EU4Environment in Eastern Partner Countries:
Water Resources and Environmental Data (ENI/2021/425-550)

# COASTAL AND TRANSITIONAL WATER SURVEY AZERBAIJAN 2022

## Contract-No: 20940-C1/AZ-AZELAB-2022/2

Funded by
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# ABOUT THIS REPORT

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# ABOUT EU4ENVIRONMENT – WATER RESOURCES AND ENVIRONMENTAL DATA

## IMPRINT

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|---|---|
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January 2023

This Programme aims at improving people's wellbeing in EU's Eastern Partner Countries and enabling their green transformation in line with the European Green Deal and the Sustainable Development Goals (SDGs). The programme's activities are clustered around two specific objectives: 1) support a more sustainable use of water resources and 2) improve the use of sound environmental data and their availability for policy-makers and citizens. It ensures continuity of the Shared Environmental Information System Phase II and the EU Water Initiative Plus for Eastern Partnership programmes.

The Programme is implemented by five Partner organisations: Environment Agency Austria (UBA), Austrian Development Agency (ADA), International Office for Water (OiEau) (France), Organisation for Economic Co-operation and Development (OECD), United Nations Economic Commission for Europe (UNECE). The action is co-funded by the European Union, the Austrian Development Cooperation and the French Artois-Picardie Water Agency based on a budget of EUR 12,75 million (EUR 12 million EU contribution). The implementation period is 2021-2024.

https://eu4waterdata.eu

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## List of abbreviations

BQE ....................... Biological Quality Elements

CTW ...................... Coastal and Transitional Waters

CW ........................ Coastal Waters

EU4EnvWD............ EU4Environment in Eastern Partner Countries:
Water Resources and Environmental Data

EUWI+ ................... European Union Water Initiative Plus

TW ........................ Transitional Waters

UBA ....................... Umweltbundesamt GmbH, Environment Agency Austria

WFD ...................... Water Framework Directive

**Country Specific Abbreviations Azerbaijan**

MENR .................... Ministry of Ecology and Natural Resources

HYDROMET ........... National Hydrometeorological Service of the Ministry of Environmental Protection

## Executive Summary

In October 2022, the first monitoring of coastal and transitional waters, in accordance with the requirements of the EU Water Framework Directive, was carried out in Azerbaijan. Monitoring was conducted at six selected stations from the north of Azerbaijan to the transitional waters of the Kura River in the south. The monitoring served several purposes, i.e. it was intended to:

- train the staff of AZELAB LLC (as the responsible analytical laboratory of MENR) in field measurements of temperature, salinity and transparency, and collection of subsamples for laboratory determination of oxygen saturation and concentration of nutrient salts and chlorophyll a;

- determination of reference stations to establish threshold values for all supporting physico-chemical quality elements as well as for the biological quality element Phytoplankton;

- investigate the occurrence of seawater intrusion upstream of the Kura delta as detected in 2020.

After the field study, it can be stated that the staff of AZELAB LLC is trained for further independent measurements and sampling in coastal and transitional waters.

Based on the results of field measurements and laboratory analysis, it can be concluded that the MP3 station (located in the northern part of Azerbaijan) can serve as a reference station.

The condition of the studied parameters at the stations in the central and southern parts of Azerbaijan reflected a stronger influence of anthropogenic pressures onto the coastal area, while very bad condition of all parameters was observed in the Bay of Baku. Significant decrease in oxygen saturation and high concentration of nutrient salts and chlorophyll a were observed in this area. We explain the extremely poor condition in this area by the inadequate wastewater treatment in the city of Baku.

The study of thermohaline properties in the Kura delta showed no evidence of seawater intrusion upstream of the river mouth.

The surveys will be repeated in late spring 2023 to determine thresholds for the parameters studied and to assess the ecological status of the water bodies.

The study of seawater intrusion upstream of the Kura Delta will also be repeated in 2023 during the summer, i.e. under low river flow conditions.

# 1. Introduction and Scope

## 1.1. Coastal and transitional waters

The status of coastal and transitional waters in Azerbaijan has not yet been assessed. The main reasons for this are that AZELAB LLC, as the responsible analytical laboratory of MENR, was until recently not sufficiently equipped with sampling and measurement equipment for the marine environment and appropriate analytical methods for the determination of physico-chemical and biological parameters in seawater.

These deficiencies were addressed in the earlier EUWI+ project, which included the acquisition of appropriate equipment, chemicals and the introduction into the laboratory of analytical methods for the determination of all supporting physicochemical parameters and for the biological quality element phytoplankton.

The aim of this first monitoring of selected coastal and transitional waters in Azerbaijan is to collect data for the assessment of status thresholds for physico-chemical parameters and the biological element phytoplankton, as well as to implement the entire monitoring system from the selection of stations to sampling protocols and laboratory work in order to establish a regular surveillance monitoring in Azerbaijan’s transitional and coastal waters.

Information on sampling data and chemical and biological analyses performed is provided in Table 1.

## 1.2. Intrusion of seawater upstream the Kura River delta

Initial reports of increasing salinization of the Kura River upstream of the Delta were noted by HYDROMET in June 2020. The salinization caused serious freshwater supply problems for local villages and livestock, and led to a temporary crisis situation among water users on the riverbank. During an online expert meeting (MENR, HYDROMET and EUWI+) on this phenomenon, a special monitoring was agreed for early August 2020 to assess the extent of salinization and identify causes and possible solutions.

The results of the survey (August 5-6, 2020) showed seawater intrusion about 66 km upstream from the mouth of the river. Unfortunately, due to Covid-19 restrictions, further planned investigations during other seasons could not be continued so far.

**Table 1: Parameters analyzed in the field and in the laboratory.**

| Country | Azerbaijan |
|---|---|
| Campaign [1)] | Autumn 2022 |
| Objectives | 1. Collection of data on supporting physico-chemical parameters and the biological quality element Phytoplankton (Chl a) in selected coastal and transitional waters for the status threshold assessment.<br>2. Determination od saltwater intrusion upwards the Kura River estuary during autumn. |
| Quality elements | Biological quality components:<br>• Phytoplankton (biomass of Chlorophyll a)<br>Supporting elements:<br>• General physico-chemical quality elements (temperature, salinity, transparency, nutrients) |
| Preparation of field work | 24.October 2022 |
| Field work | 25.- 29. October 2022 |
| Chemical analyses | 30. October – 2. November 2022 |
| Biological analyses | 2. – 15. November 2022 |
| Reporting | 16. November – 1. December 2022 |
| Submission of technical report | January 2023 |

# 2. Methods

## 2.1. Selected sampling sites

Basic data on the selected sampling sites are given in Table 2 for ecological monitoring of coastal and transitional waters and in Table 3 for temperature and salinity measurements in the Kura River delta. The geographic location of the sampling sites is shown in Figures 1 and 2.

**Table 2: List of sampling sites in coastal and transitional waters**

| WB | WB definition and location | Site | Nr | HMWB [1)] | Risk [2)] | Significant Pressure [3)] | Latitude [4)] | Longitude [4)] |
|---|---|---|---|---|---|---|---|---|
| **AZ_CW1_NSS** | Oligohaline and shallow coastal waters from Samurchay to Shuraabad | CW near Nizovaya | MP1 | NO | NR | N | 41.529489 | 48.929900 |
| | | CW near Gilgilcay | MP2 | NO | NR | N | 41.109153 | 49.172856 |
| | | CW near Suraabad | MP3 | NO | NR | N | 40.8227290 | 49.512763 |
| **AZ_CW1_STB** | Oligohaline and shallow coastal waters from Turkan to Baku | CW in front of Turkan | MP4 | NO | PR | U | 40.34560 | 50.178228 |
| **AZ_CW1_BB** | Candidate of heavily modified oligohaline and shallow coastal waters of Baku Bay | CW in front of Baku | MP5 | YES | P, E, H | P, E, H | 40.334438 | 49.945942 |
| **AZ_CW1_SSK** | Oligohaline and shallow coastal waters from Sangachal to Kura river | CW near Sahil | MP6 | NO | PR | U | 40.213662 | 49.566108 |
| **AZ_TW1_KQ** | Oligohaline and microtidal transitional waters in the northern part of the Kura river delta | TW Kura delta | K1 | YES | PR | H | 38.380623 | 49.396581 |

[1)] Assignment as provisional HMWB: yes / no

[2)] Assignment of the risk status: R = at risk, PR = possibly at risk, NR = not at risk

[3)] Significant pressure: N = no significant pressure, P = organic pollution, E = eutrophication, T = toxic impact, H = hydro-morphological alterations, M = multistressor, O = other, U = unknown

[4)] Latitude, Longitude: Format = Degree with six decimals (e.g. as 44.630139, conversion from 44° 37’ 48.5’’ through calculation 44 + 37 / 60 + 48.5 / 3600)

[5)] Site: CW = Coastal waters, TW = Transitional waters

Table 2: List of sampling sites in coastal and transitional waters

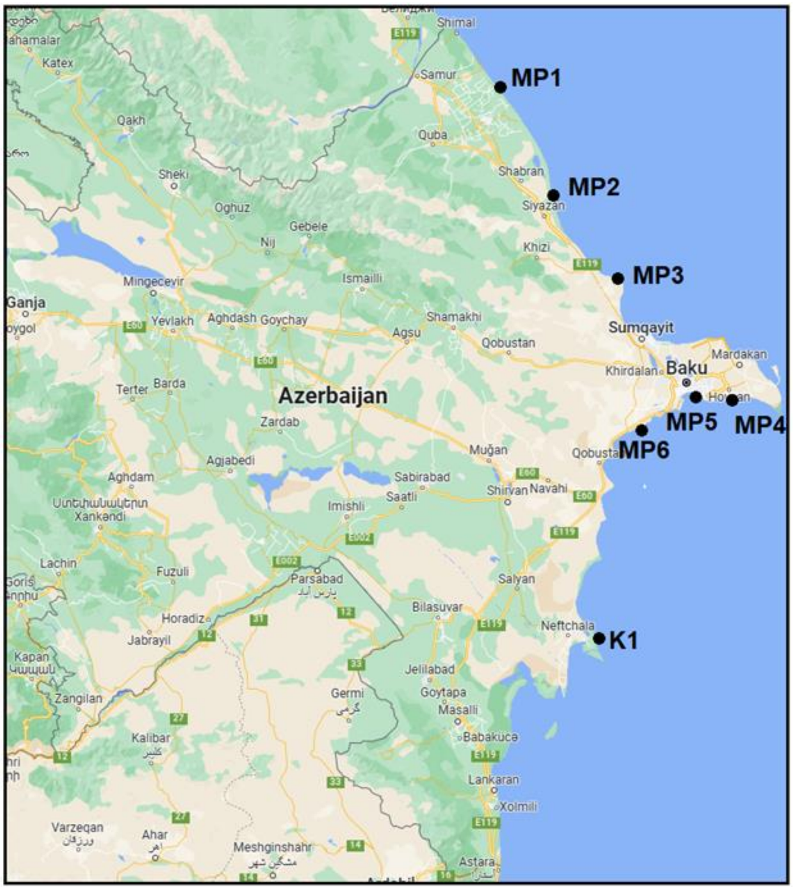



**Figure 1: Map of coastal and transitional water sampling sites.**

**Table 3: List of salinity and temperature measuring points in the Kura River estuary**

| River | WB | WB definition and location | Site | Nr | Latitude [4)] | Longitude [4)] |
|---|---|---|---|---|---|---|
| **Kura** | AZ_TW1_KQ | Oligohaline and microtidal transitional waters in the northern part of the Kura river delta | Estuary | K1 | 38.380623 | 49.396581 |
| | | | | K2 | 38.380137 | 49.384422 |
| | | | | K3 | 39.369822 | 49.344527 |
| | | | | K4 | 39.361562 | 49.348846 |
| | | | | K5 | 39.356361 | 49.352123 |
| | | | | K6 | 39.351873 | 49.352919 |
| | | | | K7 | 39.330396 | 49.366368 |


**Figure 2: Map of saltwater intrusion measuring points in the Kura River delta.**

## 2.2. Sampling period and conditions

Water sampling and measurements of thermohaline properties and transparency were conducted October 25-29, 2022. Meteorological conditions during this period were free of precipitation but with strong north to northeast winds that produced rough seas (sea state: 2-4) in the shallow coastal waters.

Due to high swell at certain stations (MP1, MP2, MP4, and MP6), samples were collected from shore rather than from a Zodiac.

Samples collected from shore during high waves at sites with sand substrate (stations MP1 and MP2) had increased suspended sediment content, which likely increased nutrient concentrations in these samples.

## 2.3. Quality Elements and sampling methods

Of the physico-chemical quality elements in coastal and transitional waters, temperature, salinity, and transparency were measured in situ, while dissolved oxygen and nutrients were determined in subsamples in the laboratory.

Temperature and salinity were measured using a calibrated YSI multiparameter probe, while transparency was measured using a white Secchi disc.

Water samples were collected from the surface layer (all CTW monitoring points) and 1m above the seafloor (Station MP5) using a General Oceanics 5L water sampler. Subsamples for dissolved oxygen and nutrient determinations were collected in Winkler bottles and high-density polyethylene bottles, respectively.

Subsamples for analysis of chlorophyll a content (biological quality element phytoplankton) were also collected in high-density polyethylene bottles.

All subsamples collected during the day were stored in portable coolers and analysed (dissolved oxygen), filtered, prepared for analysis (chlorophyll a) or frozen (nutrients) in the laboratory the same day.

## 2.4. Analyses of supporting physico-chemical parameters and Phytoplankton biomass (Chlorophyll a)

Seawater temperature and salinity were measured with a multiparameter probe. The readings from the probe were noted after the readings were stabilised.

Transparency was measured by lowering a white-painted disc (d = 30 cm) from the shaded side of the ship into the sea until it was no longer visible. The measured depth is recorded as transparency.

Dissolved oxygen was measured by the iodometric method (Table 4) in subsamples of seawater collected in Winkler bottles (bottles of well-defined volume). Solutions of KJ, NaOH, and $MnCl_2$ were then added to the samples, resulting in the binding of dissolved oxygen in a precipitate of $Mn(OH)_3$. After transporting the samples to the laboratory, the precipitate was decomposed by adding concentrated acid, and after its decomposition, the samples were titrated with thiosulfate until the colour disappeared.

All nutrient salts were determined spectrophotometrically at specific wavelengths on a Specord 205 (Analytik Jena) UV-VIS Spectrophotometer[1].

Chlorophyll a was determined in the laboratory with a fluorimeter after the samples were filtered (GF/F, 0.7 µm) and the chlorophyll a was extracted from the filter with acetone[2].

**Table 4: List of analysed parameters and analytical methods**

| Parameter | Unit | Method |
|---|---|---|
| *Field measurements* | | |
| Temperature | °C | *In situ* measurement by Probe |
| Salinity | - | In situ measurement by Probe |
| Transparency | m | In situ measurement by Secchi disk |
| *Laboratory analyses* | | |
| Nitrate | µmol/L | Spectrophotometric determination[1] |
| Nitrate | | Spectrophotometric determination[1] |
| Ammonia | | Spectrophotometric determination[1] |
| Orthophosphate | | Spectrophotometric determination[1] |
| Dissolved oxygen | ml/L and % | ISO 5813:1983, Water quality — Determination of dissolved oxygen — Iodometric method |
| Chlorophyll a | µg/L | Fluorometric determination[2] |

[1]K. Grasshoff, K. Kremling and M. Erhardt, 1999. Methods of Seawater Analysis. Third Edition, Wiley-VCH, 600 p.

[2]J.D.H. Strickland and T.R. Parsons, 1972. A Practical Handbook of Seawater Analysis. Fisheries Research Board of Canada, Bulletin 167, 310 p.

## 2.5. Responsibilities

The individuals responsible for field study preparation, instrument calibration, field work, and production of solutions, standards, and laboratory analyses are listed in Table 5.

The private company Sadic LLC was responsible for transportation and management of the Zodiac during sampling.

**Table 5: Responsibilities during the CTW Survey 2022**

| Responsibilities | Institution, contact person, email-address |
|---|---|
| *General* | |
| Responsible for the organisation of surface water body sampling | Institute/Laboratory: AZELAB LLC<br>Contact person: Ramina Abdullayeva<br>E-Mail: abdullayevaramina@gmail.com |
| *Field work* | |
| Responsible for field work (biological and chemical sampling) | Institute/Laboratory: AZELAB LLC<br>Contact person: Gunel Qurbanova<br>UBA/International expert: Grozdan Kušpilić<br>Supporting person(s): Rafig Verdiyev<br>E-Mail: gunel-qurbanova-90@mail.ru |
| Responsible for functional check of sampling equipment | Institute/Laboratory: AZELAB LLC<br>Contact person: Vusel Nabiyev<br>E-Mail: nabiyevusal@gmail.com |
| Responsible for calibration of on-site measuring equipment | Institute/Laboratory: AZELAB LLC<br>Contact person: Ziber Aghazada<br>E-Mail: ziber.agayeva@gmail.com |
| *Chemical analysis* | |
| Overall responsible for the chemical analysis in the lab, including reporting and data delivery | Institute/Laboratory: AZELAB LLC<br>Contact person: Ramina Abdullayeva<br>E-Mail: abdullayevaramina@gmail.com |
| Responsible for sample transport from the field to the laboratory | Institute/Laboratory: AZELAB LLC<br>Contact person: Vusel Nabiyev<br>E-Mail: nabiyevusal@gmail.com |
| Analysing laboratory and contact person | Institute/Laboratory: AZELAB LLC<br>Contact person: Ziber Aghazada<br>E-Mail: ziber.agayeva@gmail.com |
| *Biological analysis* | |
| Overall responsible for the biological analysis in the lab, including reporting and data delivery | Institute/Laboratory: AZELAB LLC<br>Contact person: Gunel Qurbanova<br>E-Mail: gunel-qurbanova-90@mail.ru |

# 3. Results

Due to rough seas during the CTW survey in October 2022, all field measurements and results of chemical and biological parameters refer to the surface layer (0.5 m depth), except for station MP5, where the bottom layer (BL) could also be measured and sampled.

Measurements of temperature and salinity in the Kura River delta were made at all stations in the surface layer and at five selected stations (K1, K3, K4, K5, and K6) from the surface to the bottom.

## 3.1. Field measurements

### *3.1.1. Coastal and transitional waters*

Temperature and salinity were measured using a YSI multiparameter probe. The results are shown in Figure 3.

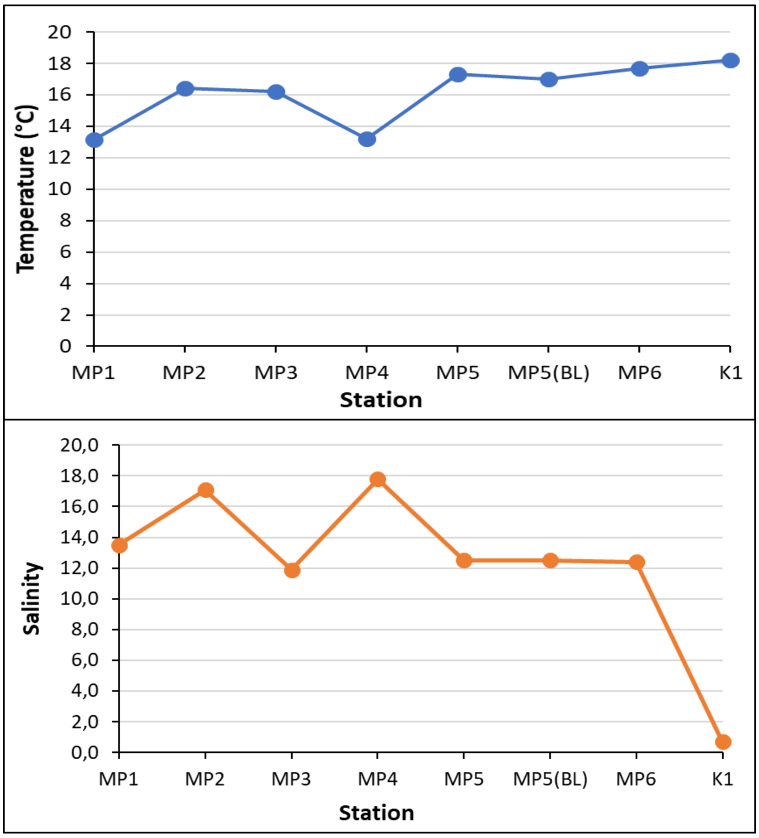



Figure 3. Temperature and salinity d6stribution along CTW stations in October 2022.

Water column transparency was measured at only one station (MP5) using a Secchi disk. The determined transparency at this station was found to be 4,5 m.

### *3.1.2. Kura River Delta*

The results of temperature and salinity distribution at 7 stations in the delta are shown in Figure 4.

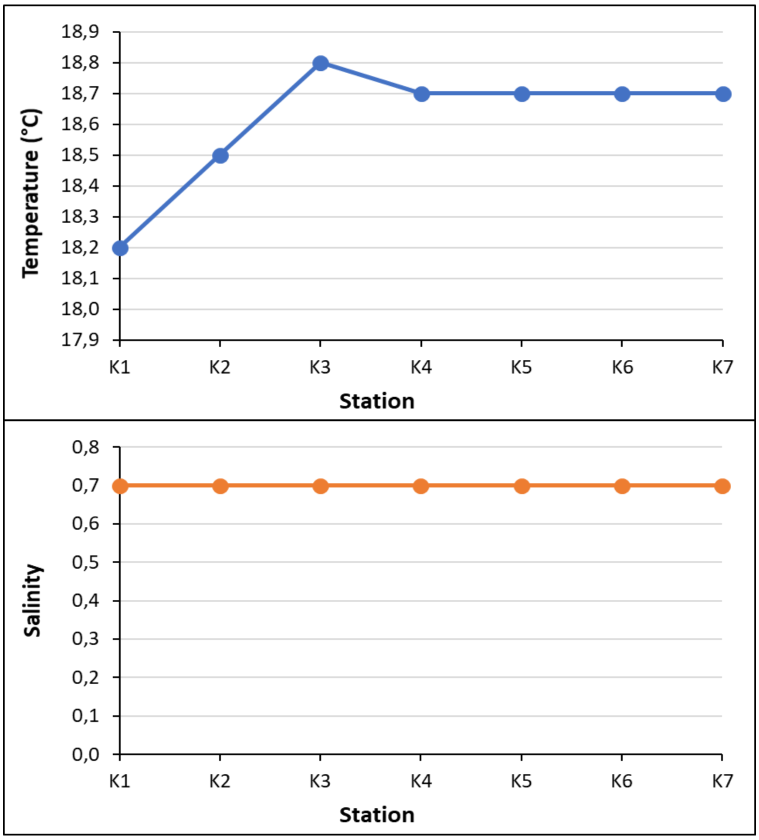



Figure 4. Temperature and salinity distribution in the surface layer along the Kura River delta in October 2022.

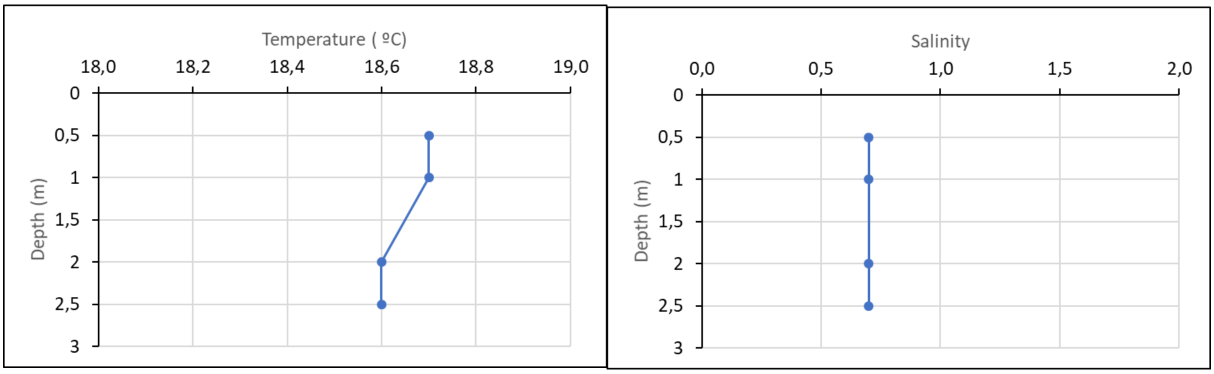



Figure 5. Vertical temperature and salinity distribution at station K4 in the Kura River delta during October 2022.

Transparency in the Kura River Delta has not been measured during October 2022.

## 3.2. Chemical results

### *3.2.1. Coastal and transitional waters*

The saturation of the surface layer with dissolved oxygen at the CTW stations studied is shown in Figure 5.

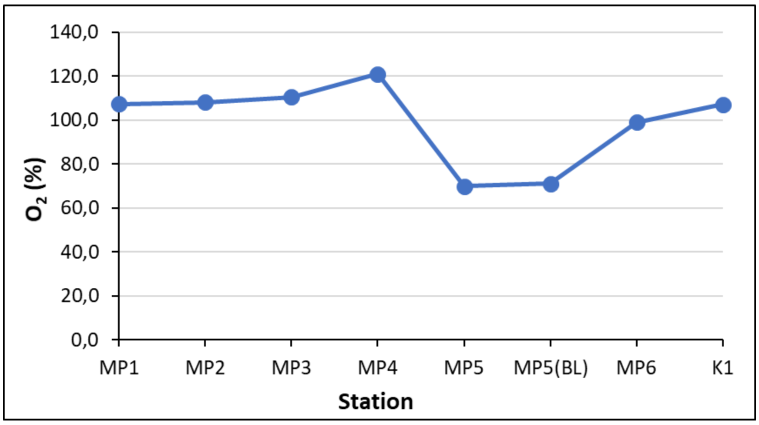



Figure 6. Dissolved oxygen saturation at the CTW stations studied in October 2022.

The concentration of dissolved inorganic nitrogen is shown in Figure 6, while the percentage of each nitrogen species is shown in Figure 7. Orthophosphate concentrations established at particular stations are shown in Figure 8.

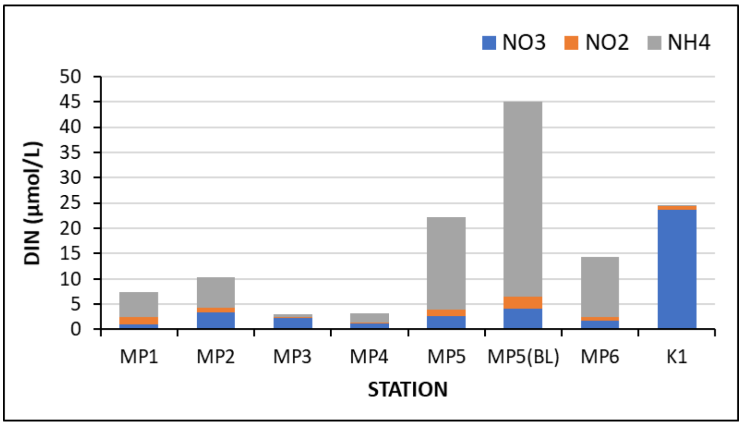



Figure 7. Concentrations of dissolved inorganic nitrogen (nitrate, nitrite, and ammonia) at particular CTW stations in October 2022.

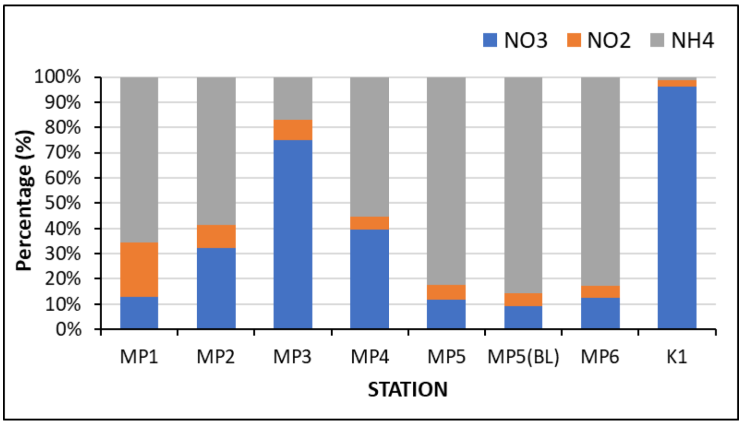



Figure 8. Percentage of nitrate, nitrite and ammonia in dissolved inorganic nitrogen in October 2022.

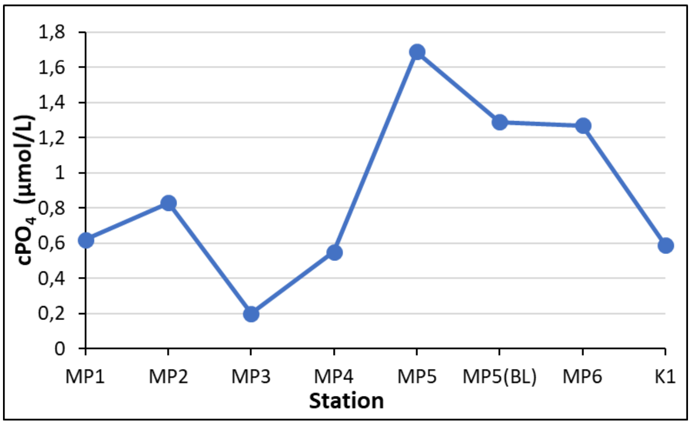



Figure 9. Orthophosphate concentrations at CTW stations in October 2022.

## 3.3. Biological results

The biomass of chlorophyll a detected in the surface layer of all stations and in the soil layer of station MP5 is shown in Figure 9.

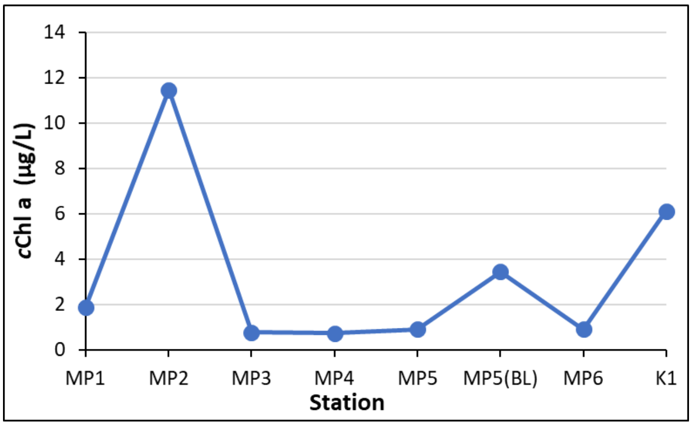



Figure 10. Chlorophyll a concentrations at CTW stations in October 2022.

# 4. Discussion of results

## 4.1. Coastal and transitional waters

The surface layer temperature ranged from 13.2°C (station MP1) to 18.2°C (station K1). As can be seen from Figure 1, a positive trend from the northern part of Azerbaijan to the southern part (with the exception of station MP4) is clearly visible. The vertical temperature distribution was studied only at one station (MP5), where a small difference of 0.3°C between the surface and bottom layers (4.5 m depth) was observed.

The salinity of the surface layer varied between 11.9 and 17.8 at the coastal stations (MP), while it was 0.7 at the Kura River transitional station K1, which corresponds to a typical freshwater salinity for Azerbaijan. The vertical difference in salinity at station MP5 was only 0.1, i.e. the water column at this station was homogeneous in terms of both salinity and temperature.

The oxygen saturation of the surface layer of the studied stations (Figure 5) ranged from 69.9% to 120.9%. The lowest oxygen saturation was found at station MP5, i.e. in the water body of Baku Bay (candidate for heavily modified water body status), while the highest saturation was found at station MP4. If we take into account that the saturation of seawater with oxygen indicates the ratio between the processes of photosynthesis and respiration (which are equal at 100% saturation), we can say that at most stations the process of photosynthesis slightly predominates in the water column, at station MP4 both processes are balanced ($O2$ = 99%), while at station MP5 the process of respiration, i.e. decomposition of organic matter, strongly predominates. Since a significant difference in saturation from the theoretical value (100%) was observed at this station, it can be assumed that the Baku Bay area is exposed to a strong load of untreated wastewater.

The results of the analysis of nitrogen and phosphorus nutrient salts (Figures 6, 7 and 8) show that the concentrations of dissolved inorganic nitrogen (DIN) were in a wide range from 3 to 45 µmol/L. The highest concentrations were again found at station MP5 in the lower layer, while relatively high concentrations were also found at station K1, i.e., the station in the transitional area of the Kura River. Although the concentrations of DIN at this station are higher compared to the stations in the coastal waters (with the exception of MP5), we still consider these values as natural, since the concentrations of DIN in freshwater are usually higher than in seawater (up to two orders of magnitude). The high concentrations of DIN at station MP5 (Baku Bay) confirm the assumption of significant pollution of this area by sewage.

At most stations, ammonia (as a reduced form of nitrogen) was predominant in the composition of DIN, while oxidized forms (nitrates and nitrites) were less abundant. The highest ammonia levels were again found at station MP5, but also at station MP6. Since it is most advantageous for primary producers from an energetic point of view to incorporate ammonia into their cells, it can be said that the potential development of a phytoplankton bloom is most likely at these two stations. From an ecological point of view, the most favourable distribution of nitrogen species was found at stations MP3 and K1, with high proportions of nitrates and nitrites.

Orthophosphate concentrations (Figure 8) ranged from 0.2 µmol/L (station MP3) to 1.69 µmol/L (station MP5). At most stations, concentrations were less than 1 µmol/L, with only stations MP5 and MP6 having higher values.

Chlorophyll a concentrations (Figure 9) ranged from 0.77 to 12.8 µg/L, which can be considered a relatively wide range. Moderate or low chlorophyll a concentrations were detected at most stations, while three stations (MP2, K1, and MP5-bottom layer) had elevated or high orthophosphate levels. The increase in concentrations at stations MP5 and K1 is expected due to the higher content of nutrient salts, but the high Chl a concentration at station MP1 is more of a surprise.

In conclusion, the worst condition in terms of all ecological parameters was found at station MP5, while low or balanced values of certain parameters at station MP3 in the northern part of Azerbaijan indicate that there are minor anthropogenic pressures at this site and it can be used as a reference station.

## 4.2. Kura River Delta

The spatial distribution of temperature and salinity in the transitional area of the Kura River (Figures 4 and 5) shows a homogeneous structure of the water column in October 2022. The intrusion of seawater into the river delta could not be detected at any station, but a uniformly low salinity (typical for freshwater) was measured throughout.

## 5. Next steps and Lessons learned

The expected next step is the preparation of the second coastal and Kura River monitoring survey in 2023.

The main lessons learned during and after the first CTW survey are:

- Due to the shallow coastal area in Azerbaijan, the use of Zodiacs is advantageous over traditional oceanographic research vessels;
- Sampling from shore should be avoided because potential sample contamination;
- Training of AZELAB personnel on sampling, field measurements and laboratory analysis was successful.

# 6. Annexes

## Annex 1: CTW Survey & Analysis data (in Excel format)

| 1 | Quality elements | Parameters | Abbreviation | Unit | Responsible person | e-mail |
|---|---|---|---|---|---|---|
| 2 | Supporting physico-chemical quality elements | Transparency | SECCHI | m | Vusel Nabiyev, AZELAB LLC | nabiyevusal@gmail.com |
| 3 | | Temperature | T | (°C) | | |
| 4 | | Salinity | S | - | | |
| 5 | | Dissolved oxygen | O2 | ml/L | Ziber Aghazada, AZELAB LLC | ziber.agayeva@gmail.com |
| 6 | | Oxygen saturatiom | O2 (%) | % | | |
| 7 | | Nitrate | NO3 | $\mu mol\ dm^{-3}$ | | |
| 8 | | Nitrite | NO2 | $\mu mol\ dm^{-3}$ | | |
| 9 | | Ammonium salts | NH4 | $\mu mol\ dm^{-3}$ | | |
| 10 | | Total dissolved nitrogen | DIN | $\mu mol\ dm^{-3}$ | | |
| 11 | | Orthophosphate | PO4 | $\mu mol\ dm^{-3}$ | | |
| 12 | Phytoplankton | Chlorophyll a | Chl a | $\mu g\ L^{-3}$ | Gunel Qurbanova, AZELAB LLC | gunel-qurbanova-90@mail.ru |
| 13 | | | | | | |
| 14 | | **Other abbreviations** | | | | |
| 15 | | Sampling depth | z | m | | |
| 16 | | Coastal waters | CW | | | |
| 17 | | Transitional waters | TW | | | |
| 18 | | Not measured | NM | | | |

| 1 | WATER CATEGORY | ESTUARY / DELTA | WATER BODY | STATION | LATITUDE | LONGITUDE | SAMPLING DATE AND TIME | | | | | SAMPLING DEPTH | PHYSICO-CHEMICAL PARAMETERS | | | | NUTRIENTS | | | | | PHYTOPLANKTON |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2 | | | | | | | YEAR | MONTH | DAY | HOUR | MIN | z | SECCHI | T | S | O2 (%) | NO3 | NO2 | NH4 | DIN | PO4 | Chl a |
| 3 | Coastal waters | | AZ_CW1_NSS | MP1 | 41,529489 | 48,929900 | 2022 | 10 | 25 | 13 | 16 | 0,5 | NM | 13,16 | 13,5 | 107,336063 | 0,95 | 1,59 | 4,81 | 7,35 | 0,62 | 1,87 |
| 4 | | | | MP2 | 41,109153 | 49,172856 | 2022 | 10 | 25 | 16 | 41 | 0,5 | NM | 16,41 | 17,1 | 108,154694 | 3,33 | 0,95 | 6,06 | 10,34 | 0,83 | 11,46 |
| 5 | | | | MP3 | 40,822729 | 49,512763 | 2022 | 10 | 27 | 11 | 15 | 0,5 | NM | 16,2 | 11,9 | 110,391505 | 2,27 | 0,25 | 0,51 | 3,03 | 0,20 | 0,77 |
| 6 | | | AZ_CW1_STB | MP4 | 40,3456 | 50,178228 | 2022 | 10 | 26 | 13 | 25 | 0,5 | NM | 13,2 | 17,8 | 120,933632 | 1,26 | 0,17 | 1,77 | 3,2 | 0,55 | 12,80 |
| 7 | | | AZ_CW1_BB | MP5 | 40,334438 | 49,945942 | 2022 | 10 | 26 | 11 | 2 | 0,5 | 4,5 | 17,3 | 12,5 | 69,9176369 | 2,61 | 1,28 | 18,29 | 22,18 | 1,69 | 0,91 |
| 8 | | | | | | | | | | | | 1 | | 17,3 | 12,5 | NM | NM | NM | NM | NM | NM | NM |
| 9 | | | | | | | | | | | | 2 | | 17,3 | 12,5 | NM | NM | NM | NM | NM | NM | NM |
| 10 | | | | | | | | | | | | 3 | | 17,3 | 12,5 | NM | NM | NM | NM | NM | NM | NM |
| 11 | | | | | | | | | | | | 4,5 | | 17 | 12,5 | 71,1411996 | 4,08 | 2,35 | 38,6 | 45,03 | 1,29 | 3,44 |
| 12 | | | AZ_CW1_SSK | MP6 | 40,213662 | 49,566108 | 2022 | 10 | 27 | 17 | 40 | 0,5 | | 17,7 | 12,4 | 98,9733143 | 1,79 | 0,7 | 11,87 | 14,36 | 1,27 | 0,90 |
| 13 | Transitional waters | Kura | AZ_TW1_KQ | K1 | 38,380623 | 49,396581 | 2022 | 10 | 28 | 10 | 46 | 0,5 | NM | 18,2 | 0,7 | 107,037983 | 23,7 | 0,61 | 0,32 | 24,63 | 0,59 | 6,11 |

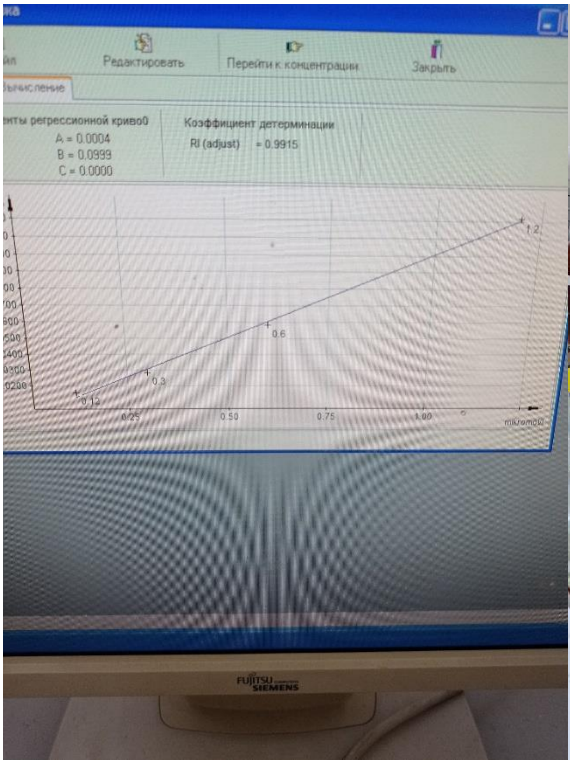
| | A | B | C | D | E | F | G | H | I | J | K | L | M | N |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | WATER CATEGORY | ESTUARY / DELTA | WATER BODY | STATION | LATITUDE | LONGITUDE | SAMPLING DATE AND TIME | | | | | SAMPLING DEPTH | THERMOHALINE PROPERTIES | |
| 2 | | | | | | | YEAR | MONTH | DAY | HOUR | MIN | z | T | S |
| 3 | Transitional waters | Kura | AZ_TW1_KQ | K1 | 38,380623 | 49,396581 | 2022 | 10 | 28 | 10 | 46 | 0,5 | 18,2 | 0,7 |
| 4 | | | | | | | | | | | | 1 | 18,2 | 0,7 |
| 5 | | | | | | | | | | | | 1,5 | 18,0 | 0,7 |
| 6 | | | | K2 | 38,380137 | 49,384422 | 2022 | 10 | 28 | 11 | 27 | 0,5 | 18,5 | 0,7 |
| 7 | | | | K3 | 39,369822 | 49,344527 | 2022 | 10 | 28 | 12 | 39 | 0,5 | 18,7 | 0,7 |
| 8 | | | | | | | | | | | | 1 | 18,7 | 0,7 |
| 9 | | | | | | | | | | | | 2 | 18,6 | 0,7 |
| 10 | | | | K4 | 39,361562 | 49,348846 | 2022 | 10 | 28 | 12 | 52 | 0,5 | 18,7 | 0,7 |
| 11 | | | | | | | | | | | | 1 | 18,7 | 0,7 |
| 12 | | | | | | | | | | | | 2 | 18,6 | 0,7 |
| 13 | | | | | | | | | | | | 2,5 | 18,6 | 0,7 |
| 14 | | | | K5 | 39,356361 | 49,352123 | 2022 | 10 | 28 | 12 | 58 | 0,5 | 18,7 | 0,7 |
| 15 | | | | | | | | | | | | 1 | 18,7 | 0,7 |
| 16 | | | | | | | | | | | | 2 | 18,6 | 0,7 |
| 17 | | | | | | | | | | | | 3 | 18,6 | 0,7 |
| 18 | | | | K6 | 39,351873 | 49,352919 | 2022 | 10 | 28 | 13 | 3 | 0,5 | 18,7 | 0,7 |
| 19 | | | | | | | | | | | | 1 | 18,7 | 0,7 |
| 20 | | | | | | | | | | | | 2 | 18,7 | 0,7 |
| 21 | | | | K7 | 39,330396 | 49,366368 | 2022 | 10 | 28 | 13 | 28 | 0,5 | 18,7 | 0,7 |

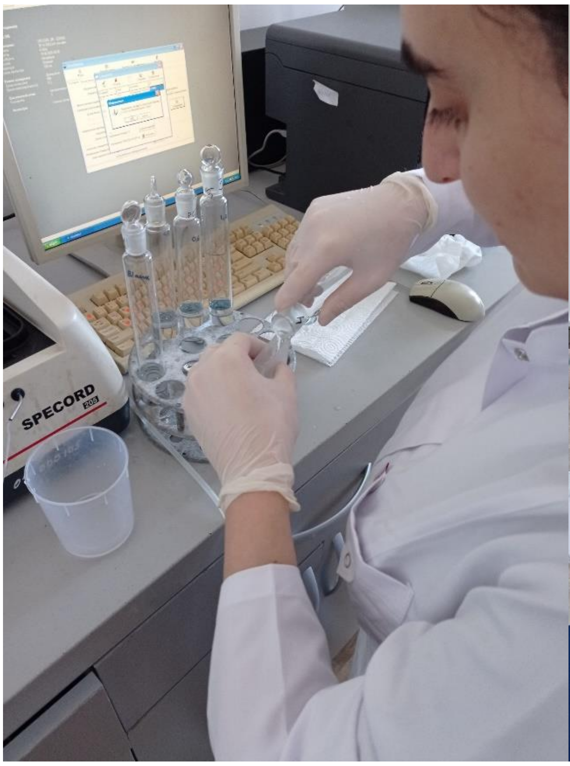
Annex 2: CTW Survey_Photo documentation



Adventure


İDARƏSİ


Редактировать
Перейти к концентрации
Закрыть
Коэффициент детерминации
A = 0.0004
B = 0.0999
C = 0.0000
Rl (adjust) = 0.9915


SPECORD

Annex 3: CTW Survey_Metadata

EU4Environment
Water and Data in Eastern Partner Countries

Action funded by the EUROPEAN UNION

***EU4Environment - Water Resources and Environmental Data programme***

**DATA SOURCE IDENTIFICATION FORM - AZERBAIJAN**

**TITLE OF THE DATA SOURCE** *(ex: Data Sheet of … , map of … Database of …, Report on ….)*: XLS file on field and laboratory data from the first coastal and transitional water survey in October 2022 including salinity measurements in the Kura delta "AZ_CTW_Survey & Analysis data"

**ABSTRACT**: *(Global content, Author and objective: Database/website/map on … created by ….to do … )*

In October 2022, the first monitoring of coastal and transitional waters, in accordance with the requirements of the EU Water Framework Directive, was carried out in Azerbaijan. Monitoring was conducted at six selected stations from the north of Azerbaijan to the transitional waters of the Kura River in the south. The aim of this first monitoring of selected coastal and transitional waters in Azerbaijan was to collect data for the assessment of status thresholds for physico-chemical parameters and the biological element phytoplankton, as well as to implement the entire monitoring system from the selection of stations to sampling protocols and laboratory work in order to establish a regular surveillance monitoring in Azerbaijan's transitional and coastal waters.

| | | | |
|---|---|---|---|
| **GEO KEYWORD ADMIN** | Azerbaijan | **GEO KEYWORD MAIN BASIN** | Not determined |
| **TOPIC KEYWORD IWRM** | Surface water | **TOPIC KEYWORD INSPIRE** | Environmental monitoring facilit |

**INFORMATION ON DISSEMINATION**

WEB ADDRESS OR URL WHERE THE DOCUMENT CAN BE CONSULTED AND/OR DOWNLOADED: http://

LEVEL OF ACCESS (ONE OF THE FOLLOWING: "FREE ACCESS WITH COPYRIGHT", "RESTRICTED TO PARTNERS", "AVAILABLE UNDER PAYMENT OF FEES" ): Copyright

**CATEGORY, FORMAT AND SCALE OF THE DATA SOURCE**

| | | | | | |
|---|---|---|---|---|---|
| CATEGORY ("DATASET", "GIS LAYER", "MAP"," DOCUMENT", INFORMATION SYSTEM) | Dataset | FORMAT *(EX: PAPER, PDF; JPEG; SHP…)* | Table (xls, ...) | SCALE *(EX: 1/100.000)* | 1: |

**CONTACT PERSON TO GET MORE INFORMATION ON THIS DATA SOURCE**

| | | | |
|---|---|---|---|
| NAME | Ramina Abdullayeva | ORGANIZATION | AzeLab LLC |
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**FORM OF METADATA COMPLETED BY**

| | | | |
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| NAME | Gunel Gurbanova | ORGANIZATION | AzeLab LLC |
| EMAIL | gunel-qurbanova-90@mail.ru | POSITION | lead-biologist |
| Date | 15.02.2023 | | |

Annexes are available as separate documents

Funded by the European Union

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Water and Data in Eastern Partner Countries

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