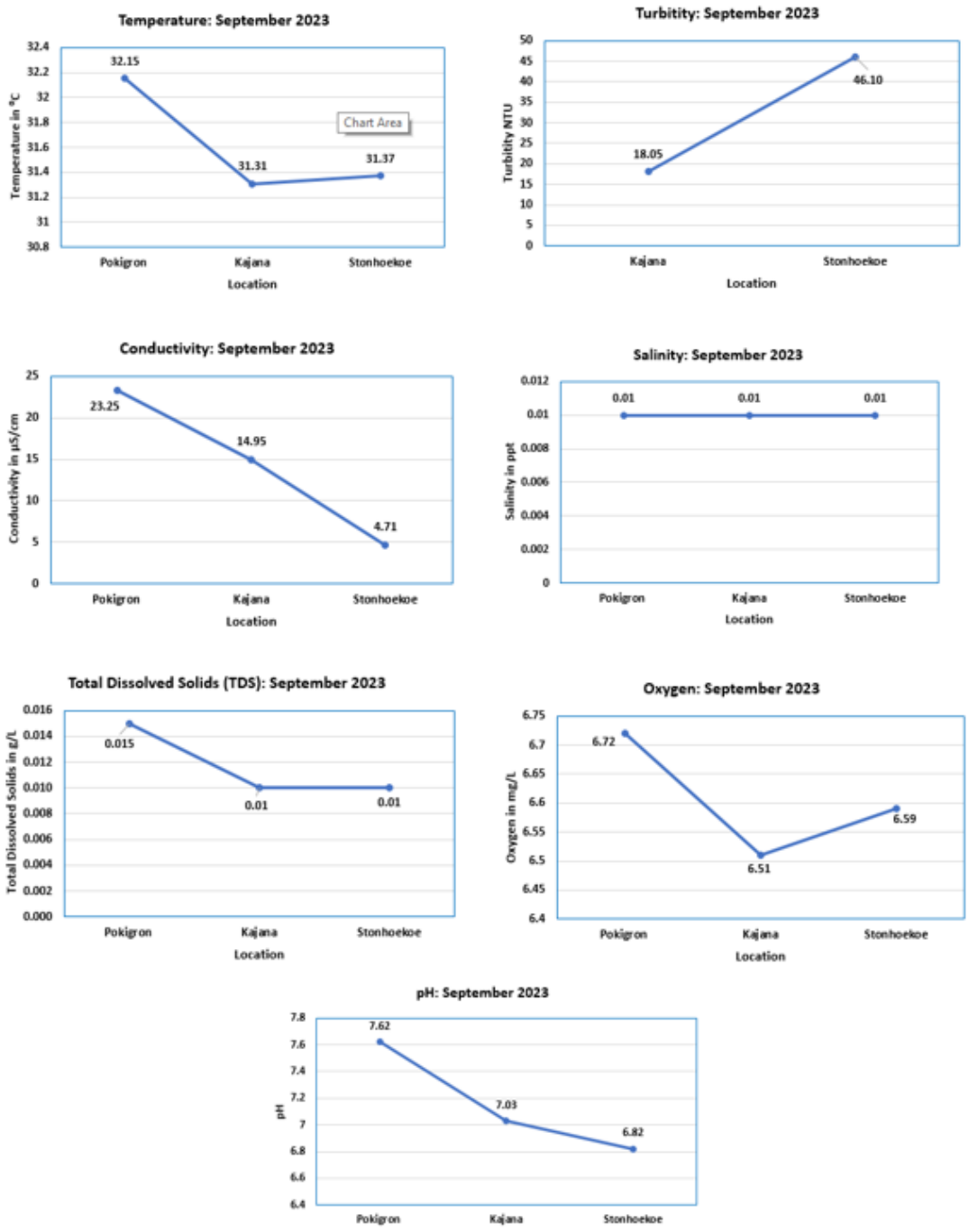


Figure 19: Graphical representation of water quality parameters at Pokigron, Kajana and Stonhoekoe in September

Notes figure 18:

- The month September falls within the dry season in Suriname.
- **Temperature:** The temperature slightly decreases from Pokigron to Kajana, possibly due to their locations relative to the Suriname River.
- **Turbidity:** Increases from Kajana to Stonhoekoe, likely because of stronger water flow upstream.
- **Conductivity:** Decreases from Pokigron to Stonhoekoe, with low conductivity at Stonhoekoe indicating low salt and mineral concentrations.
- **Salinity:** Values remain consistently low during the measured month, suggesting no outside influences.
- **Total Dissolved Solids (TDS):** Show no significant difference.
- **Oxygen:** Levels are slightly above the standard, crucial for aquatic life.
- **pH:** Decreases slightly from Pokigron to Stonhoekoe, possibly due to their downstream locations.

Table 20: Water Quality Measurements and Standards Comparison for Pokigron, Kajana and Stonhoekoe in September

Locations and water quality standards	Date	Time(H)	Weather	Depth	Temp (°C)	Turb(NTU)	Cond (µS/ cm)	Sal (ppt)	TDS (g/L)	DO (Mg/L)	pH
Pokigron	Sep-23	9:30	Sunny	-	32.15	-	23.25	0.01	0.015	6.72	7.62
Kajana	Sep-23	16:00	Sunny	-	31.31	18.05	14.95	0.005	0.01	6.51	7.03
Stonhoekoe	Sep-23	16:19	Sunny	-	31.37	46.10	4.71	0.005	0.01	6.59	6.82
Freshwater (US EPA)	-	-	-	-	-	-	0 – 1500	-	<500	> 6.00	5.00 - 9.00
Irrigation water (FAO)	-	-	-	-	-	-	0 - 3000	-	0 - 2000	-	6.00 - 8.50

Notes table 19:

- All measured parameters meet the required standards for freshwater and irrigation water usage.
- In September, the turbidity at Pokigron wasn't measured because the meter was malfunctioning, hence we lack data.

7. Commewijne- and Cottica River

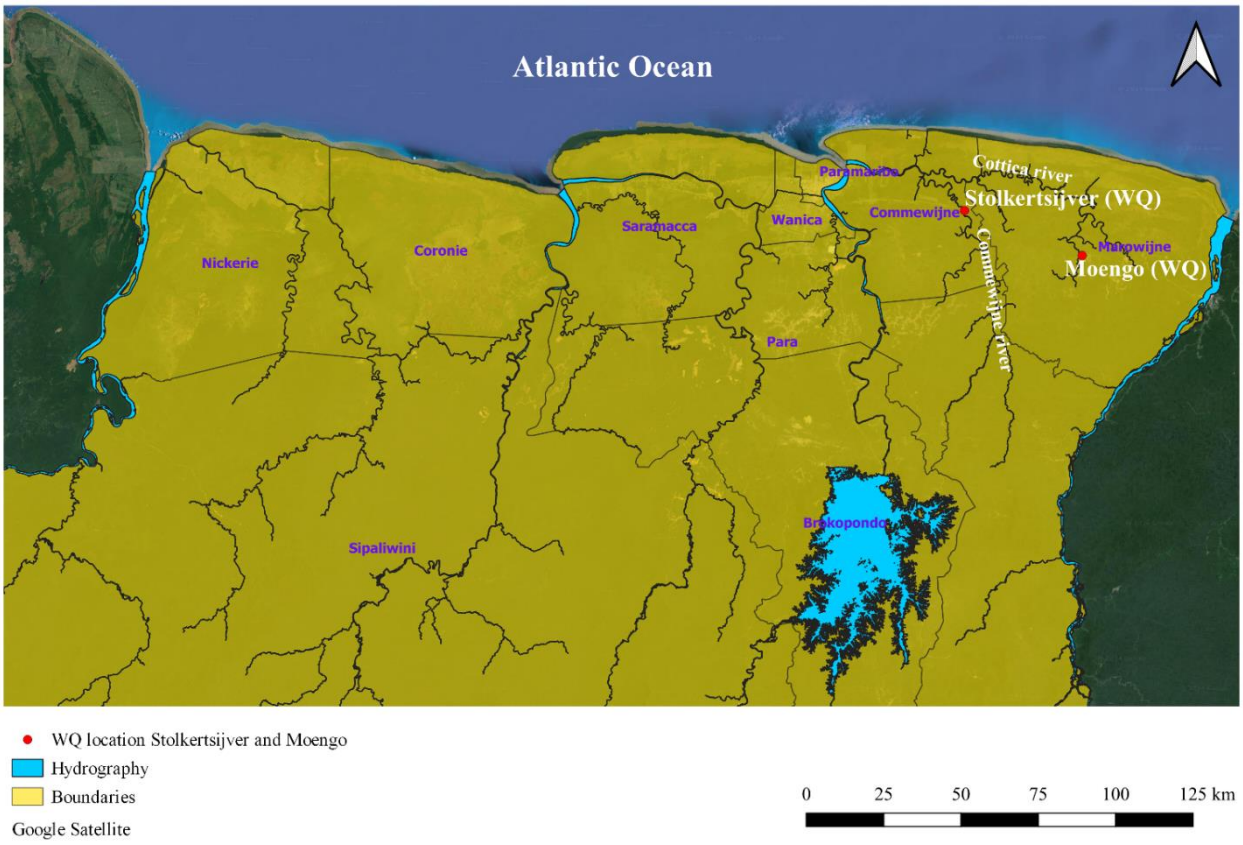


Figure 20: Water quality locations along the Commewijne- and Cottica River

The Commewijne River is primarily used for navigation, transport, tourism, and local fishing. Its source lies in the Hok-A-Hing Mountains near the Brokopondo Lake. This river flows predominantly northward and eventually empties into the Atlantic Ocean via the Suriname River. The Commewijne River basin, covering approximately 6,600 km², includes tributaries such as the Cottica, Cassewinica, Mapane, and Tempati Creeks. This waterway is influenced by the tidal regime of the Atlantic Ocean and human activities such as gold mining.

The Cottica River is of great importance to local communities for transportation, fishing, and economic activities. Its course begins in the east of Suriname, flowing through dense forests and ultimately joining the Commewijne River. The Cottica River basin covers approximately 2900 km². Like the Commewijne River, the water quality of the Cottica River is influenced by the tidal regime of the Atlantic Ocean and freshwater discharge.

River	Location	Water use	Coordinates
Commewijne	Stolkertsijver	- Agricultural Irrigation - Fishery	5°45'18.5"N 54°44'56.7"W
Cottica	Moengo	- Fishery - Drinking Water - Household Use	5°37'20.2"N 54°24'22.8"W

Table 21: In Commewijne and Marowijne districts: overview of locations along the Commewijne and Cottica River and their use of river water, including coordinates

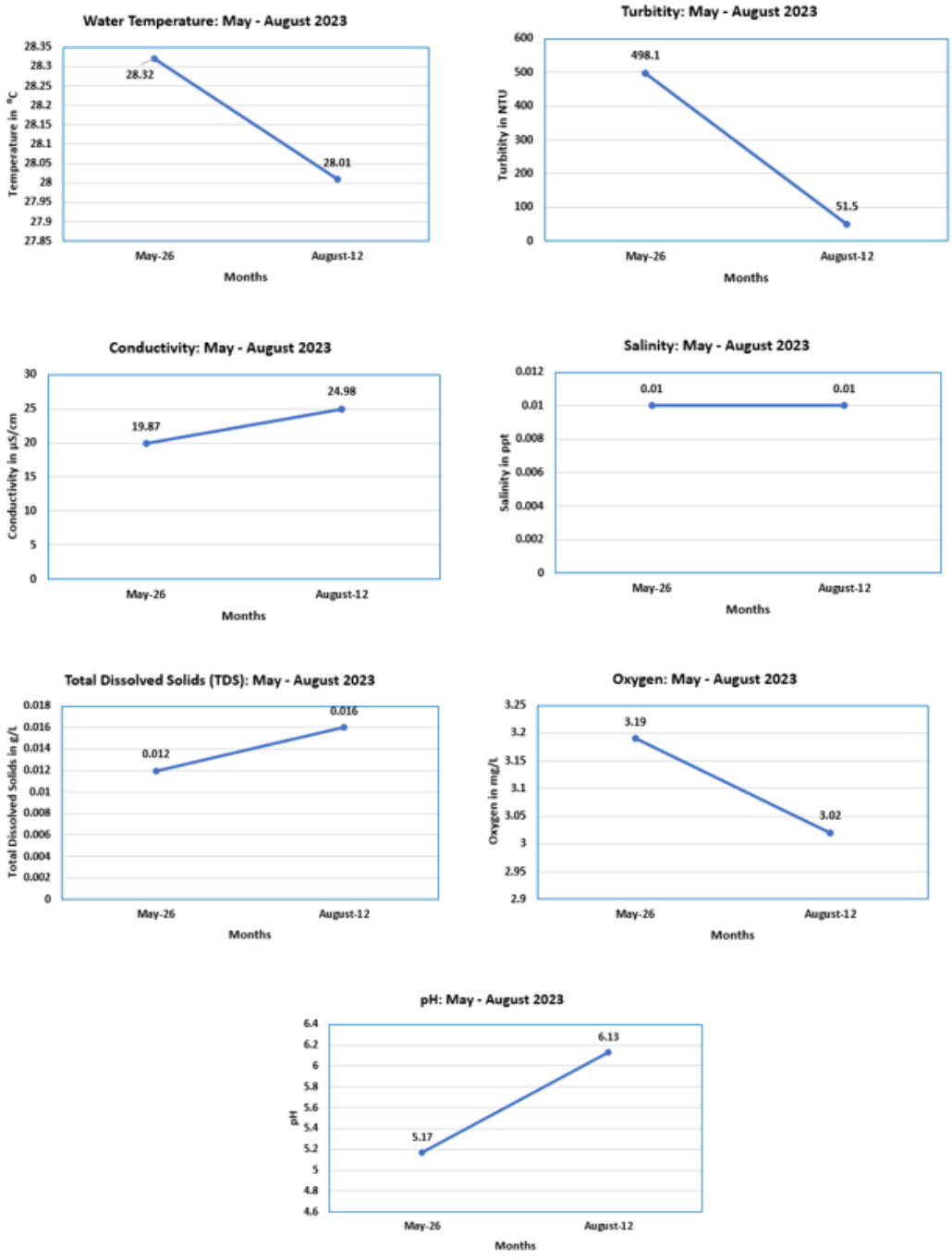


Figure 21: Graphical representation of water quality parameters at Moengo

Notes figure 20:

- The month May is the start of the rainy season and August is the start of the dry season. This impacts the water quality measurements.
- **Temperature:** A slight decrease is measured. This can be due the fact that the dry season starts in August.
- **Turbidity:** A significant decrease is measured. This could be due to a decrease in rainfall. Excessive rainfall causes sediment runoff and soil erosion which leads to a high turbidity. A decrease in rainfall leads to low turbidity measurements.
- **Conductivity:** The measured conductivity values vary and are considerably below the average conductivity standard. The water has a low conductivity range due the possible lack of salt ions or other contaminants present in the water.
- **Salinity:** The predominantly low salinity values indicate freshwater. The salinity values in May and August are low. There is no salt intrusion from the sea and no significant human activities as such that can increase the salinity values in this part of the river.
- **Oxygen:** A slight decrease is measured from May to August. This can be due to the transition from the rainy season to the dry season.
- **pH:** A slight increase is measured from May to August. This can be due to the transition from the rainy season to the dry season.

Table 22: Water Quality Measurements and Standards Comparison for Moengo (Cottica river)

Locations and water quality standards	Date	Time(H)	Weather	Depth	Temp (°C)	Turb (NTU)	Cond (µS/ cm)	Sal (ppt)	TDS (g/L)	DO (Mg/L)	pH
Moengo port	May-26	12:20	Sunny	-	28.01	51.5	24.98	0.01	0.016	3.02	6.13
Moengo port	Aug-12	11:39	Sunny	-	28.32	498.1	19.87	0.01	0.012	3.19	5.17
Freshwater (US EPA)	-	-	-	-	-	-	0 – 1500	-	<500	> 6.00	5.00 - 9.00
Irrigation water (FAO)	-	-	-	-	-	-	0 - 3000	-	0 - 2000	-	6.00 - 8.50

Notes table 21:

- The pH at Moengo in the month of August is lower than the required irrigation water standard, but does meet the required standard for freshwater usage.
- The measured DO levels do not meet the required standards for freshwater and irrigation water usage.

Table 23: Water Quality Measurements and Standards Comparison for Stolkertsijver (Commewijne River)

Water quality standards	Date	Time(H)	Weather	Depth	Temp (°C)	Turb (NTU)	Cond (µS/ cm)	Sal (ppt)	TDS (g/L)	DO (Mg/L)	pH
	Aug-14	10:10	Sunny	-	29.01	0	28.87	0.01	0.018	4.17	6.43
Freshwater (US EPA)	-	-	-	-			0 – 1500		<500	> 6.00	5.00 - 9.00
Irrigation water (FAO)	-	-	-	-			0 - 3000		0 - 2000		6.00 - 8.50

Notes table 22: In the first phase of the project (May – September 2023) the water quality team was only able to go to Stolkertsijver (Commewijne River) one time. There are no measurements of the other months (from the first phase: May- September) to generate a graph. We still wanted to place the measurements in this report to make a comparison with the measurements of the Cottica River, because the Cottica River is a branch of the Commewijne River.

8. Marowijne River

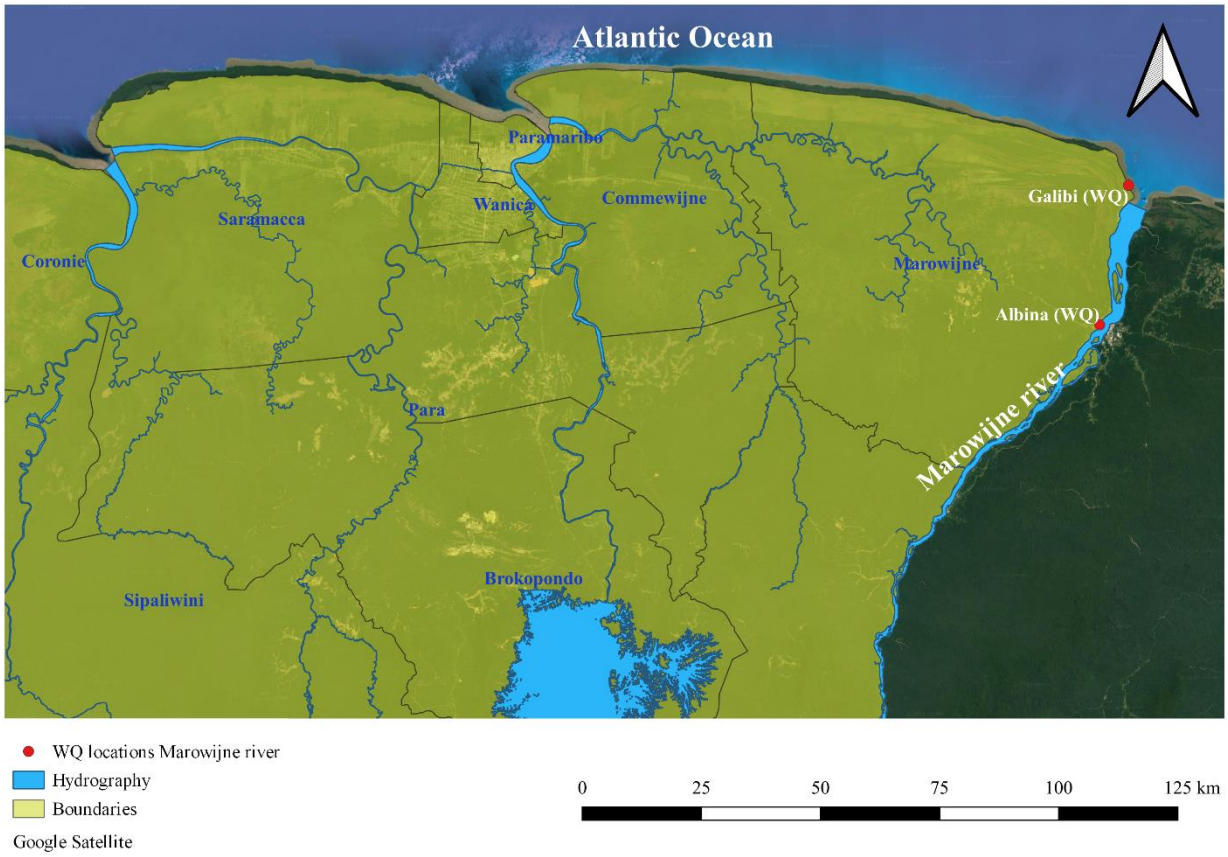


Figure 22: Water quality locations along the Marowijne River

The Marowijne River, located in the eastern part of Suriname on the border with French Guiana, is an important waterway used for navigation and transportation. Small boats and ferries cross the river daily between Albina and Saint Laurent, French Guiana. Commercial activities are observed near the dock in Albina, and upstream, gold mining activities are conducted using skalianen, which affect water quality and the livelihoods of surrounding communities. The Marowijne River is also utilized for tourism and recreational activities, such as turtle spotting downstream.

The river primarily originates in the southern half of Suriname, divided by the Eilerts de Haan Mountains, with approximately 40% of its watershed located in French Guiana. The Lange Tabbetje measurement

station monitors the river's discharge, covering an area of approximately 63,500 km², representing 92% of the total watershed. The estimated average discharge at the mouth of the Marowijne River is 1780 m³/s.

The Marowijne River, also known as Marowini, Maroni, Marwina-liba, and Lawa, spans approximately 609-612 kilometers, depending on the definition. Its watershed includes parts of the Marowijne district in Suriname and provides habitat for diverse plant and animal species, alongside its crucial role in the culture and traditions of local indigenous communities.

Table 24: In Marowijne districts: overview of locations along the Marowijne River and their use of river water, including coordinates

River	Location	Water use	Coordinates
Marowijne	Albina	- Tourism & recreation - Fishery - Transportation - Household use - Drinking water	5°30'17.6"N 54°03'07.5"W
	Galibi		5°46'03.3"N 54°00'21.2"W

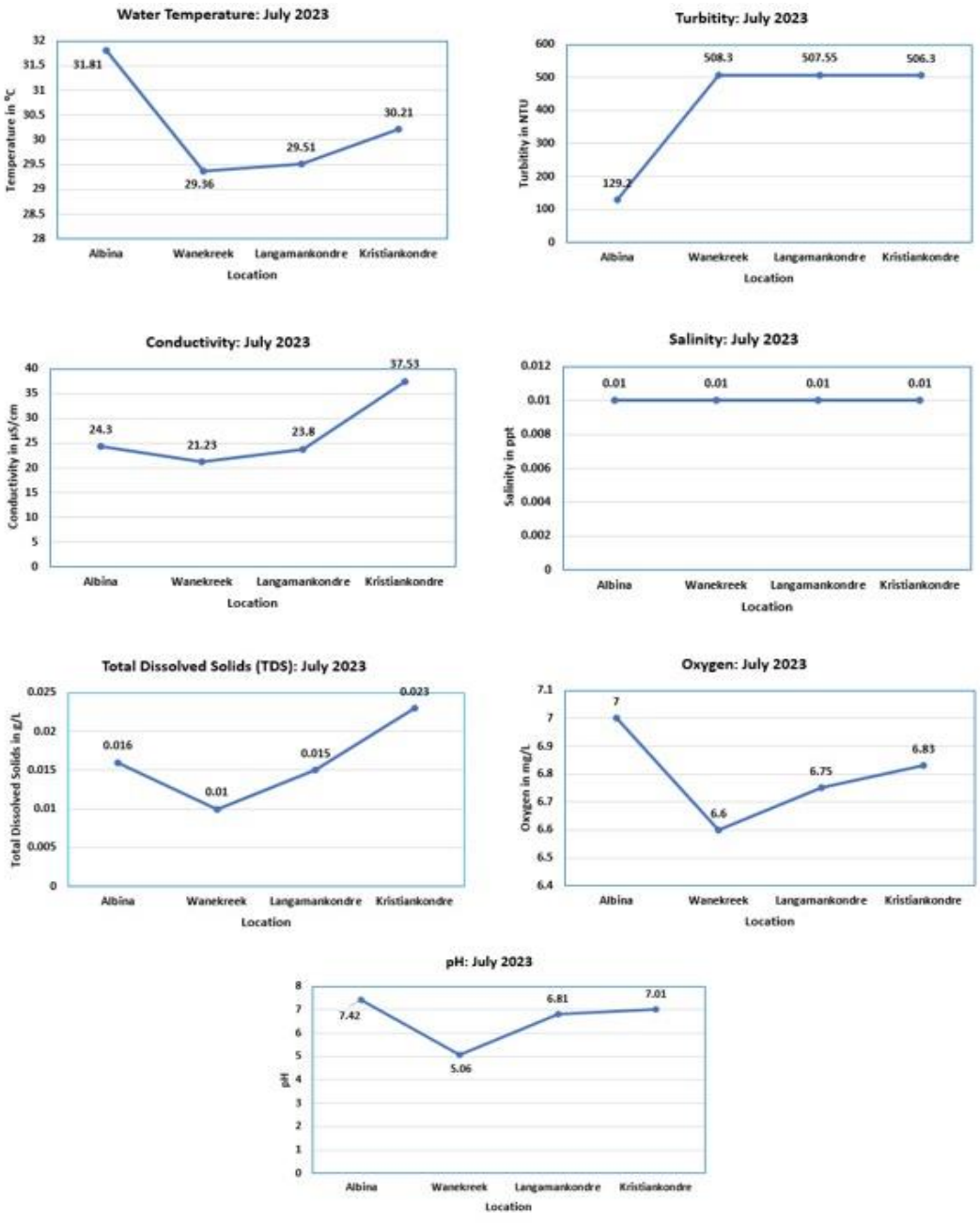


Figure 23: Graphical representation of water quality parameters at Albina and Galibi

Notes figure 22:

- The graphs show how the values of the parameters change from Albina to Galibi. Galibi is more to the North of the Marowijne river and also connects to the sea. The closer we come to the sea the more the values will change and also due to the rainy season which you can see in the graphs. The measurements were taken in July of 2023, which is in the rainy season of Suriname.
- **Temperature:** Fluctuations can be caused by natural factors, environmental influences, hydrological factors, and human activities.
- **Turbidity:** High values suggest poor turbulence, possibly due to factors like sediment runoff and soil erosion.
- **Conductivity:** Lower than average values suggest less pollution in the water.
- **Salinity:** Predominantly low values indicate fresh water, with July values affected by the rainy season and no significant human activities contributing to increased salinity.
- **Total Dissolved Solids (TDS):** Levels remain relatively stable, indicating consistent water quality.
- **Dissolved Oxygen:** Variations observed across locations, but levels remain above the standard value of 6 mg/L, indicating a healthy water body.
- **pH:** Fluctuations may be attributed to strong water currents in the river.

Table 25: Water quality measurements and standards comparison for Albina and Galibi (Marowijne River)

Locations and water quality standards	Date	Time(H)	Weather	Depth	Temp (°C)	Turb (NTU)	Cond (µS/ cm)	Sal (ppt)	TDS (g/L)	DO (Mg/L)	pH
Albina	July 6	18:00	Sunny	-	31.81	129.2	24.3	0.01	0.016	7	7.42
Wanekreek	July 6		Sunny	-	29.36	508.3	21.23	0.01	0.01	6.6	5.06
Langamankondre	July 6	10:10	Sunny	-	29.51	507.55	23.8	0.01	0.015	6.75	6.81
Kristiankondre	July 6	10:40			30.21	506.3	37.53	0.01	0.023	6.83	7.01
Freshwater (US EPA)	-	-	-	-	-	-	0 – 1500	-	<500	> 6.00	5.00 - 9.00
Irrigation water (FAO)	-	-	-	-	-	-	0 - 3000	-	0 - 2000	-	6.00 - 8.50

Notes table 24:

- The measurements in table 24 meet the required standards for freshwater and irrigation water usage, except the pH at Wanekreek which meets the required standard for freshwater usage but not for irrigation water usage.

Conclusion

The quality of water in rivers and streams reflects the underlying climate, geology, and the diverse activities within their catchment areas. Numerous factors contribute to the observed variations in water quality.

A comprehensive study was conducted on water quality across various regions, including the Corantijn River, Nickerie River, Coppename River, Suriname River, Commewijne River, and Marowijne River. Measurements taken between May and September 2023 revealed significant fluctuations, indicating the impact of seasonal factors on water quality.

Despite these fluctuations, the water quality remains generally acceptable based on water quality standards used as mentioned in chapter 2 for a range of purposes, such as sustaining aquatic life and supporting recreational activities. These findings offer valuable insights for policymakers and managers seeking to protect this vital water resource. Implementing adaptable management plans is essential to promptly address changes in water quality.

A strategic understanding of these fluctuations is crucial for maintaining favorable conditions and ensuring sustainable water quality in the examined regions. The report underscores the importance of continuous monitoring to effectively manage fluctuations in water quality over extended periods.

Recommendations

Concrete Actions for Improving Water Quality: Recommendations from the Hydraulic Research Division:

1. **Strengthening Capacity and Expertise:** Invest in training and capacity building within the Hydraulic Service to increase the ability to monitor water quality, analyze data and formulate effective policy measures.

2. **Development of Local Solutions:** Encourage research into and implementation of local solutions for water quality problems, taking into account the specific geographical and ecological characteristics of Suriname.

3. **Public Participation and Awareness:** Actively involve local communities in water resources management and raise awareness about the importance of clean water and sustainable water use.

4. **Collaboration with International Partners:** Work with international organizations and neighboring countries to share expertise, resources and best practices for managing shared water resources and addressing transboundary water pollution.

References:

- ILACO WFS Technical Report #1_Assessment current uses of surface water
- Food and Agriculture Organization (FAO) (2015). The State of Suriname's Biodiversity for Food and Agriculture
- Water quality standards from the US EPA

Annex 1: Procedure Water Quality measurement

- Step 1 the date and time of the instrument must first be synchronized with the tablet or laptop.
- Step 2 lower the sensor into the water so that all sensors are just covered, check the depth reading.
- Step 3 Slowly lower the sensor to the bottom of the location to be measured and measure the depth.
- Step 4 Raise the sensor 10 cm from the bottom using the depth sensor and record the depth.
- Step 5 The second measurement should be taken at 80% of the depth
- Step 6 This is followed by the third measurement. This measurement takes place at 60% of the depth.
- Step 7 The fourth measurement is taken at 40% of the depth.
- Step 8 The fifth measurement is taken at 20% of the depth.
- Step 9 The next measurement is taken at 0.50 meters from the surface.
- Step 10 The sensor is lowered to the 1st measurement to take a sample. This will serve as the first check.
- Step 11 The sensor is then returned to just below the surface and another measurement is taken. This will be the second check.

Workflow for Water Depth Measurement

- Synchronize Date and Time:
- Ensure that the instrument's date and time are synchronized with the tablet or laptop.

- Initial Depth Check:
- Lower the sensor into the water until all sensors are just covered, and check the depth reading.

- Depth Measurement Process:
- Slowly lower the sensor to the bottom of the measurement location and record the depth.

- 10 cm Above Bottom:
- Raise the sensor 10 cm from the bottom using the depth sensor and record the depth.

- 80% Depth Measurement:
- Take the second measurement at 80% of the depth.

- 60% Depth Measurement:
- Take the third measurement at 60% of the depth.

- 40% Depth Measurement:
- Take the fourth measurement at 40% of the depth.

- 20% Depth Measurement:
- Take the fifth measurement at 20% of the depth.

- 0.50 Meters from Surface:
- Take the next measurement at 0.50 meters from the water surface.

- Sample Check - 1st Measurement:
- Lower the sensor to the depth of the first measurement and take a sample for the initial check.

- Surface Measurement - Second Check:
- Return the sensor just below the water surface and take another measurement for the second check.

This clear and concise workflow ensures systematic and accurate water depth measurements, allowing for proper checks and data validation at each step.

Depths may vary depending on tides, environment and specific conditions. This procedure is carried out to check the river stratification. The last two checks are performed to ensure that there has been no change in the previous sampling times

Depth variations are contingent upon tide fluctuations, environmental factors, and specific conditions. This protocol is enacted to assess the stratification of the river. The final two validations are executed to ascertain the absence of alterations in the preceding sampling instances.

Annex 2: Pictures of various locations

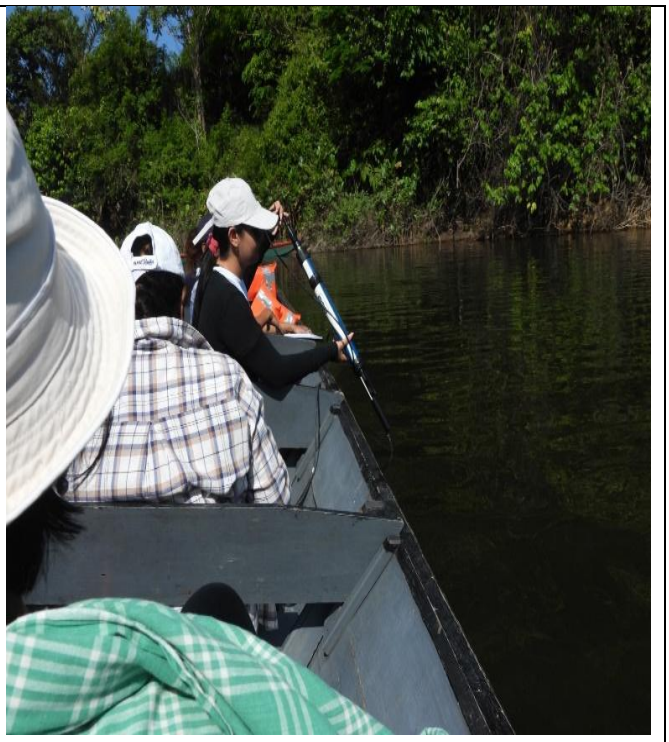
1. Water quality measurement at Boskamp

2. Water quality measurement at Ingas (Nickerie)

3. Water quality measurement at Stolkersijver Bridge

4. Water quality measurement at Marowijne River

5. Water quality measurement and maintenance at Pokigron



6. Water quality measurement at Cajana

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Annex 3: All measurements of the water quality sampling locations

Location	Date	Time	Weather	Depth	Temperature (°C)	Turbidity (NTU)	Conductivity (µS/ cm)	Salinity (ppt)	Total Dissolved Solids (TDS) (g/L)	Dissolved Oxygen (Mg/L)	pH	Color	Comments
Boskamp	13-18 June 2023	10:00	Sunny	1.52	28.09	504.7	60.3	0.02	0.039	1.28	5.95	Light brown	Low waterlevel
				0.57	28.08	500.5	61.9	0.02	0.039	1.33	6.01		
				0.02	28.27	503.4	57.3	0.02	0.037	1.50	6.04		
				1.49	28.21	504.8	57.2	0.02	0.039	1.32	5.90		Checkpoint 1
				0.03	28.21	503.0	57.4	0.02	0.039	1.43	6.02		Checkpoint 2
				0.73	28.17	503.28	58.82	0.02	0.039	1.37	5.98		Average
Boskamp	11-13 July 2023	08:43	Sunny	0.98	27.64	513.9	45.3	0.02	0.029	0.78	5.96		
				0.52	27.54	519.1	47.4	0.02	0.030	0.79	5.93		
				0.01	26.72	522.2	49.0	0.02	0.031	0.81	5.82		
				0.96	27.59	526.9	46.1	0.02	0.029	0.79	5.89		
				0.62	27.37	520.53	46.95	0.02	0.030	0.79	5.90		Average
		08:45	Sunny/ cloudy		29.71	134	3793.4	2.00	2.394	4.52	7.17	Milkey light brown	HL4
Boskamp	22-24 Aug 2023			1.91	30.64	-	18338.4	10.52	11.673	4.33	7.37		High waterlevel, clean environment
				0.89	30.73	-	17852.6	10.48	11.426	4.26	7.36		
				0.01	30.76	-	3974.1	8.03	8.943	4.43	7.33		
				1.90	30.69	-	20999.0	12.52	13.439	4.33	7.28		
				1.18	30.71	454.00	15291.03	10.39	11.370	4.34	7.34		Average
		08:10	Sunny		29.03	454.00	3.3	0.01	0.002	4.01	7.76	Milky brown	HL4 Low and dirty water
Boskamp	05-07 Sept 2023			2.81	30.95	-	8706.9	4.81	5.572	3.63	7.75		
				1.86	31.06	-	9618	5.36	6.155	3.59	7.69		
				0.80	31.07	-	9809	5.48	6.278	3.6	7.73		
				0.00	31.05	-	1052	5.62	6.433	3.65	7.75		
				2.75	31.03	-	12313.8	7.00	7.881	3.75	7.73		Checkpoint 1
				1.64	31.03	510	8299.94	5.65	6.464	3.64	7.73		Average

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Location	Date	Time	Weather	Depth	Temperature (°C)	Turbidity (NTU)	Conductivity (µS/ cm)	Salinity (ppt)	Total Dissolved Solids (TDS) (g/L)	Dissolved Oxygen (Mg/L)	pH	Color	Comments
Coronie Saltwater	13-18 June 2023	11:05	Sunny	1.13	29.99	502.5	1102.6	0.52	0.706	2.12	6.56	Light brown	Clean flowing water
				0.02	30.04	500.5	1089.5	0.52	0.703	2.10	6.57		Fish spotted
				1.13	30.05	504.6	1152.7	0.55	0.703	1.99	6.55		Checkpoint 1
				0.76	30.03	502.53	1114.93	0.53	0.704	2.07	6.56		Average
Coronie Saltwater	21-26 June 2023	10:20	Sunny	1.76	28.89	513.5	106.5	0.37	0.516	0.00	6.76	Dark brown	Oil layer detected
				0.80	28.60	514.3	831.0	0.39	0.532	0.00	6.76		
				0.00	29.14	509.4	867.5	0.41	0.555	0.00	6.73		
				1.75	28.88	503.5	863.7	0.40	0.553	0.00	6.78		Checkpoint 1
				0.01	29.26	513.0	901.9	0.42	0.577	0.00	6.75		Checkpoint 2
				0.86	28.95	510.74	714.12	0.40	0.547	0.00	6.76		Average
Coronie Saltwater	11-13 July 2023	14:10	Sunny	1.88	28.98	513.8	1758.5	0.86	1.125	0.00	7.19	Light brown	
				0.86	29.17	509.6	1754.3	0.86	1.123	0.00	7.20		
				0.01	31.39	511.7	1942.5	0.96	1.243	2.88	7.34		
				1.88	29.74	509.4	1741.9	0.85	1.115	0.00	7.24		Checkpoint 1
				1.16	29.82	511.13	1799.30	0.88	1.152	0.72	7.24		Average
Coronie Saltwater	22-24 Aug 2023	12:14	Sunny	0.42	30.67	-	599.2	0.27	0.383	2.14	6.63	Milky brown	
				0.05	30.71	-	562.2	0.25	0.360	1.98	6.57		Open sluis
				0.24	30.69		580.70	0.26	0.372	2.06	6.60		Average
					31.46	50.8	717.5	0.33	0.459	2.26	6.73		HL4
Coronie Saltwater	05-07 Sept 2023	12:00	Sunny	2.30	31.20	-	3747.2	23.72	23.985	0.00	7.80	Brown	
				1.32	29.36	-	39230.2	24.94	25.107	0.00	7.75		
				0.62	30.16	-	6686.1	73.62	4.279	2.33	7.43		
				0.04	30.56	-	3265.5	1.68	2.900	2.52	7.15		
				2.30	30.86	-	37819.5	23.96	24.204	0.00	7.85		Checkpoint 1
				1.32	30.43		18149.7	29.58	16.095	0.97	7.60		Average
					30.05	119.8	3576.8	1.85	2.289	2.71	6.94		HL4

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Location	Date	Time	Weather	Depth	Temperature (°C)	Turbidity (NTU)	Conductivity (µS/ cm)	Salinity (ppt)	Total Dissolved Solids (TDS) (g/L)	Dissolved Oxygen (Mg/L)	pH	Color	Comments
Lozing 49	21-26 June 2023	10:35	Sunny	1.45	29.27	513.9	879.3	0.41	0.563	0.00	6.97	Light brown	
				0.73	28.77	512.1	821.2	0.38	0.526	0.00	6.88		
				0.00	29.08	109.7	815.6	0.01	0.010	0.00	6.78		
				1.41	28.86	512.8	876.6	0.41	0.561	0.00	6.80		Checkpoint 1
				0.00	28.91	512.1	790.0	0.39	0.506	0.00	6.76		Checkpoint 2
				0.718	28.98	432.12	836.54	0.32	0.4332	0.00	6.84		Average
Lozing 49	11-13 July 2023	10:25	Sunny	1.74	29.97	-	9358.9	5.20	5.990	0.00	7.12	Light brown	Oil layer
				0.78	29.58	-	3359.4	1.73	2.150	0.00	6.65		
				0.03	29.77	-	3076.4	1.57	1.969	0.50	6.82		
				1.67	30.06	-	9253.00	5.14	5.922	0.00	7.11		Checkpoint 1
				1.06	29.85		6261.93	3.41	4.008	0.13	6.93		Average
					29.55	121	3429.4	1.77	2.195	0.83	6.81		HL4
Lozing 49	22-24-Aug 2023	10:00	Sunny	1.99	28.31	-	131.5	0.05	0.084	0.00	6.25	Light brown	
				1.03	28.57	-	137.3	0.06	0.088	0.00	6.27		
				0.04	29.17	-	134.9	0.06	0.092	0.67	6.35		
				1.94	28.42	-	134.0	0.05	0.086	0.00	6.20	Checkpoint 1	
				1.25	28.62		134.43	0.06	0.088	0.168	6.27	Average	
					28.37	50.9	153.3	0.06	0.098	0.93	6.42	HL4	
Lozing 49	05-07 Sept 2023	09:40	Sunny	1.89	29.63	-	9343.9	5.20	5.980	0.00	7.08	Light brown	
				0.98	29.80	-	9330.1	5.19	5.971	0.00	7.11		
				0.03	29.96	-	9264.8	5.15	5.929	0.00	7.11		
				1.87	29.68	-	9368.8	5.21	5.996	0.00	7.11		Checkpoint 1
				1.19	29.77		9326.90	5.19	5.969	0.00	7.10		Average
					29.72	107.8	9656.3	5.39	6.179	0.8	6.95		HL4
Lozing 52	22-24 Aug 2023	09:40	Sunny	0.61	27.19		148.2	0.06	0.095	0.97	6.46	Brown	
				0.01	27.23		148.5	0.06	0.095	0.98	4.46		
				0.31	27.21		148.35	0.06	0.095	0.98	5.46		Average
					27.35	112.7	157.3	0.07	0.101	1.22	6.44		HL4
Lozing 52	05-07 Sept 2023	09:10	Sunny	0.59	27.79	-	474.6	0.21	0.304	0.99	7.14		
				0.01	28.38	-	317.3	0.14	0.203	2.33	7.09		Checkpoint 1
				0.30	28.09		395.95	0.18	0.254	1.66	7.12		Average
					27.80	92.4	339.7	0.15	0.217	2.16	6.98		HL4

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Wageningen (Nickerie River)	13-18 June 2023	13:20	Sunny	0.45	29.12	5005.3	64.5	0.03	0.041	0.77	5.85		
				0.02	30.60	504.4	75.5	0.03	0.048	1.18	5.99		
				0.45	29.00	507.2	66.4	0.03	0.420	0.77	5.68		Checkpoint 1
				0.31	29.57	2005.63	68.80	0.03	0.170	0.91	5.84		Average
Coronie Freshwater	13-18 June 2023	11:50	Sunny	1.70	29.76	502.1	110.4	0.04	0.071	0.000	5.98	Brown	Low waterlevel
				0.94	29.59	498.0	110.7	0.04	0.071	0.000	6.00		
				0.02	29.87	499.3	111.0	0.04	0.071	0.000	6.02		
				0.90	29.66	500.5	111.5	0.05	0.710	0.000	5.96		Checkpoint 1
				0.89	29.72	499.98	110.90	0.04	0.231	0.000	5.99		Average
Coronie Freshwater	11-13 July 2023	15:40	Sunny	1.86	29.50	521.2	101.1	0.04	0.065	0.00	6.10	Very light brown	
				0.84	29.88	516.7	99.8	0.04	0.064	0.00	6.10		
				0.01	29.72	515.9	100.6	0.04	0.064	0.13	6.11		
				1.85	29.53	516.0	100.2	0.04	0.064	0.00	6.04		Checkpoint 1
				1.14	29.66	517.45	100.43	0.04	0.064	0.03	6.09		Average
Coronie Freshwater	22-24 Aug 2023	11:23	Sunny	1.60	28.69	-	112.7	0.05	0.072	0	6.16	Very light brown	
				0.79	29.01	-	111.8	0.05	0.072	0	6.13		
				0.01	27.77	-	120.1	0.05	0.077	0	6.20		
				1.58	29.04	-	114.4	0.05	0.073	0	6.10		
				1.00	28.63		114.75	0.05	0.074	0	6.15		Average
					29.53	20.50	124.4	0.05	0.079	0.43	6.37		HL4
Coronie Freshwater	05-07 Sept 2023	11:25	Sunny	1.65	29.35	-	111.2	0.04	0.071	0.00	6.37	Light brown	
				0.83	29.66	-	110.0	0.04	0.07	0.00	6.23		
				0.01	30.33	-	115.9	0.05	0.074	0.93	6.27		
				1.70	29.07	-	115.3	0.05	0.074	0.00	6.29		Checkpoint 1
				1.05	29.60		113.10	0.05	0.072	0.23	6.29		Average
					30.54	38.2	125.8	0.05	0.081	1.01	6.21		HL4

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Burnside	11-13 July 2023	17:00	Sunny		28.72	522.4	109	0.04	0.07	3.95	6.07		klep open
Burnside	22-24 Aug 2023	12:51	Sunny		29.48	87.5	150.9	0.06	0.097	3.99	6.27		HL4
Burnside					29.91	-	145.0	0.06	0.093	4.22	6.38		HL7
Burnside	05-07 Sept 2023	13:15	Sunny	0.99	29.35		9647.4	5.38	6.174	4.26	6.83		
				0.00	30.28		7970.6	4.38	5.101	4.85	6.85		
				0.50	29.82		8809.00	4.88	5.638	4.56	6.84		Average
					29.47	52.2	7631.2	4.74	4.948	4.38	6.79		HL4
Adamming	13-18 June 2023	12:30	Sunny	0.13	31.83	506.1	949.8	0.45	0.608	6.33	6.89	Dark brown	
Afdamming	21-26 June 2023	11:57	Sunny	0.53	27.43	514.2	426.8	0.19	0.273	0.00	5.51		
				0.03	28.97	506.3	433.0	0.19	0.277	0.00	5.49		
				0.50	29.23	505.2	435.6	0.19	0.279	0.00	5.49		Checkpoint 1
				0.35	28.54	508.57	431.8	0.19	0.2763	0.00	5.50		Average
Afdamming	11-13 July 2023	17:30			30.18	525	824.1	0.38	0.527	6.69	7.18	High waterlevel	
Afdamming overkant	11-13 July 2023	17:45		1.20	28.08	539.3	410.3	0.18	0.263	0.00	6.00	Stagnant water	
				0.56	28.09	522.3	376.7	0.17	0.210	0.00	5.63	Fish	
				0.01	28.23	521.6	380.1	0.17	0.243	0.00	5.64	Dark brown	
				1.23	28.30	520.5	440.7	0.20	0.282	0.00	6.46	Light brown	Checkpoint 1
				0.75	28.18	525.93	401.95	0.18	0.250	0.00	5.93		Average

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Afdamming	22-24 Aug 2023	13:30	Sunny		32.04	147.90	861.7	0.4	0.551	5.8	7.14	Milky dark brown	HL4
					29.03	-	879.4	0.41	0.563	7.04	7.11		HL7
Afdamming overkant	22-24 Aug 2023	14:00	Sunny	1.28	27.28	-	438.7	0.20	0.281	0.00	5.78	Brown	
				0.70	28.08	-	428.4	0.19	0.274	0.00	5.75		
				0.01	28.67	-	421.4	0.19	0.270	0.00	5.73		
				1.27	28.15	-	434.8	0.19	0.278	0.00	5.75		Checkpoint 1
				0.82	28.05		430.83	0.19	0.276	0.00	5.75		Average
					28.41	12.20	444.2	0.2	0.284	0.43	5.59		HL4
Afdamming	05-07 Sept 2023	14:20	Sunny		31.02		897.3	0.42	0.574	7.11	7.46	Milky dark brown	HL7
					30.82	293.30	926.1	0.44	0.597	6.34	7.54		HL4
Afdamming overkant	05-07 Sept 2023	14:50	Sunny	1.19	28.49		465.8	0.20	2.292	0.10	5.98		Low waterlevel, grass in the middle and on the side
				0.58	28.31		462.3	0.21	0.296	0.00	5.95		
				0.03	30.11		465.3	0.21	0.298	0.27	5.94		
				1.14	28.40		460.9	0.21	0.295	0.00	5.93		Checkpoint 1
				0.74	28.83		463.58	0.21	0.795	0.09	5.95		Average
					30.76	30.3	491	0.22	0.314	0.59	5.96		HL4

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Kaaimanpolder bridge 1	21-26 June 2023	12:55	Sunny	2.06	27.79	510.2	295.5	0.13	0.189	0.00	6.63		
				1.05	29.88	515.3	361.4	0.16	0.231	0.00	6.89		
				0.05	35.04	509.9	376.8	0.17	0.241	4.86	7.14		
				2.06	28.07	513.2	292.6	0.13	0.187	0.00	6.67		Checkpoint 1
				0.04	34.65	511.5	379.6	0.17	0.243	6.44	6.20		Checkpoint 2
				1.05	31.09	512.02	341.18	0.152	0.218	2.26	6.71	Average	
Kaaimanpolder bridge 1	11-13 July 2023	18:15		2.66	26.74	526.2	610.8	0.28	0.391	0.00	6.91	Black, brown	
				1.63	28.27	527.7	370.3	0.16	0.237	0.40	6.81		
				0.69	30.23	525.0	362.2	0.16	0.232	1.39	6.69		
				0.02	30.93	526.8	370.3	0.16	0.237	3.13	7.22		
				2.60	30.63	523.2	481.3	0.22	0.308	0.00	6.79		Checkpoint 1
				1.52	29.36	525.78	438.98	0.20	0.281	0.98	6.884		Average
Kaaimanpolder bridge 1	22-24 Aug 2023	15:00	Sunny	2.63	28.50	-	714.3	0.33	0.457	0.00	6.69		Low waterlevel, densely overgrown
				1.67	28.58	-	438.9	0.20	0.281	0.00	6.75		
				0.60	29.19	-	418.5	0.19	0.268	0.00	6.75		
				0.00	35.08	-	421.2	0.19	0.270	3.68	6.95		
				2.65	29.11	-	561.2	0.25	0.359	0.00	6.72		Checkpoint 1
				1.51	30.09		510.82	0.23	0.327	0.74	6.77		Average
					31.35	79.1	457.9	0.2	0.292	4.7	6.89		HL4
Kaaimanpolder bridge 1	05-07 sept 2023	15:45	Sunny	1.43	29.29		530.5	0.24	0.340	0.00	6.80	Milky brown	
				0.76	29.03		531.1	0.24	0.340	0.00	6.78		
				0.04	32.98		495.6	0.22	0.317	2.62	7.07		
				1.38	29.43		527.8	0.24	0.338	0.00	6.76		
				0.90	30.18		521.25	0.24	0.334	0.66	6.85		Average
					33.9	116.70	522.2	0.24	0.334	4.17	7.08		HL4

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Kaaimanpolder bridge 2	21-26 June 2023	10:25	Sunny	1.06	29.84	502.0	209.7	0.09	0.134	0.00	6.89		Low waterlevel and a lot of grass
				0.55	29.77	502.2	210.2	0.096	0.135	0.00	6.85		
				0.01	31.23	502.9	213.1	0.09	0.136	1.78	6.95		
				1.07	29.98	506.4	209.5	0.09	0.134	0.00	6.92		Checkpoint 1
				0.00	31.09	504.4	215.2	0.09	0.138	2.22	7.03		Checkpoint 2
				0.54	30.38	503.58	211.54	0.09	0.135	0.80	6.93		Average
Kaaimanpolder bridge 2	11-13 July 2023	18:55	Sunny	0.97	31.11	528.3	224.4	0.10	0.144	0.47	6.99	Brown, green	Densely overgrown
				0.00	31.70	527.0	230.4	0.10	0.147	1.96	7.02		
				0.49	31.41	527.65	227.4	0.10	0.146	1.22	7.01		Average
Kaaimanpolder bridge 2	22-24 Aug 2023	16:00	Sunny	0.54	31.33	-	198.8	0.08	0.127	0.00	6.74	Milky brown	
				0.02	34.37	-	196.8	0.08	0.126	1.80	6.73		
				0.28	32.85		197.8	0.08	0.127	0.90	6.74		Average
					34.01	95.4	211.4	0.09	0.135	2.2	6.72	HL4	
Kaaimanpolder bridge 2	05-07 Sept 2023	16:35	Sunny	0.83	31.15		275.4	0.12	0.176	0.28	6.63	Light brown	
				0.02	32.28		281.2	0.12	0.180	1.08	6.70		
				0.43	31.72		278.3	0.12	0.178	0.68	6.67		Average
					32.07	58.40	96.27	290.1	0.13	0.186	6.77		HL4

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Wageningen	13-18 June 2023	13:20	Sunny	0.45	29.12	505.3	64.5	0.03	0.041	0.77	5.85		
				0.02	30.60	504.4	75.5	0.03	0.048	1.18	5.99		
				0.45	29.00	507.2	66.4	0.03	0.042	0.77	5.86		Checkpoint 1
				0.31	29.57	505.63	68.80	0.03	0.044	0.91	5.90		Average
Wageningen	11-13 July 2023		Sunny		29.59	520.40	57.3	0.02	0.037	1.28	6.74	Light brown	Measured from a bucket
Wageningen	22-24 Aug 2023	16:50	Sunny	HL7	31.78		42.7	0.02	0.027	2.81	6.07	Light brown	HL7
					31.1	38.60	46.6	0.02	0.03	2.51	6.43		HL4
Wageningen	05-07 Sept 2023	17:40	Sunny	0.60	31.10		33.9	0.01	0.022	2.57	5.85		
				0.00	31.45		39.5	0.01	0.025	2.55	5.90		
				0.30	31.28		36.7	0.01	0.024	2.56	5.88	Average	
					31.18	36.10	43.7	0.02	0.028	2.3	6.05	HL4	

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Stalweide bridge	21-26 June 2023	11:07	Sunny	1.72	29.54	506	286.8	0.12	0.184	0.00	7.05	Milky brown	Suspended particles, oil layer, odor
				0.72	29.56	505.3	279.6	0.12	0.179	0.00	7.01		
				0.02	30.71	502	266.1	0.11	0.17	0.00	6.96		
				1.72	29.62	503	286.7	0.12	0.183	0.00	7.07		Checkpoint 1
				0.01	30.94	504.6	264.5	0.11	0.169	0.00	6.96		Checkpoint 2
				0.84	30.07	504.18	276.74	0.12	0.177	0.00	7.01		Average
Stalweide bridge	11-13July 2023	19:23		1.77	30.97	528.1	242.2	0.10	0.155	1.10	7.04	Light brown	
				0.72	31.06	527.8	244.5	0.10	0.156	1.14	7.03	milkybruin	
				0.00	30.93	526.0	247.4	0.11	0.158	1.25	7.05		
				1.77	31.06	527.9	245.2	0.10	0.157	1.20	7.03		Checkpoint 1
				1.07	31.01	527.45	244.83	0.10	0.157	1.17	7.04		Average
Stalweide bridge	22-24 Aug 2023	06:58	Cloudy	1.19	30.13		217.0	0.09	0.139	1.22	6.90	Milky brown	Dirty water and low waterlevel
				0.52	30.03		139.1	0.06	0.089	0.78	6.84		
				0.03	30.17		173.4	0.07	0.111	1.08	6.80		
				1.15	30.16		170.0	0.07	0.109	0.89	6.76		Checkpoint 1
				0.72	30.12		174.88	0.07	0.112	0.99	6.83		Average
					25.93	181.30	128.9	0.05	0.083	1.89	6.74		HL4
Stalweide bridge	05-07 Sept 2023	18:30	Sunny	1.19	31.88		46.2	0.02	0.03	2.97	6.09	Light brown	
				0.47	32.29		49.6	0.02	0.032	2.90	6.17		
				0.01	32.98		55.8	0.02	0.036	3.23	6.22		
				1.19	31.73		44.1	0.02	0.028	2.82	6.05		
				0.72	32.22		48.93	0.02	0.032	2.98	6.13		Average
					33.19	71.30	62.1	0.02	0.04	3.16	7.19		HL4

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Ingas scaffold EBS	13-18 June 2023	17:25	Sunny	8.07	28.49	506.9	50.0	0.02	0.032	0.79	6.06		High waterlevel
				6.08	28.49	506.2	50.1	0.02	0.032	0.80	6.04		
				4.05	28.55	505.2	50.1	0.02	0.032	0.82	6.07		
				2.05	28.61	507.4	50.1	0.02	0.032	0.88	6.09		
				0.03	28.61	506.9	76.6	0.03	0.049	0.95	6.06		
				6.00	28.49	505.1	49.6	0.02	0.032	0.77	6.01		Checkpoint 1
				0.03	28.62	505.9	76.0	0.03	0.049	0.95	6.05		Checkpoint 2
				3.76	28.55	506.23	57.50	0.02	0.037	0.85	6.05		Average
Ingas steiger EBS	11-13July 2023	10:44	Sunny/cloudy	7.15	28.16	524.7	55.2	0.02	0.035	1.05	6.12	Light brown	
				5.10	28.12	525.8	55.4	0.02	0.035	1.04	6.16		
				3.11	28.15	525.1	55.4	0.02	0.035	1.22	6.15		
				1.12	28.3	524.3	55.5	0.02	0.036	2.40	6.17		
				0.01	28.48	525.2	61.8	0.02	0.040	1.19	6.16		
				7.15	28.81	526.8	54.8	0.02	0.035	1.00	6.11		Checkpoint 1
				0.01	28.26	527.8	61.4	0.02	0.039	1.27	6.16		Checkpoint 2
				3.38	28.33	525.67	57.07	0.02	0.036	1.31	6.15		Average
Ingas steiger EBS	05-07 Sept 2023	15:10	Sunny	6.44	30.00		40237.2	25.66	25.752	4.18	7.94	Milky brown	
				4.33	30.49		25808.1	15.69	16.517	3.39	7.75		
				2.43	31.35		10591.8	5.95	6.779	2.96	7.31		
				0.02	31.63		5553.9	2.97	3.555	3.02	7.15		
				6.45	29.99		40273	25.69	25.775	4.07	7.91		
				3.93	30.69		24492.80	15.19	15.68	3.52	7.61		Average
					31.4	226.40	5583.4	2.98	3.577	0.14	7.06		HL4

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Henar bridge	13-18 June 2023	10:30	Sunny	3.65	28.13	512.8	56.0	0.02	0.036	0.80	5.68		Low waterlevel and strong current
				2.66	28.14	507.1	57.2	0.02	0.037	0.80	5.74		
				1.71	28.15	508.4	57.7	0.02	0.037	0.81	5.75		
				0.67	28.15	506.6	58.7	0.02	0.038	0.81	5.75		
				0.01	26.84	509.3	33.4	0.01	0.021	0.00	5.70		
				3.59	28.16	506.9	58.7	0.02	0.038	0.79	5.66		Checkpoint 1
				0.02	28.18	508.1	60.0	0.02	0.038	0.00	5.80		Checkpoint 2
				1.76	27.96	508.46	54.53	0.019	0.035	0.57	5.73		Average
Henar bridge	11-13 July 2023	12:41	Rainy	4.56	27.52	525.0	48.9	0.02	0.031	1.52	5.94	Light brown	High waterlevel
				3.57	27.57	530.2	49.0	0.02	0.031	1.29	5.95		
				2.50	27.58	527.9	48.7	0.02	0.031	1.19	5.96		
				1.59	27.83	529.4	48.7	0.02	0.031	1.17	5.98		
				0.02	25.58	528.5	0.0	0.00	0.000	1.79	5.94		
				4.58	27.9	531.1	48.7	0.02	0.031	1.22	5.94		Checkpoint 1
				0.05	27.93	530.2	52.5	0.02	0.034	1.48	6.01		Checkpoint 2
				2.41	27.42	528.90	42.36	0.02	0.027	1.38	5.96		Average
Henar bridge	22-24 Aug 2023	08:00	Cloudy	3.68	30.13		43.5	0.02	0.028	2.51	6.16	Brown	Low waterlevel
				2.64	30.23		44.6	0.02	0.029	2.52	6.08		
				1.50	30.25		38.7	0.01	0.025	2.51	6.12		
				0.48	30.25		38.6	0.01	0.025	2.52	6.15		
				0.00	30.19		43.4	0.02	0.028	2.55	6.03		
				1.66	30.21		41.76	0.02	0.027	2.52	6.11		Average
					29.74	115.90	48.3	0.02	0.031	2.55	7.31		HL4
Henar bridge	05-07 Sept 2023	13:01	Sunny	4.12	31.49		40.2	0.02	0.026	3.03	6.31		
				3.13	31.20		40.2	0.02	0.026	3.03	6.31		
				2.12	31.22		40.3	0.02	0.026	3.03	6.23		
				1.15	31.26		40.4	0.02	0.026	3.04	6.26		
				0.03	31.40		42.3	0.02	0.027	3.08	6.24		Checkpoint 1
				4.13	31.26		40.4	0.02	0.026	3.02	6.25		Checkpoint 2
				2.45	31.31		40.63	0.02	0.026	3.038	6.27		Average
					30.89	129.00	53.7	0.02	0.034	2.87	7.14		HL4

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Nani swamp (1st bridge Baitali)	13-18 June 2023	17:30	Rainy	2.95	29.85	517.2	35.6	0.01	0.023	0.85	5.81	Light brown	
				1.95	29.90	507.9	35.6	0.01	0.023	0.82	5.87		
				0.93	29.30	501.7	35.7	0.01	0.023	0.82	5.87		
				0.01	29.85	508.6	35.9	0.01	0.023	0.90	5.84		
				2.90	29.88	507.4	35.5	0.01	0.023	0.88	5.90		Checkpoint 1
				1.75	29.76	508.56	35.66	0.01	0.023	0.85	5.86		Average
Nani swamp (1st bridge Baitali)	13-18 June 2023	17:00	Sunny/Cloudy	0.74	30.18	510.0	33.4	0.01	0.021	0.31	5.94	Light brown	
				0.00	30.00	499.1	33.7	0.01	0.022	0.65	5.92		
				0.37	30.09	504.55	33.55	0.01	0.022	0.48	5.93		Average
Nani swamp 2nd bridge	13-18June 2023	18:15	Sunny	3.06	29.49	510.9	41.1	0.02	0.026	0.00	5.93	Light brown	Floating particles. 1 valve closed
				2.03	29.54	510.8	38.1	0.01	0.024	0.00	5.95		
				1.03	29.68	508.4	34.6	0.01	0.022	0.03	5.98		
				0.00	29.51	505.2	37.6	0.01	0.024	0.00	5.96		
				3.03	29.50	509.6	42.8	0.02	0.027	0.00	5.99		Checkpoint 1
				0.03	29.62	509.8	35.0	0.01	0.022	0.00	5.94		Checkpoint 2
				1.53	29.56	509.12	38.20	0.01	0.024	0.01	5.96		Average
Nani swamp (sluice	13-18 June 2023	10.2	Sunny	3.73	28.85	511.8	37.3	0.01	0.024	0.00	5.97	Light brown	Clean flowing water
				2.72	28.88	508.1	37.8	0.01	0.024	0.00	5.85		
				1.73	28.91	511.6	38.4	0.01	0.025	0.00	5.86		
				0.70	28.95	511.0	38.4	0.01	0.025	0.03	5.84		
				0.00	28.93	511.7	39.5	0.01	0.025	0.11	5.78		
				3.70	28.91	511.7	37.4	0.01	0.024	0.10	5.75		Checkpoint 1
				0.03	28.12	512.7	39.4	0.01	0.025	0.24	5.84		Checkpoint 2
				1.80	28.79	511.23	38.31	0.01	0.025	0.07	5.84		Average
Nani swamp (1st bridge Baitali)	11-13 July 2023	13:56	Rainy	1.71	29.02	529.4	35.5	0.01	0.018	1.83	6.01	Very light brown	
				0.80	29.04	531.0	33.7	0.01	0.018	1.83	5.95		
				0.00	29.03	528.0	41.1	0.01	0.021	1.88	6.02		
				1.76	29.04	526.4	38.1	0.01	0.018	1.86	5.95		
				1.07	29.03	528.70	37.10	0.01	0.019	1.85	5.98		Average

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Nani swamp 2nd bridge	11-13 July 2023	14:45	Rainy	3.06	28.73	525.8	37.3	0.01	0.023	1.15	5.98	Very lightbrown	
				2.03	28.71	525.2	37.8	0.01	0.02	1.17	5.95		
				1.07	28.90	524.1	38.4	0.01	0.018	1.24	5.92		
				0.00	28.96	523.1	38.4	0.01	0.022	1.20	5.96		
				3.04	28.88	524.0	39.5	0.01	0.020	1.19	5.92		
				1.84	28.84	524.44	38.28	0.01	0.021	1.19	5.95		Average
Nani swamp (1st bridge Baitali)	05-07 Sept 2023	10:01	Sunny	2.73	31.35		45.6	0.02	0.029	4.33	6.80		
				1.73	31.33		45.5	0.02	0.029	4.36	6.78		
				0.93	31.38		45.5	0.02	0.029	4.43	6.74		
				0.03	31.48		50.5	0.02	0.032	4.63	6.72		
				2.70	31.36		45.5	0.02	0.029	4.37	6.74		Checkpoint 1
				1.62	31.38		46.52	0.02	0.030	4.42	6.76		Average
					31.35	176.20	55.4	0.02	0.035	4.12	6.74		HL4
Nani swamp 2nd bridge	05-07 sept 2023	11:00	Sunny	1.14	29.63		124.4	0.05	0.078	0.00	6.74	Light brown	
				0.60	30.02		126.3	0.05	0.081	0.00	6.78		
				0.02	31.44		87.0	0.03	0.056	0.00	6.73		
				1.14	29.85		122.2	0.05	0.078	0.00	6.74		Checkpoint 1
				0.73	30.24		114.98	0.05	0.073	0.00	6.75		Average
					31.18	96.80	85.4	0.03	0.055	0.89	6.42		HL4
Nani swamp	05-07 Sept 2023	09:00	Sunny	2.64	31.32		42.7	0.02	0.027	4.33	7.10	Light brown	
				1.64	31.28		42.6	0.02	0.027	4.29	6.89		
				0.80	31.29		42.6	0.02	0.027	4.32	6.84		
				0.01	31.30		47.3	0.02	0.030	4.38	6.74		
				2.63	31.30		43.1	0.02	0.028	4.35	6.73		Checkpoint 1
				1.54	31.30		43.66	0.02	0.028	4.33	6.86		Average
					27.62	125.10	52.1	0.02	0.033	4.07	6.67		HL4

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Nani sluice	21-26 June 2023	09:17	Sunny	1.85	29.39	507.1	141.7	0.06	0.910	1.02	6.89	Milky brown	
				0.83	30.34	507.1	141.1	0.06	0.900	1.82	6.90		
				0.01	30.86	509.7	158.9	0.07	0.102	1.82	7.03		
				1.82	29.47	508.3	141.3	0.06	0.900	0.99	6.86		Checkpoint 1
				0.00	30.81	507.3	159.5	0.07	0.102	1.86	7.04		Checkpoint 2
				0.90	30.17	507.90	148.50	0.06	0.583	1.50	6.94		Average
Nani sluice	11-13 July 2023	17:45	Cloudy	1.31	30.04	520.4	119.8	0.05	0.077	2.07	6.90	Milky light brown	
				0.66	30.14	517.1	118.1	0.05	0.076	2.59	6.91		
				0.01	30.20	516.1	122.8	0.05	0.079	2.75	6.94		
				1.26	30.17	516.8	117.0	0.05	0.075	2.47	6.90		Checkpoint 1
				0.81	30.14	517.60	119.43	0.05	0.077	2.47	6.91		Average
Nani sluice	22-24 Aug 2023	13:30	Sunny	1.44	31.27		218.7	0.09	0.140	2.03	7.07	Milky light brown	
				0.69	31.38		243.0	0.10	0.156	2.64	7.10		
				0.00	32.44		112.3	0.05	0.072	2.01	6.96		
				1.42	31.37		225.7	0.10	0.144	1.92	6.99		Checkpoint 1
				0.89	31.62		199.93	0.09	0.128	2.15	7.03		Average
					31.76	117.30	116.7	0.03	0.056	2.17	7.14		HL4
Nani sluice	05-07 Sept 2023	14:00	Sunny	1.41	30.98		1743.7	0.86	1.116	2.96	7.12	Milky brown	Low waterlevel
				0.72	30.91		1772.1	0.87	1.134	3.43	7.23		
				0.00	34.89		162.2	0.07	0.104	3.09	7.31		
				1.37	30.81		1765.9	0.87	1.130	3.00	7.19		
				0.88	31.90		1360.98	0.67	0.871	3.12	7.21		Average
					32.2	164.60	152.8	0.06	0.098	3.24	7.13		HL4

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Ferry (Canawaima)	13-18 June 2023	12:00	Sunny	0.69	29.44	512.8	32.0	0.01	0.020	4.84	6.24	Brown	
				0.01	29.44	512.2	34.0	0.01	0.022	4.66	6.23		
				0.35	29.44	512.5	33.00	0.01	0.021	4.75	6.24		Average
Ferry (Canawaima)	11-13 July 2023	16:20	Rainy	1.89	29.44	512.80	32.0	0.01	0.020	4.84	6.24	Brown	
				0.96	29.44	512.20	34.0	0.01	0.022	4.66	6.23		
				1.43	29.44	512.50	33.00	0.01	0.021	4.75	6.235		Average
Ferry (Canawaima)	22-24 Aug 2023	12:00	Sunny	2.05	31.15		19.3	0.01	0.012	6.00	6.89	Light brown	
				1.08	31.54		19.3	0.01	0.012	5.99	6.85		
				0.04	31.66		25.5	0.01	0.016	5.99	6.91		
				1.98	31.61		19.4	0.01	0.012	5.96	6.85		Checkpoint 1
				1.29	31.49		20.88	0.01	0.013	5.99	6.88		Average
					31.5	130.80	27.8	0.01	0.018	5.46	7.73		HL4
Ferry (Canawaima)	05-07 Sept 2023	12:30	Sunny	2.34	31.67		20.4	0.01	0.013	5.57	6.87		
				1.31	31.72		20.5	0.01	0.013	5.53	6.86		
				0.63	32.06		20.3	0.01	0.013	5.61	6.95		
				0.01	32.17		26.1	0.01	0.017	5.66	7.06		
				2.33	31.70		20.8	0.01	0.013	5.50	6.91		Checkpoint 1
				1.32	31.86		21.62	0.01	0.014	5.57	6.93		Average
					31.96	201.40	30.1	0.01	0.019		7.34		HL4
Bigipan	21-26 June 2023	08:45	Sunny	1.61	27.93	509.6	160.7	0.07	0.103	0.83	6.33		
				0.59	28.04	522.8	82.6	0.03	0.053	0.91	6.08		
				0.05	28.04	506.7	85.4	0.03	0.055	0.91	6.04		
				0.75	28.00	513.03	109.57	0.04	0.070	0.88	6.15		Average
Bigipan	21-26 June 2023	10:48	Sunny	0.33	29.62	507.5	18041.8	10.6	11.547	5.99	7.93		
				0.02	29.89	506.9	18017.5	10.59	11.531	6.24	7.98		
				0.33	29.77	507.7	17891.5	10.51	11.451	5.87	7.94		Checkpoint 1
				0.02	29.99	507.4	17989.7	10.57	11.513	6.37	7.99		Checkpoint 2
				0.18	29.82	507.38	17985.13	10.57	11.511	6.118	7.96		Average

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Bigipan	05-07 Sept 2023	18:23	Sunny	0.06	32.87		21057.1	12.59	13.477	6.46	8.41		
					32.75	369	21647.6	12.97	13.854	5.89	8.27	HL4	
Ramdien Pier	11-13 July 2023	18:40		0.31	29.23	514.6	1523.7	0.74	0.975	1.36	6.73	Light brown	Oil layer, dirty gras
				0.00	29.25	516.0	1486.0	0.72	0.951	1.27	6.87		
				0.16	29.24	515.30	1504.85	0.73	0.963	1.32	6.80		Average
Ramdien pier	22-24 Aug 2023	17:00	Sunny	1.83	31.05		10158.2	5.69	6.501	2.86	6.95	Milky light brown	Low waterlevel
				0.95	31.05		10173.5	5.70	6.511	2.95	6.97		
				0.00	31.28		4924.10	2.61	3.151	2.03	6.95		
				0.93	31.13		8418.60	4.67	5.388	2.61	6.96		Average
					31.26	39.20	10945.80	6.16	7.01	2.77	7.13		HL4
Ramdien pier	05-07 Sept 2023	16:20	Sunny	1.00	31.54		10958.20	6.17	7.01	2.89	7.15		
				0.51	31.54		10605.20	5.96	6.79	2.82	7.17		
				0.01	31.44		6774.60	3.67	4.34	2.09	7.12		
				1.02	31.51		12269.70	6.98	7.84	3.05	7.24		Checkpoint 1
				0.64	31.51		10151.93	5.70	6.49	2.71	7.17		Average
					31.13	117.30	6440.10	3.48	4.12	1.82	7.06		HL4

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Pokigron/Atjoni	18-05-2023/11:15		1.27	27.26	14.7	14.9	0.01	0.01	5.07	5.67	
			0.63	27.2	14.6	15.4	0.01	0.01	5.11	5.73	
			0	27.24	14.2	15.6	0.01	0.01	5.09	5.75	
			1.28	27.04	14.3	14.7	0.01	0.009	5.17	5.68	Checkpoint 1
			0.01	27.06	14.6	15.5	0.01	0.01	5.28	5.77	Checkpoint 2
				27.16	14.48	15.22	0.01	0.010	5.14	5.72	Average
Pokigron/Atjoni	21-09-2023/9:30	Sunny	0.61	32.1		23.3	0.01	0.015	6.69	7.84	
			0	32.19		23.2	0.01	0.015	6.75	7.39	
				32.15		23.25	0.01	0.015	6.72	7.62	Average
Cajana(voor)	15:54	Sunny		31.31	5.9	19.8	0.01	0.013	6.49	7.29	
	16:00	Sunny		31.3	31	10.1	0	0.006	6.52	6.77	
				31.31	18.05	14.95	0.005	0.01	6.51	7.03	Average
Ston hoekoe	16:17	Sunny		31.4	17.8	0.02	0.01	0.013	6.64	6.89	
	16:29	Sunny		31.34	74.4	9.4	0	0.006	6.54	6.75	
				31.37	46.1	4.71	0.005	0.01	6.59	6.82	Average

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Moengo Port Cottica River	26-May-23	12.20	Sunny/ Cloudy	29.05	5.35	496.1	5.05	0.01	19.00	0.012	2.32	freshwater
		80%	Sunny	28.87	4.36	496.1	5.11	0.01	19.30	0.012	2.30	Clean flowing water
		60%	Sunny	28.77	3.28	496.5	5.15	0.01	19.50	0.012	2.27	
		40%	Sunny	28.27	2.15	497.3	5.15	0.01	19.90	0.010	3.15	
		20%	Sunny	27.83	1.09	497.8	5.24	0.01	20.30	0.013	4.76	
		10%	Sunny	27.94	0.55	499.2	5.22	0.01	20.70	0.013	4.56	
				29.07	0.02	499.4	5.28	0.01	20.60	0.013	3.29	
				27.17	5.30	500.3	5.14	0.01	19.70	0.013	2.75	Checkpoint 1
				27.88	0.01	500.3	5.23	0.01	19.80	0.013	3.35	Checkpoint 2
				28.32	2.46	498.1	5.17	0.01	19.87	0.012	3.19	Average
Wanekreek	4 t/m 6 July 2023		Sunny/ Rainy	29.38	0.98	508.5	6.74	0.01	21.00	0.013	6.64	
			Sunny/ Rainy	29.34	0.03	508.9	6.78	0.01	21.70	0.014	6.57	
			Sunny/ Rainy	29.36	1.91	507.5	6.72	0.01	21.00	0.013	6.60	Checkpoint 1
				29.36	0.97	508.30	5.06	0.01	21.23	0.013	6.60	Average
Langamankondre	4 t/m 6 July 2023	10:10	Sunny	29.50	1.33	508.2	6.78	0.01	23.70	0.015	6.74	
				29.52		506.9	6.84	0.01	23.90	0.015	6.76	
				29.51		507.55	6.81	0.01	23.80	0.015	6.75	Average

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Kristiankondre	4 t/m 6 July 2023	10:40	Sunny	30.00	0.8	509.0	6.99	0.01	39.40	0.025	6.81	
				30.25	0.41	503.1	7.03	0.01	36.50	0.023	6.81	
				30.37	0.05	506.9	7.02	0.01	36.70	0.024	6.87	
				30.21		506.3	7.01	0.01	37.53	0.024	6.83	Average
Stolkertsijver	09-14 August 2023	10.10	Sunny	28.56			6.54	0.01	30.10	0.019	4.27	Measured with a bucket
		10.20	Sunny	28.48	0.37		6.22	0.01	26.60	0.017	3.98	Low waterlevel
			Sunny	30.00	0.01		6.54	0.01	29.90	0.019	4.27	
				29.01			6.43	0.01	28.87	0.018	4.17	Average
Moengo Cottica River	09-14 August 2023	11.39	Sunny	28.06	1.69		6.12	0.01	24.70	0.016	3.06	
			Sunny	28.00	0.84		6.00	0.01	24.70	0.016	3.07	
			Sunny	28.08	0.01		5.94	0.01	25.00	0.016	3.08	
			Sunny	28.01	1.65		5.82	0.01	24.20	0.016	3.06	
		11.55	Sunny	27.89	0.00	51.5	6.77	0.01	26.30	0.017	2.82	
				28.01	0.84	51.5	6.13	0.01	24.98	0.016	3.02	Average
Marowijne River (Albina)	11/08/2023	17.54	Sunny	31.77	1.17		7.50	0.01	23.80	0.015	7.16	
				31.89	0.74		7.38	0.01	23.40	0.015	7.12	
				31.99	0.02		7.33	0.01	25.10	0.016	7.09	
			Sunny	31.75	1.15		7.27	0.01	22.80	0.015	7.09	
		18.38		31.64		129.2	7.60	0.01	26.40	0.017	6.54	HL4
				31.808		129.2	7.42	0.01	24.30	0.016	7.00	Average