WATERMANIA

A PROJECT COMPARATIVE STUDY

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1. Introduction - about Watermania project

The Watermania project was focused on monitoring of water quality and its differences in various sources and locations. The project involved measuring various water samples using a multiparametric probe, which allows several different parameters to be monitored during a single measurement. The samples taken came from various sources (water from protected areas, from ordinary watercourses, reservoirs used for fish farming or other aquatic animals, drinking water, etc.).

Two teams of students participated in the project – one from the Czech Republic (Jakub Krčín Secondary School of Fisheries and Water Management, Třeboň) and the other from France (Lycée Professionnel Olivier Guichard, Guérande). The measurements were carried out in the Czech Republic and France, always in selected areas near the partner schools. The measurements were carried out by selected students from both schools during two study trips (Třeboň – Czech Republic and Guérande – France). All the results of these measurements and the entire project are summarized in this study.

During the trips, students from both schools learned how to use the AquaTroll 600 multiparameter probe (VuSitu, USA) as described in more detail below. They learned the basics of scientific work, work with raw data, its evaluation and interpretation. At the same time, the students learned how to plan and actively carry out sampling. The measurements were performed both *in-situ* and in outdoor sampling mode at the locality, followed by *ex-situ* analysis. During the work on the project, measuring and sampling were necessarily linked to learning about a different country, its culture, language, and also completely different approaches to aquaculture. The project promoted connections between the two schools, their students, and staff as well.

2. Guérande and its surroundings

Guérande is a small historic town in France, located in the Pays de la Loire region, close to the Atlantic Ocean. It has approximately 15 000 inhabitants and is mainly known for its exceptionally well-preserved medieval walls that surround the entire old town. These stone walls are nearly 1.5 kilometers long and are among the best-preserved in all of France. The walls once served to protect the city from enemies and still remain one of the major attractions for visitors.

The main entrance to the town is the impressive Porte Saint-Michel gate, which is also the symbol of Guérande. This gate dates back to the 15th century and is one of the four main gates that once led into the fortified town. Upon entering through the gate, visitors find themselves in the historic center, full of narrow cobbled streets and old stone houses that have retained their original medieval character.

Among the most important landmarks is the Saint-Aubin Church, built in the 14th and 15th centuries in the Gothic style. It is known for its beautiful architecture and well-preserved stained glass windows. The town's walls are also worth mentioning, featuring several defensive towers and loopholes, reflecting how important the town's defense was in the past. Around the walls, one can find old customs houses and remnants of former fortifications.

The town also houses the Salt Museum (Musée des Marais Salants), where visitors can learn all about the traditional production of sea salt, which is very important in Guérande. The salt marshes, known as salines, are located right next to the town and are among the largest in Europe. Salt is produced here in the traditional way: seawater is slowly evaporated in shallow ponds, leading to the formation of high-quality salt known as "sel de Guérande". This method of salt production is not only eco-friendly but also culturally significant, as it has been passed down from generation to generation.

One very interesting place near Guérande is the seaside town of La Baule, located just a few kilometers away. La Baule is famous for its long sandy beach, one of the longest in Europe, and is a popular spot for summer holidays. In addition to the beach, it also offers promenades, restaurants, and various sports activities, making it an ideal place to relax after a day spent exploring Guérande's history.

Parc Naturel Régional de la Brière

Parc Briére is an important regional natural park in the Guérande area, known for its diverse wetlands, marshes, reed beds, and lakes. The park is home to more than 200 species of birds, including the gray heron, great cormorant, white stork, and wild ducks. In addition to birds, various mammals, such as muskrat, wild rabbit, and red fox, can be found here.

The park is also home to many species of amphibians and reptiles, including the common toad and brown frog, which are typical for wetland areas. Various species of fish, such as the pike and perch, live in the local streams and ponds.

Regarding flora, the park is rich in reeds, sundews, sedge, and water orchids. In forested areas, poplars, alders, willows, and birches form part of the local ecosystems. In wetlands and ponds, rare species like the middle orchid and water sedge can also be found.

This national park features both saltwater and freshwater locality, as well as a mix of both. Brière is an ecologically valuable area, providing refuge for many protected species and playing a crucial role in preserving biodiversity in the region.

The Atlantic ocean

The Atlantic Ocean has great significance for the region. The coastline, located just a few kilometers from the town, is known for its sandy beaches and salty lagoons. Tides regularly shift in the area, influencing marine ecosystems.

The sea is home to a variety of species, such as crabs, shellfish, plaice, and mackerel. Birds like herons, cormorants, and gulls also frequent the wetlands and coastal areas for nesting.

Guérande's coastline is also famous for its traditional sea salt production and fishing, which have a long history in the region. The sea, therefore, plays an essential role not only in the ecosystem but also in the local economy and culture.

Salt

The process of salt production continues to be carried out in traditional ways that have been passed down through generations. The region is home to extensive salt marshes (marais salants), specially designed wetlands that use the natural tidal cycle. The sea brings in salty water, which is then collected in several layers of shallow ponds.

The process begins when seawater fills the first part of the ponds, where it slowly evaporates under the influence of sunlight and wind. This process can take several days. As the water gradually loses moisture, salt crystals begin to form at the bottom of the ponds. This crystal is known as "fleur de sel" – fine, delicate layers of salt that form on the water's surface and are manually collected.

Fleur de sel is considered the highest quality form of sea salt, known for its delicate texture and rich mineral flavor. It is regarded as one of the most valuable salts in the world. After collecting this delicate layer, coarser salt is then harvested from the bottom of the ponds. This salt is larger and is primarily used for cooking and preservation.

3. Třeboň and its surroundings

Třeboň – general overview

Třeboň is a historic town located in the South Bohemian Region of the Czech Republic, close to the Austrian border. It lies in a flat landscape known as the Třeboň Basin, which is characterized by forests, meadows, wetlands, and an extensive system of fishponds. The town has a population of approximately 8 500 inhabitants, which makes it a small town by Czech standards, yet it plays an important cultural, historical, and economic role in the region. The total area of the town is around 67 square kilometers, including the surrounding countryside and natural sites.

The history of Třeboň dates back to the 12th century. The first written mention of the town appears in historical records from the year 1376, although the settlement itself is older. Třeboň became particularly important in the Middle Ages, when it was owned by the powerful noble family of the Rožmberks (Rosenbergs). Under their rule, the town developed into a significant economic and administrative center. The Rožmberks supported trade, crafts, education, and especially fish farming, which would later become a defining feature of the entire region.

One of the most important historical landmarks of Třeboň is the Třeboň Chateau, which was originally a Gothic fortress and later rebuilt into a Renaissance residence. The chateau served as the main seat of the Rožmberk family and remains a symbol of the town's historical importance. The historic town center, with its well-preserved square, burgher houses, and town hall, reflects the prosperity of Třeboň during the Renaissance period. Despite wars, fires, and political changes, the town has managed to preserve much of its historical character.

In modern times, Třeboň is known not only for its history but also for its spa tradition. The local spa specializes mainly in treatments using peat, which is extracted from nearby wetlands. Thanks to this, Třeboň has become a popular destination for visitors seeking relaxation and health care. Today, the town successfully combines historical heritage, natural beauty, and tourism, making it one of the most attractive towns in South Bohemia.

The system of ponds

The Třeboň region is world-famous for its unique system of fishponds, which is one of the largest and oldest artificial water management systems in Europe. The foundations of this system were laid in the 14th and 15th centuries and were further developed in the 16th century. The main figures associated with the creation of the fishpond network are Štěpánek Netolický and Jakub Krčín, two outstanding engineers of their time. Their work transformed the originally marshy and flood-prone landscape into a carefully managed system of reservoirs and canals.

Today, the Třeboň fishpond system includes hundreds of ponds of various sizes, the largest of which is Rožmberk Pond, covering almost 490 hectares. Other well-known ponds include Svět, Opatovický, and Kaňov. These ponds are interconnected by channels and streams that regulate water levels and protect the surrounding area from floods. The system represents a remarkable example of how humans can shape the landscape in harmony with nature.

Fish farming, especially carp breeding, has been an essential part of the regional economy for centuries. Carp from South Bohemia is considered a traditional Czech product and plays an important role in Czech cuisine, particularly during Christmas. The fishponds therefore have not only economic significance but also cultural value, as they are closely connected with national traditions and customs.

In addition to fish production, the fishpond system is extremely important for water retention, biodiversity, and climate regulation. The ponds help to store water in the landscape, reduce the risk of floods and droughts, and create habitats for many species of plants and animals. Many rare and endangered birds, amphibians, and insects depend on these wetlands. For these reasons, the Třeboň fishponds are protected as part of a biosphere reserve and are considered valuable not only for the Czech Republic but also for Europe as a whole.

The protected area of Červené Blato

Červené Blato is one of the most valuable protected natural areas in the vicinity of Třeboň. It is a national nature reserve located to the southwest of the town and represents a unique peat bog ecosystem. The name “Červené Blato” which can be translated as “Red Bog,” refers to the reddish coloration of the peat and vegetation caused by specific plant species and mineral content.

This area is important mainly because of its rare flora and fauna. Červené Blato is home to many specialized plant species adapted to acidic and nutrient-poor conditions, such as peat mosses, sundews, and cotton grasses. Some of these species are very rare and protected at the national or European level. The reserve also provides habitats for various insects, amphibians, and birds that depend on wetland environments.

To protect this fragile ecosystem, human activity in Červené Blato is strictly regulated. Visitors are allowed to move only along marked trails and wooden boardwalks, which minimize damage to the peat surface. Educational panels along the paths provide information about the formation of peat bogs, their ecological importance, and the need for conservation.

Červené Blato plays an important role not only as a nature reserve but also as an educational and scientific site. It helps raise awareness about the importance of wetlands in water retention, climate regulation, and biodiversity protection. Together with the fishponds and forests of the Třeboň region, it forms an essential part of the local natural heritage, which is carefully preserved for future generations.

4. Multiparametric probe AquaTroll 600

The Aqua TROLL 600 multiparametric probe from In-Situ is a modern device designed to measure water quality in various types of water environments. Thanks to its robust design, interchangeable sensors and wireless connectivity, it allows accurate and flexible monitoring of many physics-chemical water parameters in a single measurement. The probe is widely used in the field of environmental monitoring and hydrology, and is used not only for the analysis of surface waters such as rivers, lakes, ponds or dams, but also for groundwater monitoring in boreholes and wells. Other applications include water quality monitoring in waterworks or industrial applications such as wastewater and chemical plant monitoring. Last but not least, the Aqua TROLL 600 is also used in research projects and education, where it allows students to gain hands-on experience in measuring water quality and analyzing measured data.

The probe is capable of measuring a wide range of water quality parameters. In this project, we will focus on monitoring the following parameters: turbidity, pH, dissolved oxygen content, and nitrite and/or ammonium ion concentrations. Turbidity provides information on the amount of suspended particles in the water and can indicate pollution or changes in hydrological conditions. The pH value is key to understanding the chemical processes occurring in the aquatic environment as it affects the solubility of substances and the biological processes of organisms. Dissolved oxygen concentration is a key indicator of water quality for aquatic ecosystems as it affects the survival of fish and other aquatic organisms. Nitrite and ammonium ions are indicators of organic pollution and are important factors in assessing the impact of human activities on aquatic ecosystems. In addition to these sensors, a variety of other probes can be purchased with the Aqua TROLL 600.

Available sensors for the Aqua TROLL 600 include (according to www.in-situ.com):

- Temperature: basic sensor for measuring water temperature.
- Conductivity: Sensor for measuring electrical conductivity, which helps determine the overall mineralization of the water.
- pH/ORP: Combined sensor for measuring pH and oxidation-reduction potential (ORP), which are key parameters for assessing water chemistry.
- Dissolved Oxygen (RDO®): An optical sensor for measuring dissolved oxygen concentration, important for assessing water quality and aquatic ecosystem health.
- Turbidity: A sensor for measuring water turbidity, indicating the presence of suspended particles.

- Chlorophyll A: Sensor for detecting the concentration of chlorophyll A, which helps monitor algae growth.
- Phycocyanin (BGA-PC): Sensor for the detection of cyanobacteria containing phycocyanin.
- Phycoerythrin (BGA-PE): Sensor for the detection of cyanobacteria containing phycoerythrin.
- Fluorescent soluble organic matter (FDOM): Sensor for measuring the concentration of fluorescent organic matter in water.
- Crude oil: Sensor for detecting the presence of crude oil in water.
- Rhodamine WT: Sensor for detecting the fluorescent dye Rhodamine WT, often used in tracer studies.
- Fluorescein WT: Sensor for the detection of the fluorescent dye Fluorescein WT.
- Ammonium (ISE): Ion-selective electrode for measuring the concentration of ammonium ions.
- Chloride (ISE): Ion-selective electrode for measuring the concentration of chloride ions.
- Nitrate (ISE): Ion-selective electrode for measuring the concentration of nitrate ions.

In addition to the sensors, an “antifouling wiper”, which is a system for automatic cleaning of the sensors, can be connected to the probe. This dual cleaning mechanism prolongs the intervals between manual cleaning during long-term deployments of the probe in the field.

One of the main advantages of the Aqua TROLL 600 is its flexibility and ease of use. Thanks to its modular design, users can easily change sensors according to their current measurement needs. The probe is made of titanium, which gives it high corrosion resistance and allows for long-term deployment even in harsh conditions. It is designed for use at depths of up to 200 meters, making it suitable not only for measurements in shallow water flows, but also in deep lakes or wells, or for deployment in ocean and marine research.

The Aqua TROLL 600 offers a wide range of connectivity and data transfer options. In addition to the traditional cable connection, it also has wireless communication via Bluetooth, which allows convenient control and data downloading directly to mobile devices or tablets via the VuSitu app. This application not only allows real-time monitoring of the measured values, but also their recording and export to formats suitable for further analysis, for example in Microsoft Excel. The data can also be transmitted to telemetry systems, allowing real-time

remote monitoring of water quality. The probe also has a built-in GPS system, which can be used to clearly identify and describe the measurement site.

Manual for the AquaTroll 600 used in Watermania project is included in **Appendix 1**.

5. Measured parameters

Conductivity

Conductivity (also called electrical conductivity) is a physical quantity that expresses the ability of a material to conduct electric current. It is usually measured in $S \cdot m^{-1}$ (siemens per meter) and denoted by the Greek letter σ (sigma).

Conductivity plays a crucial role in electrical engineering, chemistry, and environmental science. It helps determine the purity of water (water with a higher number of ions has higher conductivity), assess the quality of metals, or monitor chemical reactions in solutions. In practice, it is used for testing drinking water, producing semiconductors, or in the energy industry.

Electric current is generated by the movement of charged particles — electrons in metals or ions in liquids. Therefore, conductivity depends on how easily these particles can move through the material. In metals, current is carried by electrons that move within a metallic crystal lattice. In aqueous solutions, it is carried by ions (such as Na^+, Cl^-) that transfer electric charge between electrodes.

Parameters that influence conductivity:

- Temperature – In metals, conductivity decreases with increasing temperature because electron scattering increases. In liquids, however, conductivity usually increases as ions move faster.
- Material type – Different substances have different abilities to conduct current. For example, copper and silver are among the best conductors, while plastics and glass are insulators.
- Ion concentration – In solutions, conductivity depends on the amount of dissolved salts. More ions mean higher conductivity.
- Structure and purity – Impurities, cracks, or defects in the crystal structure can reduce conductivity.

Temperature

Temperature is one of the fundamental physical parameters influencing natural and engineered systems. It represents a measure of the average kinetic energy of particles in matter and plays a crucial role in determining the physical, chemical, and biological properties of environments. In aquatic systems, temperature significantly affects water chemistry, gas solubility, and the physiological processes of aquatic organisms, particularly fish.

It is widely utilized as a controlling and descriptive parameter across various scientific and technical fields. In physics and engineering, it governs heat transfer, phase transitions, and material properties. In chemistry, temperature affects reaction rates, equilibrium states, and solubility of substances. In environmental sciences, temperature is a critical indicator of climate conditions, ecosystem health, and water quality. In aquaculture and fisheries management, temperature directly influences metabolism, growth rates, reproduction, and survival of aquatic organisms.

It is commonly measured using instruments that rely on predictable physical changes in materials. Traditional devices include liquid-in-glass thermometers, which operate on thermal expansion principles. Modern measurement techniques employ electronic sensors such as thermocouples, resistance temperature detectors (RTDs), and thermistors, which convert temperature-dependent electrical properties into readable signals. In aquatic environments, temperature is often monitored continuously using submerged probes or data loggers to capture temporal and spatial variability.

Temperature has a profound effect on the solubility of gases in water. According to Henry's law and thermodynamic principles, gas solubility generally decreases as temperature increases. This relationship is particularly important for dissolved oxygen (DO), carbon dioxide (CO_2), and nitrogen (N_2). As water warms, its capacity to retain dissolved oxygen declines, leading to lower oxygen availability for aquatic organisms. Conversely, colder water can hold higher concentrations of dissolved gases.

In addition to solubility effects, temperature influences gas exchange rates between water and the atmosphere. Higher temperatures increase molecular motion, accelerating diffusion and gas release. In stratified water bodies, temperature gradients can further restrict vertical mixing, potentially resulting in hypoxic conditions in deeper layers.

Fish are ectothermic organisms, meaning their body temperature and metabolic activity are directly regulated by the surrounding water temperature. Each fish species has a specific

thermal tolerance range and an optimal temperature window for growth and reproduction. Deviations from this range can induce stress, reduce feeding efficiency, impair immune function, and increase susceptibility to disease.

Temperature also indirectly affects fish through its influence on dissolved oxygen levels. Elevated temperatures combined with low oxygen concentrations can lead to severe physiological stress or mortality. Consequently, temperature management is a critical component in aquaculture systems, where maintaining optimal thermal conditions ensures adequate oxygen availability and supports healthy fish development.

Disolved oxygen (RDO)

Dissolved oxygen is oxygen gas (O_2) that is mixed and dissolved in water. It's not part of the water molecules themselves, but oxygen from the air or produced by plants gets into the water.

Oxygen gets into water mainly in two ways: by mixing with the air on the water surface and through photosynthesis by water plants and algae. The amount of dissolved oxygen in water depends on a few things. One big factor is the water temperature (see above). Cold water can hold more oxygen than warm water. So, in summer when the water is warm, there is usually less oxygen, which can be bad for fish and other animals that need oxygen to live. Water movement also matters. In rivers and streams where water flows, oxygen gets mixed in more easily from the air. But in still water like ponds or lakes, especially near the bottom, there is often less oxygen because the water doesn't move much.

Pollution and nutrients in the water also change oxygen levels. When there are a lot of nutrients, like from fertilizers, algae grow a lot. When the algae die, bacteria use oxygen to break them down, which lowers the oxygen in the water. Also, pollution like sewage uses up oxygen when it breaks down.

Water plants produce oxygen during the day through photosynthesis when there is sunlight. But at night, plants also use oxygen to breathe, so oxygen levels can drop at night, especially in ponds or lakes with little water movement. The amount of oxygen in water also changes with altitude and air pressure. Higher places have lower air pressure, so less oxygen can dissolve in the water. In winter, when the water surface is frozen with ice, less oxygen gets

into the water from the air. This can cause oxygen levels to drop and sometimes fish die because of it.

Dissolved oxygen is really important for all water animals and plants. Different fish and animals need different amounts of oxygen. If there isn't enough oxygen, some animals might die or move away. Scientists measure dissolved oxygen to check how healthy the water is.

Turbidity

Turbidity is an important physical parameter used to describe the optical clarity of water. It refers to the degree to which water loses transparency due to the presence of suspended and colloidal particles, such as clay, silt, organic matter, plankton, and microorganisms. Turbidity is widely applied as an indicator of water quality in environmental monitoring, water treatment, and aquaculture systems.

It originates from both natural and anthropogenic sources. Natural contributors include soil erosion, resuspension of bottom sediments, and biological activity, while human-induced sources involve agricultural runoff, urban drainage, and industrial discharges. In aquatic ecosystem assessments, turbidity is commonly used to evaluate sediment loads, nutrient dynamics, and overall ecosystem health. In aquaculture and fisheries management, turbidity serves as a practical parameter for assessing habitat suitability and operational conditions.

Turbidity is typically measured using optical instruments known as turbidimeters or nephelometers. These devices quantify the intensity of light scattered by suspended particles at a specific angle, most commonly 90 degrees, and express turbidity in Nephelometric Turbidity Units (NTU). Continuous turbidity monitoring is increasingly employed in aquatic systems to detect rapid changes caused by runoff events, algal blooms, or mechanical disturbances.

Elevated turbidity can indirectly affect gas concentrations in water by altering physical and biological processes. High concentrations of suspended particles reduce light penetration, limiting photosynthetic activity of aquatic plants and phytoplankton. This reduction in oxygen production may lead to decreased dissolved oxygen levels, particularly in productive or densely stocked systems. Additionally, organic particles contribute to microbial respiration, increasing oxygen consumption and potentially intensifying hypoxic conditions.

Turbidity significantly influences fish behavior and physiological performance. Moderate turbidity may provide shelter from predators and reduce visual stress; however, excessive turbidity can impair respiration by clogging gill structures, reduce feeding efficiency, and disrupt reproductive behaviors. Prolonged exposure to high turbidity levels is associated with increased stress, reduced growth rates, and higher mortality, especially in sensitive species and early life stages.

Oxidative-reduction pottential (ORP)

Oxidation–reduction potential (ORP) is a physicochemical parameter that reflects the ability of an aquatic system to either oxidize or reduce chemical substances. It represents the overall balance between oxidizing agents, such as dissolved oxygen, and reducing agents, including organic matter and reduced ions. ORP is expressed in millivolts (mV) and is widely used as an integrative indicator of water quality and redox conditions.

ORP is measured using electrochemical probes consisting of an inert measuring electrode, typically platinum or gold, and a reference electrode. The measured potential provides insight into the oxidative capacity of water but does not identify specific chemical species. ORP monitoring is commonly applied in environmental studies, wastewater treatment, drinking water systems, and aquaculture, where it is used to assess oxygen availability, organic loading, and the effectiveness of disinfection processes.

ORP is closely linked to dissolved gas concentrations, particularly oxygen. High ORP values generally indicate well-oxygenated conditions and the dominance of oxidative processes, whereas low or negative ORP values are associated with oxygen depletion and the prevalence of anaerobic or reducing reactions. Under low ORP conditions, harmful reduced compounds such as ammonia, hydrogen sulfide, or methane may accumulate, negatively affecting water quality.

ORP plays also an important indirect role in fish health by reflecting the balance between oxygen supply and organic matter decomposition. Low ORP environments can cause physiological stress, impair respiration, and increase the toxicity of certain compounds. Maintaining stable and sufficiently high ORP levels is therefore essential in aquaculture systems to support aerobic conditions, efficient waste degradation, and healthy fish metabolism.

6. Material and methods

Sample collection and measurement

An AquaTroll 600 multiparameter probe (VuSitu, USA – see above for more information) was used to measure all samples. In most cases, samples were measured *in-situ* (directly at the locality). Only samples from recirculation systems and tanks with the possibility of contamination were collected in a container and subsequently measured by *ex-situ* method.

All samples were measured at least in triplicate, and the average value was then calculated and recorded in the worksheets (below).

For each sample, the location was also recorded in the form of GPS coordinates and the depth from which the sample was taken.

Samples were designed to monitor different locations and different water qualities. Sampling always took place at partner schools or in areas in close proximity to both schools (in Czech Republic as well as in France).

Data from each sample are presented in a separate worksheet, where these data are also discussed.

List of samples

Complete list of samples is shown in table I.

TABLE I. :

Czech Republic	
1	Drinking water (Třeboň)
2	School biotop
3	Naděje pond systém - pond Faith (outlet)
4	Naděje pond systém - pond Rod (surface, shadowed location)
5	Rožmberk pond - outlet Adolfka (outlet on the site of pond)
6	Mlýnský pond
7	Annín Trout farm (tank)
8	Annín Trout farm (inlet)
9	Červené blato protected area (peat bog lake)
France	
10	Drinking water (Guérande)
11	Outside fish tank (LPO Guérande)
12	RAS system (pike perch)
13	School pond
14	See marsh Pen Bron
15	Briére national park (Saint-Malo de Guersac)

7. Results and discussion - data worksheets

WATERMANIA

DATE:	26/07/2025	**GPS:**	49.00980833333; 14.7573866666	**TIME:**	8:11
LOCATION:	**Drinking water (Třeboň): ex-situ analysis**			**CLIMATE:**	Inside building

DATA RESULTS

Turbidity (NTU)	Specific Conductivity (mS/m)	Density (g/cm³)	RDO Concentration (mg/L)	RDO Saturation (%Sat)	Water Temperature (°C)	pH
7,72	24,80	1,00	7,88	90,80	19,88	7,29
7,72	24,80	1,00	7,88	90,81	19,87	7,29
7,63	24,66	1,00	7,87	90,73	19,87	6,87
7,69	24,75	1,00	7,88	90,78	19,87	7,15

Depth (cm)	ORP (mV)	Barometric Pressure (mbar)	Air Temperature (°C)
30,12	340,94	965,54	22,80
30,58	340,96	965,54	22,80
28,97	341,15	965,53	22,84
29,89	341,02	965,53	22,81

DISCUSSION

The measured data show that the drinking water at the sampling site has very good quality. All key parameters (pH, conductivity, dissolved oxygen content, ORP) meet the requirements for drinking water. The slightly increased value of turbidity may indicate a small presence of undissolved particles, but it is not a serious issue. Overall, the water can be evaluated as safe, clean, and suitable for drinking.

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DATE:	26/05/2025	**GPS:**	49,009206666; 14,75778333333	**TIME:**	10:15
LOCATION:	**School biotop (Třeboň) – air inlet**			**CLIMATE:**	Partly cloudy

DATA RESULTS

Turbidity (NTU)	Specific Conductivity (mS/m)	Density (g/cm³)	RDO Concentration (mg/L)	RDO Saturation (%Sat)	Water Temperature (°C)	pH
12,67	256,22	1,00	9,96	99,73	13,27	7,12
12,63	256,18	1,00	9,93	99,46	13,27	7,11
12,55	256,23	1,00	9,91	99,21	13,27	7,12
12,62	256,21	1,00	9,93	99,47	13,27	7,12

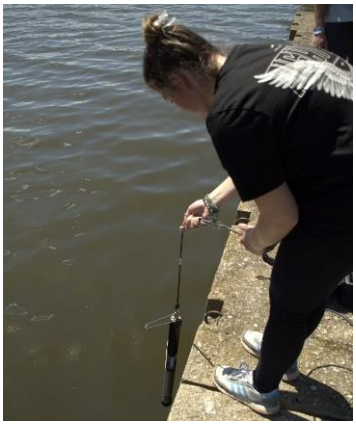
Depth (cm)	ORP (mV)	Barometric Pressure (mbar)	Air Temperature (°C)
27,31	247,22	966,69	22,34
27,97	247,67	966,69	22,33
59,53	252,49	966,75	22,51
38,27	249,12	966,71	22,39

DISCUSSION

Samples were taken from the school biotope. Looking over the results the average data show that the water is clean and of good quality. A pH of 7.1 and temperature of 13 °C indicate suitable conditions for aquatic life. Dissolved oxygen levels are high as expected since measurements were taken very close to the oxygenator inlet. Turbidity and conductivity values suggest a natural, balanced environment. To maintain its quality the water is run through a robust filtration system that filters it both mechanically and biologically. The biotope is also planted with a large number and variety of plants that naturally help maintain water quality. Several species of fish, such as minnows, chubs, and sturgeons, which are extremely demanding in terms of water quality, have been successfully bred and kept in the biotope for a long time.

WATERMANIA

DATE:	26/05/2025	GPS:	49,11858333; 14,74819333	TIME:	14:09
LOCATION:	Naděje pond systém – pond Faith (outlet)			CLIMATE:	Sunny



DATA RESULTS

Turbidity (NTU)	Specific Conductivity (mS/m)	Density (g/cm³)	RDO Concentration (mg/L)	RDO Saturation (%Sat)	Water Temperature (°C)	pH
24,07	266,27	1,00	13,82	154,12	18,37	8,21
24,30	265,76	1,00	13,83	154,41	18,46	8,23
23,88	267,26	1,00	13,68	153,02	18,52	8,53
24,08	266,43	1,00	13,78	153,85	18,45	8,32

Depth (cm)	ORP (mV)	Barometric Pressure (mbar)	Air Temperature (°C)
105,05	192,29	968,33	29,22
64,30	192,12	968,32	30,57
98,35	-3,33	968,36	28,55
89,23	127,03	968,34	29,45

DISCUSSION

The measurements were taken from a pond system consisting of 21 different ponds. The first pond was built by Jakub Krcin in 1579. Naděje (Faith) is the biggest pond in the system. RDO was surprisingly high (about 150 % relative saturation). The weather was sunny that day so the possible cause was that the water plants and other autotrophic organisms were intensively photosynthesizing. It also affected the pH as we measured a very high value of about 8,2. Turbidity was also very good if we take in consideration that Naděje (Faith) pond is directly intended for fish farming. Water temperature was also relatively high, which was caused by a warm and sunny weather in the locality for the past few weeks.

WATERMANIA

DATE:	26/05/2025	**GPS:**	49,11959; 14.7403183333333	**TIME:**	14:34
LOCATION:	**Naděje pond systém – pond Rod (surface, shadowed location)**			**CLIMATE:**	Sunny

DATA RESULTS

Turbidity (NTU)	Specific Conductivity (mS/m)	Density (g/cm³)	RDO Concentration (mg/L)	RDO Saturation (%Sat)	Water Temperature (°C)	pH
17,31	236,59	1,00	5,59	60,35	16,84	7,58
18,36	237,12	1,00	5,54	59,82	16,81	7,52
17,57	239,00	1,00	5,53	53,45	16,56	7,55
17,75	237,57	1,00	5,55	57,87	16,74	7,55

Depth (cm)	ORP (mV)	Barometric Pressure (mbar)	Air Temperature (°C)
99,12	138,13	968,40	24,98
100,18	128,41	968,40	24,95
99,89	98,20	968,46	24,84
99,73	121,58	968,42	24,93

DISCUSSION

What was interesting about this pond was that it had relatively low turbidity considering its location. The data is specifically from the Rod pond, which is one of the smaller, secondary ponds, so that somewhat explains the low turbidity. Oxygen saturation was relatively low (around 60 % of the saturation). This was probably due to the fact that the sample was taken from a greater depth and that the location was shaded and without noticeable mixing. Similarly, there was no noticeable trace of photosynthesis in the water, such as the presence of algae or cyanobacteria. The pH value and water temperature were within favorable limits for aquatic life and fish farming.

WATERMANIA

DATE:	28/05/2025	**GPS:**	49,05160667; 14,782365	**TIME:**	14:39
LOCATION:	**Rožmberk pond – outlet Adolfka (outlet on the side of pond)**			**CLIMATE:**	Rainy

DATA RESULTS

Turbidity (NTU)	Specific Conductivity (mS/m)	Density (g/cm³)	RDO Concentration (mg/L)	RDO Saturation (%Sat)	Water Temperature (°C)	pH
23,29	260,86	1,00	8,93	98,32	18,98	6,87
23,29	260,86	1,00	8,93	98,32	18,96	6,87
23,29	260,86	1,00	8,93	98,32	18,96	6,87
23,29	260,86	1,00	8,93	98,32	18,97	6,87

Depth (cm)	ORP (mV)	Barometric Pressure (mbar)	Air Temperature (°C)
30,92	246,57	970,27	20,87
31,06	244,79	970,32	20,82
31,20	244,83	970,32	20,82
31,06	245,40	970,30	20,83

DISCUSSION

Water turbidity was low at the measuring point because the water was not cloudy at the measuring point. The electrical conductivity of the water was normal. The density of the water is the same everywhere. The amount of oxygen in the water was optimal for the life of fish and aquatic organisms. The oxygen level was higher because the water was oxygenated due to rain at the locality and intensive mixing in the outlet locality. Given the weather that prevailed that week, the water was quite warm but still cooler than the surrounding air.

WATERMANIA

DATE:	26/05/2025	GPS:	49,01990333; 14,778715	TIME:	18:29
LOCATION:	Mlýnský pond (outlet – surface, bottom)			CLIMATE:	Sunny

DATA RESULTS

Surface

Turbidity (NTU)	Specific Conductivity (mS/m)	Density (g/cm³)	RDO Concentration (mg/L)	RDO Saturation (%Sat)	Water Temperature (°C)	pH
16,08	289,60	1,00	7,79	86,57	18,11	6,56
16,09	289,63	1,00	7,79	86,53	18,11	6,57
16,11	289,65	1,00	7,79	86,49	18,11	6,54
16,09	289,63	1,00	7,79	86,53	18,11	6,56

Depth (cm)	ORP (mV)	Barometric Pressure (mbar)	Air Temperature (°C)
83,39	240,53	966,83	25,32
83,38	240,45	966,83	25,32
83,38	240,36	966,83	25,31
83,38	240,45	966,83	25,32

Bottom

Turbidity (NTU)	Specific Conductivity (mS/m)	Density (g/cm³)	RDO Concentration (mg/L)	RDO Saturation (%Sat)	Water Temperature (°C)	pH
291,95	313,84	1,00	4,15	43,65	15,53	6,51
349,56	323,47	1,00	4,03	42,38	15,50	6,51
1679,85	350,97	1,00	2,77	28,98	15,28	6,51
773,79	329,43	1,00	3,65	38,33	15,44	6,51

Depth (cm)	ORP (mV)	Barometric Pressure (mbar)	Air Temperature (°C)
280,30	183,22	966,83	24,44
281,00	179,58	966,82	24,35
283,03	146,08	966,88	24,15
281,44	169,62	966,84	24,32

DISCUSSION

The sample was taken and measured at two different depths. The weather was sunny that day and the water at the surface had a higher temperature than at the bottom, which was quite expected. The same goes for other parameters as well, such as conductivity and oxygen saturation (RDO). It is possible that RDO is lower due to depth as well as the presence of mud with microorganisms living in it, different species of fish and other aquatic animals and their activity. When comparing both results and average values of all measured parameters, we can easily see that the quality of the water at the bottom was worse in terms of conditions for fish and aquatic life.

WATERMANIA

DATE:	29/05/2025	**GPS:**	49,009505; 14,75773	**TIME:**	9:03
LOCATION:	**Annín Trout farm (outlet): es-situ analysis**			**CLIMATE:**	Sunny



DATA RESULTS

Turbidity (NTU)	Specific Conductivity (mS/m)	Density (g/cm³)	RDO Concentration (mg/L)	RDO Saturation (%Sat)	Water Temperature (°C)	pH
13,12	46,48	1,00	8,90	98,07	20,87	7,01
13,68	47,00	1,00	8,41	98,31	20,82	7,02
13,22	47,13	1,00	8,43	98,46	20,82	7,02
13,34	46,87	1,00	8,58	98,28	20,83	7,02

Depth (cm)	ORP (mV)	Barometric Pressure (mbar)	Air Temperature (°C)
30,92	246,57	970,27	23,51
31,06	244,79	970,32	24,00
31,20	244,83	970,32	24,04
31,06	245,40	970,30	23,85

DISCUSSION

The trout farm Annín is located in Šumava National Park. We were there for about two hours and the weather was very good (sunny) and relatively stable throughout our visit. The sunny weather caused the water to heat up, making the water temperature unexpectedly high in the outlet location. Turbidity was around 13 NTU which is a really good value for trout since this fish requires clean water to thrive. The farm is located in Šumava where it rains a lot and the conductivity was comparable to that of rainwater – which is around 10 – 50 mS/m. Since we were measuring a freshwater outlet the density remained the same, unlike saltwater. Saturation was also great for trout since they are a very demanding species of fish that require a lot of oxygen. Saturation (about 98%) is also high due to the measurements being taken at the outlet in depth of 30 centimeters. The pH is neutral despite the reservoir's inflow coming from a forest with acidic soil.

WATERMANIA

DATE:	27/05/2025	**GPS:**	49,17492; 13,51379	**TIME:**	9:30
LOCATION:	**Annín Trout farm (inlet – fish tank)**			**CLIMATE:**	Sunny

DATA RESULTS

Turbidity (NTU)	Specific Conductivity (mS/m)	Density (g/cm³)	RDO Concentration (mg/L)	RDO Saturation (%Sat)	Water Temperature (°C)	pH
10,41	41,16	1,00	8,76	100,85	20,58	7,13
10,79	41,65	1,00	8,75	100,82	20,60	7,12
10,12	41,59	1,00	8,90	100,08	20,87	7,13
10,44	41,46	1,00	8,80	100,58	20,68	7,13

Depth (cm)	ORP (mV)	Barometric Pressure (mbar)	Air Temperature (°C)
30,78	277,84	970,35	22,94
30,56	277,56	970,27	22,98
30,92	276,63	970,27	22,51
30,75	277,34	970,30	22,81

DISCUSSION

Since it was a trout farm, the turbidity was very low, which is very good value for trout farming. The conductivity of the water was not high because it did not contain large amounts of ions; the water is coming from local mountain stream. The oxygen saturation of the water was about 100 % which is again very good for fish, because trout is species which is very sensitive for oxygen. Water was evidently sufficiently oxygenated especially due to low temperature of the stream and intensive mixing. Because we used ex-situ measuring the temperature of water was relatively high and does not correspond to real temperature in fish tank probably. The ex-situ measuring was chosen because of the real possibility of contamination of the farm, which we wanted to prevent by this approach. The pH of the water was nearly neutral, which is surprising given the peaty nature of the surrounding area.

WATERMANIA

DATE:	25/05/2025	**GPS:**	48.860060; 14.8125925	**TIME:**	15:58
LOCATION:	**Červené blato protected area (peat bog lake)**			**CLIMATE:**	Sunny

DATA RESULTS

Turbidity (NTU)	Specific Conductivity (mS/m)	Density (g/cm³)	RDO Concentration (mg/L)	RDO Saturation (%Sat)	Water Temperature (°C)	pH
102,36	98,25	1,00	4,01	43,68	15,98	5,87
100,52	104,25	1,02	4,25	44,89	15,89	5,82
102,58	101,25	1,00	4,28	44,98	15,85	5,85
101,82	101,25	1,01	4,18	44,52	15,91	5,85

Depth (cm)	ORP (mV)	Barometric Pressure (mbar)	Air Temperature (°C)
30,12	173,53	970,27	21,05
31,18	184,54	970,32	21,12
30,09	183,56	970,32	21,06
30,46	180,54	970,30	21,08

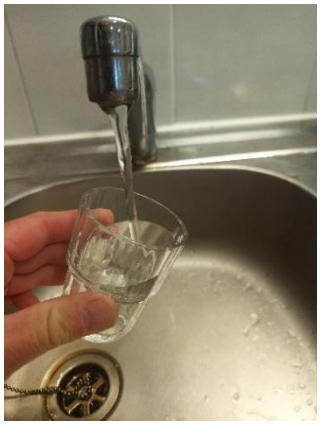
DISCUSSION

Červené blato is a very important protected area near the town of Třeboň. Here you can find peat bogs, peat lakes, and other similar biotopes. Thanks to this, many protected and endangered species of plants and animals can also be found here.

The sample came from a peat bog lake. Therefore, it was assumed that the pH would be lower, which was confirmed by the measured value of around 5,87. Similarly, based on brief sensory analysis of the lake, it was assumed that there would be visible turbidity. The measurement showed a value of around 100 NTU, which is consistent with this observation. As this is a peat bog lake where organic matter decomposes intensively, a relatively high conductivity value was also measured. On the other hand, the oxygen content was very low due to decomposition processes and the lack of any mixing – only around 40% of relative saturation. Due to this fact, no macroscopic life was visible in this lake.

WATERMANIA

DATE:	09/10/2025	**GPS:**	47,343446; -2,422338	**TIME:**	8:07
LOCATION:	**Drinking water (Guérande): ex-situ analysis**			**CLIMATE:**	Inside building



DATA RESULTS

Turbidity (NTU)	Specific Conductivity (µS/cm)	Density (g/cm³)	RDO Concentration (mg/L)	RDO Saturation (%Sat)	Water Temperature (°C)	pH
7,45	719,72	1,00	9,72	105,74	20,18	7,24
7,46	719,72	1,00	9,85	106,00	20,17	7,23
7,45	719,72	1,00	9,71	105,71	20,18	7,24
7,45	719,72	1,00	9,76	105,82	20,18	7,24

Depth (cm)	ORP (mV)	Barometric Pressure (mbar)	Air Temperature (°C)
83,47	221,10	102,56	20,06
83,50	220,80	102,54	20,70
83,17	221,12	102,75	20,06
83,38	221,01	102,62	20,27

DISCUSSION

All drinking water parameters were fine and met our expectations and anticipated limits.

WATERMANIA

DATE:	08/10/2025	GPS:	47,34380667; -2,423502	TIME:	8:25
LOCATION:	Outside fish tank (LPO Guérande)			CLIMATE:	Sunny

DATA RESULTS

Turbidity (NTU)	Specific Conductivity (µS/cm)	Density (g/cm³)	RDO Concentration (mg/L)	RDO Saturation (%Sat)	Water Temperature (°C)	pH
217,45	224,48	1,00	10,00	101,00	14,10	6,87
217,12	224,52	1,00	10,06	100,97	14,10	6,87
217,28	224,44	1,00	10,03	100,97	14,10	6,87
217,28	224,48	1,00	10,03	100,98	14,10	6,87

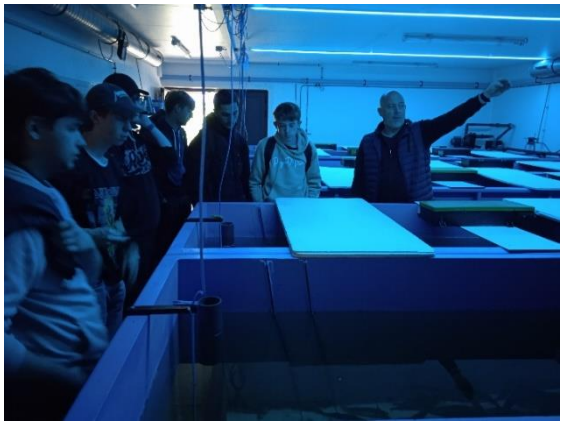
Depth (cm)	ORP (mV)	Barometric Pressure (mbar)	Air Temperature (°C)
126,37	163,14	962,15	16,07
125,25	163,52	962,15	16,07
126,50	164,14	965,25	16,07
126,04	163,60	963,18	16,07

DISCUSSION

The sample was taken from an outdoor tank at the water inlet, where intensive mixing took place. Therefore, high oxygen saturation can be observed. Other parameters were generally as expected. The water had a relatively high turbidity value, as it was pumped from a nearby pond. The pH value was good, confirming the low level of eutrophization of the water in the reservoir.

WATERMANIA

DATE:	08/10/2025	GPS:	47,34383333; -2,421735	TIME:	8:42
LOCATION:	RAS systém (pike perch): es-situ analysis			CLIMATE:	Indoor



DATA RESULTS

Turbidity (NTU)	Specific Conductivity (µS/cm)	Density (g/cm³)	RDO Concentration (mg/L)	RDO Saturation (%Sat)	Water Temperature (°C)	pH
6,74	857,51	1,00	8,28	95,26	13,53	7,57
6,74	857,13	1,00	8,25	95,22	13,53	7,57
6,74	855,53	1,00	8,32	95,32	13,53	7,57
6,74	856,72	1,00	8,28	95,27	13,53	7,57

Depth (cm)	ORP (mV)	Barometric Pressure (mbar)	Air Temperature (°C)
81,54	182,22	102,15	22,76
81,51	182,65	102,21	22,71
81,54	182,11	102,75	22,76
81,53	182,33	102,37	22,74

DISCUSSION

The measured parameters were correct with the RAS system. The turbidity value was exceptionally low, indicating that the filtration system is extremely effective. The pH and oxygen saturation values were ideal for breeding the pike perch. The water temperature was kept low, which also benefits the farming system. The analysis was performed *ex-situ* to avoid contamination of the RAS system.

WATERMANIA

DATE:	08/10/2025	GPS:	47,3440233333; -2,422236666666	TIME:	8:32
LOCATION:	School pond (LP Olivier Guichard)			CLIMATE:	Sunny

DATA RESULTS

Turbidity (NTU)	Specific Conductivity (µS/cm)	Density (g/cm³)	RDO Concentration (mg/L)	RDO Saturation (%Sat)	Water Temperature (°C)	pH
105,65	235,41	1,00	8,12	80,10	13,59	7,78
104,98	235,81	1,00	8,15	80,25	13,59	7,78
105,50	235,53	1,00	8,51	80,98	13,59	7,78
105,38	235,58	1,00	8,26	80,44	13,59	7,78

Depth (cm)	ORP (mV)	Barometric Pressure (mbar)	Air Temperature (°C)
86,32	159,07	102,21	15,23
86,51	157,07	102,21	15,23
86,11	159,09	102,75	15,23
86,31	158,41	102,39	15,23

DISCUSSION

The analyses reveal an overall satisfactory water quality in terms of pH, temperature, dissolved oxygen, and conductivity. These parameters indicate a good physicochemical balance, compatible with aquatic life. However, the very high turbidity (105.5 NTU) indicates a source of disturbance caused by the presence of phytoplankton.

WATERMANIA

DATE:	07/10/2025	**GPS:**	47,317205 ; -2,485785	**TIME:**	10:28
LOCATION:	**See marsh Pen Bron**			**CLIMATE:**	Sunny

DATA RESULTS

Turbidity (NTU)	Specific Conductivity (µS/cm)	Density (g/cm³)	RDO Concentration (mg/L)	RDO Saturation (%Sat)	Water Temperature (°C)	pH
65,56	51341,21	1,02	11,03	109,13	15,65	8,14
65,85	51342,28	1,02	11,01	109,10	15,65	8,14
68,21	51342,20	1,02	10,98	108,99	15,65	8,14
66,54	51341,90	1,02	11,01	109,07	15,65	8,14

Depth (cm)	ORP (mV)	Barometric Pressure (mbar)	Air Temperature (°C)
135,35	181,95	102,75	21,48
135,41	181,95	102,75	21,49
135,30	181,95	102,75	21,48
135,35	181,95	102,75	21,48

DISCUSSION

This is a saltwater sample, which is why, at first glance, it has a significantly higher conductivity value compared to the other samples. The turbidity value was very good, considering that it was a relatively unmixed location. The high transparency of the water also indicated low turbidity. The pH value was higher, which was probably caused by the nature of salt water itself and the intense photosynthesis taking place. The quality of this salt water seems good, the salinity (34 g/L) and the sunny weather explain the high RDO due to photosynthetic activity.

WATERMANIA

DATE:	09/10/2025	**GPS:**	47,352380; -2,184353	**TIME:**	8:30
LOCATION:	**Briére national park (Sant-Malo de Guersac)**			**CLIMATE:**	Sunny

DATA RESULTS

Turbidity (NTU)	Specific Conductivity (µS/cm)	Density (g/cm³)	RDO Concentration (mg/L)	RDO Saturation (%Sat)	Water Temperature (°C)	pH
27,24	13326,60	1,00	7,50	80,60	19,02	6,88
27,26	13326,68	1,00	7,50	80,60	19,02	6,82
27,23	13326,66	1,00	7,50	80,60	19,02	6,83
27,24	13326,65	1,00	7,50	80,60	19,02	6,84

Depth (cm)	ORP (mV)	Barometric Pressure (mbar)	Air Temperature (°C)
48,32	240,00	0,95	19,00
48,31	240,00	0,95	19,00
48,32	240,00	0,95	19,00
48,32	240,00	0,95	19,00

DISCUSSION

The Brière Regional Nature Park (Parc naturel régional de Brière) is the second largest wetland area in France after the Camargue. It is located in the Loire-Atlantique department in Brittany. It covers 40,000 hectares and offers a labyrinth of canals, reeds, and peat bogs. The sample was taken from a reservoir where there is apparently slight contact between salt and fresh water. This can be seen in the high conductivity value. As the water was stagnant, oxygen concentration is lower. The pH value is very good given the peatland nature of the surrounding area. The sample of marsh water is slightly turbid and has a high conductivity due to a slight salinity (7 grams of salt per liter).

Water quality comparison

As part of the project, three similar types of water bodies in the Czech Republic and France were compared. Specifically, these included a small school pond, a protected area, and drinking water sources. The evaluated parameters included pH, dissolved oxygen content, conductivity, turbidity, and temperature.

In the Czech Republic, the protected area Červené Blato showed typical characteristics of peatland water – low pH (around 5.8), low oxygen content, and higher turbidity. These conditions are natural but less suitable for most aquatic organisms. In contrast, Mlýnský pond showed very good values, especially sufficient oxygen levels and low turbidity, indicating a stable and high-quality environment for fish. Drinking water from Třeboň met all quality requirements – with neutral pH, low turbidity, and an appropriate level of dissolved oxygen.

In France, the national park Brière had very high conductivity, indicating a higher content of dissolved substances and specific wetland conditions. These values are related to the park's location near the sea, which affects water mineralization. A school pond had good levels of dissolved oxygen and neutral pH, but higher turbidity. Drinking water in Guérande was of good quality, with an ideal pH and high oxygen content, although it showed higher mineralization, also influenced by its coastal location.

Overall, it can be concluded that drinking water in both countries is of good quality and meets the required standards. Ponds in the Czech Republic generally provide more suitable conditions for freshwater organisms, while French locations have higher mineralization, mainly due to their proximity to the sea.

Appendices :

Appendix 1 : Manual for the AquaTroll 600 üsed for Watermania project work.

Aqua TROLL 600 - User manual

1. Unpacking and Preparing the Probe

- Remove the probe, sensors and accessories from the packaging.
- Install the necessary sensors, such as the RDO (dissolved oxygen optical sensor), ISEs and the pH/ORP sensor.

2. Installing the sensors

- Make sure the sensors are clean and undamaged before installation.
- Install the sensors into the appropriate ports on the probe according to the instructions in the manual.
- For ion-selective sensors, work carefully to avoid damaging the sensors (during storage, ion-selective sensors must be kept in a humid environment at all times and **must not dry out !!!**)

3. Calibration

- Before measuring, calibrate each sensor according to the instructions in the manual, instructional video, or the Vu-Situ app.
- Use the appropriate calibration solutions for each sensor and follow the recommended procedures.

4. Connecting to the device

- Connect the probe to the Wireless TROLL Com device using a cable.
- Turn on the Wireless TROLL Com and pair it with the VuSitu mobile app on your tablet via Bluetooth.

5. Measurements

- Place the probe in the water at the measurement site.
- In the VuSitu app, monitor the current values of the measured parameters.
- Perform spot measurements or set up continuous data recording as needed.

6. Data download and processing

- After completing the measurement, download the data from the VuSitu app in CSV format.
- Import the data into Excel for further analysis and graphing.

Measurement and evaluation protocol

1. Preparation before measurement

- Check the battery status of the Wireless TROLL Com and the tablet.
- Make sure all necessary sensors are properly installed and calibrated.
- Prepare the necessary calibration solutions and tools for possible recalibration in the field.

2. Site selection and measurements

- Select measurement sites: local pond, Lužnice River and Vltava River, etc.
- At each site, perform the following steps:
  - Place the probe in the water at the desired depth.
  - Wait for the readings on the display to stabilize.
  - In the VuSitu application, record the current values of all measured parameters.
  - Save the data for subsequent processing.

3. After measurement

- Rinse the probe with clean water and dry it.
- Check the condition of the sensors and clean them if necessary according to the instructions in the manual.

4. Data processing

- Import the downloaded data into Excel.
- Create graphs for each measured parameter and compare between sites.
- Compare the measured data with the data collected in France/Czechia and identify any differences or similarities.