



Abstract Booklet

Mura Conference - Water in Focus

19th October 2021

Project title: "Monitoring of surface and underground
water in Medimurje and Zala county"
HUHR/1901/2.2.1/0128

*A cross-border region where rivers
connect, not divide*

Purpose of the project

The Mura and Drava rivers geographically divide the Croatian and Hungarian region. As both countries face the same problems related to surface and underground water, it is advisable to cooperate in surveying the status of the border rivers.

Our goal is to develop a regional research network by cooperation and professional collaboration, and thereby to collect and share the information obtained during water sampling for the protection of the aquatic environment of the cross-border region with experts in the water sectors.

Our long-term goal is to put the knowledge gained into practice, which can even be extended to the whole of the European region in the future, thusly helping achieve the good status of water bodies and creating a well-functioning cross-border network for the improvement of water quality.

Dézlala Waterwork and Sewerage Privated Ltd.

Dézlala Waterwork and Sewerage Privated Limited Company performs the tasks of supplying drinking water to 102 settlements and draining and treating wastewater of 67 settlements in the southern third of Zala County and in the western part of Somogy County. In addition to its core business, the company also performs water meter repair and certification, instrumented plumbing troubleshooting, camera sewer inspection, sewer cleaning, sewer repair, water utility construction, biogas production and utilization, composting, laboratory testing and fitting sales.

The history of the Dézlala Waterwork dates back to 1916, to a waterworks that met the water needs of the World War I Military Hospital. From 1965, under the direction of the Zala County Council, from January 1, 1993 - since the transfer of water utilities to municipal ownership - until September 30, 2002, the company operated as a "Company of Certain Legal Entities". Since October 2002, the company has been operating as a joint-stock company, and since 2006 as a private limited company, the ownership rights are exercised by 107 local governments.

The company is managed by a 5-member Board of Directors and a 6-member Supervisory Board.

The operated water utility systems are owned by the municipality, the operating assets are the property of the Ltd

Dézlala Waterwork and Sewerage Ltd. has a laboratory accredited by the National Accreditation Authority, whose activities cover the testing of the physical, chemical and biological microbiological parameters of groundwater, surface water, drinking water, bathing water and wastewater.

Délzala Waterwork and Sewerage Privated Ltd.

The performance of the company's water utility services and other activities is based on the Quality and Environmental Management System according to the MSZ EN ISO 9001 and MSZ EN ISO 14001 standards, the Food Safety System according to the MSZ EN ISO 22000 standard, the Occupational Health and Safety System according to the MSZ 28001 standard and the MSZ EN ISO 50001 standard, supported by the operation of the Energy Management System.

Délzala Waterwork and Sewerage Ltd. mainly participated as an associate partner in several international projects for environmental protection, the main purpose of which was to protect the water quality of the Mura border river and valuable, vulnerable water bases and nature reserves on both sides of the Croatian-Hungarian border. The most significant of these are the Mura WWTP project for the construction of the Bottornya wastewater treatment plant and the development of the Tótszerdahely regional wastewater treatment plant, as well as the ProMur projects for the development of the Letenye municipal wastewater treatment plant and the sewerage of the southwestern part of Perlak.

Medimurje Water Ltd.

Međimurske vode d.o.o. Čakovec, as a public supplier of water services owned by cities and municipalities of Međimurje, provides public water supply and public wastewater services throughout the whole Međimurje County. For more than 60 years, with their own knowledge and activities, they have been continuously providing all current and new users with drinking water in the public water supply and the collection and treatment of wastewater.

Međimurske vode d.o.o. manage water structures for public water supply in the total length of 1,080,492 m, with two water wells: water well Nedelišće and Prelog.

Public water supply is provided in a total of 131 settlements in Međimurje County and the total number of household and companies connections is 39,441 with a percentage of connection to the water supply network of 83.2%. The total length of the sewerage network is 484,358 m, and wastewater is treated at wastewater treatment plants in Čakovec, Novo Selo on the Drava, Podturn and Donji Kraljevec. Public sewerage is currently provided in a total of 46 settlements in Međimurje County and the total number of household connections is 19,280 with a percentage of connection to the sewerage system of 68%, which is significantly increasing from year to year with the construction of new sewerage systems or agglomerations.

The company is focused on maintaining and improving existing systems (for water supply and sewerage) in order to provide permanent, efficient and quality public water supply and sewerage services, to the satisfaction of water service users, ensuring sustainable development and continuous increase in the number of users. The company is also focused on the further development of water utility infrastruc-

Medimurje Water Ltd.

ture, primarily by building a sewerage and wastewater treatment system in areas where it has not yet been built, while ensuring that infrastructure construction projects are funded by the European Union. By encouraging the local community in Međimurje, in cooperation with Croatian and European institutions, Međimurske vode constantly improving the protection of water and the environment, and thus the protection of human health and safety, by building and maintaining modern water supply systems and sewerage and wastewater treatment.

University of Pannonia

University of Pannonia, founded in 1949, is the most significant institution of higher education in Transdanubia. The university offers degrees covering nearly all the areas of science: agriculture, humanities, economics, engineering, information technology, education, social and natural sciences. Beside the main campus in Veszprém, it has campuses in Nagykanizsa, Kőszeg, Zalaegerszeg. The university is composed of 4 faculties: Faculty of Business and Economics; Faculty of Engineering; Faculty of Information Technology; Faculty of Modern Philology and Social Science.

The University of Pannonia Nagykanizsa University Center for Circular Economy is an integral part of one of the most dynamically-developing universities in the country. In order for a city to develop dynamically and have vibrant cultural life, it needs knowledge centers and well-trained professionals, who by staying in the city, reinforce its identity. An important part of the identity of a city is a university with its lecturers and students.

Since its establishment the Nagykanizsa Campus has sought to become a major regional player both in science and in its socio-economic environment. The Campus has developed its current training and research portfolio in close collaboration with three faculties. Currently it offers 3 higher education vocational training programs, 5 bachelor programs, 2 masters programs and 2 postgraduate programs. The main focus is on tourism, computer science and water treatment. Since its 20 years of existence the Campus has been engaged in numerous scientific activities in these areas.

Soós Ernő Research and Development Center Nagykanizsa

Soós Ernő Research and Development Center, Water Technology Research Group

With the establishment of the Soós Ernő Research and Development Center, a unique knowledge center was created in Nagykanizsa in the field of water purification and water treatment. The work of the Research Center is supported by an international network of industry experts.

The colleagues of the Center are experts in various fields (chemist, biologist, pharmacist, environmental engineer, environmental researcher, food engineer, agricultural biotechnologist, nature conservation engineer), thus providing a wide range of knowledge to the Research Center.

The main research areas include:

- water treatment
- industrial water treatment and waste water treatment
- technological and wastewater recycling solutions from oil technologies
- possibilities for recycling wastewater from thermal waters
- qualitative and quantitative determination of micropollutants and microplastics in waters, development of removal technologies
- detection of COVID-19 and other gastroenterological virus hereditary material in wastewater

An own, well-equipped laboratory is available to the Research and Development Center, which allows: the determination of analytical and microbiological components from waters of various origins (eg surface water, groundwater, drinking water, sewage, industrial water); and

Soós Ernő Research and Development Center Nagykanizsa

to carry out laboratory (semi-industrial) experiments in the framework of R&D projects.

We provide the following services to our partners:

- review of water treatment systems, proposing innovative, up-to-date technologies based on international practice and/or experiments, optimization, consideration of water recycling options, OPEX-CAPEX calculation
- case studies of operating systems, suggestions for improving chemical use, with cost-effectiveness calculations
- “Zero Liquid Discharge” or similar technologies
- comparative analyzes, evaluations, drawing conclusions from existing data, SWOT analysis
- planning and implementation of semi-industrial (Pilot) experiments in the framework of R&D projects
- performing water chemical and microbiological tests (not accredited)
- detection of COVID-19 virus inheritance from wastewater

In case of individual company needs, the Research Center undertakes to hold a lecture or a complex educational program in Hungarian or English, prepared in accordance with the needs of the companies, in connection with water treatment, new technological methods, analytical methods, biological or microbiological issues.

Program

09:45-10:00	Online login
10:00-10:15	Official opening
10:15-11:35	Plenary session
11:35-12:30	Lunch break
12:30-13:45	Section for professional lectures
13:45	Official closing

Plenary session

10:00-10:15	Official opening, welcome speeches
10:15-10:35	Zrinka Šajn, Financial manager of HUHR Joint Secretariat
10:35-10:55	László Cziráki, CEO of Lead Beneficiary (Délzala Water work and Sewerage PLC)
10:55-11:15	Biserka Mavrin-Veinović, projekt manager (Medimurje Waters Ltd.)
11:15-11:35	Ildikó Galambos PhD, associate professor, head of institute (University of Pannonia, Soós Ernő Research and Development Center)

Section for professional lectures

- 12:30-12:45 László Deák, head of laboratory (West-transdanubian Water Directorate, Water Protection Laboratory)
„General activities of the NYUDUVIZIG VVGO laboratory, in particular river sampling”
- 12:45-13:00 Zsófia Kovács PhD, assistant professor (University of Pannonia, Sustainability Solutions Research Laboratory)
“Best regional practices of automatic water quality monitoring systems”
- 13:00-13:15 Iva Ćurić, assistant (University of Zagreb, Faculty of Chemical Engineering and Technology)
„Success of textile wastewater treatment using a hybrid membrane process for discharge into surface waters”
- 13:15-13:30 Gábor Németh, researcher (University of Pannonia, Soós Ernő Research and Development Center)
“The flora and fauna of the Landscape Conservation Area along the Mura”
- 13:30-13:45 Tamás Kucserka PhD, researcher (University of Pannonia, Soós Ernő Research and Development Center)
„Mura monitoring – Pollutant sources, selected substances, sampling plan and database development”

László Deák

head of laboratory

West-transdanubian Water Directorate

General activities of the NYUDUVIZIG VVGO laboratory, with special reference to river water sampling

Among the collaborating partners of the MonMur project, sampling on the Mura River is carried out by the NYUDUVIZIG Laboratory of the Water Conservation and River Basin Management Department. The NYUDUVIZIG Laboratory was built in 1987 and has continuously maintained its accredited status since 1995. The accreditation covers sampling and physico-chemical analyses. The presentation describe the existing resources, the staff and equipment of the Laboratory, as well as its experience in taking samples and testing - these are the factors that make the Laboratory suitable for sampling on Mura. The presentation will also provide a map of the sampling sites, the dates of sampling and the list of components to be tested. Sampling is carried out according to the national standards, and the presentation will also provide details on the main points of correct sampling. At the end of the presentation, photographic documentation of the sampling that has already been carried out is included.

Deák László

laborvezető

Nyugat-dunántúli Vízügyi Igazgatóság

A NYUDUVIZIG VVGO laboratóriumának általános tevékenysége, különös tekintettel a folyóvízi mintavételezésre

A MonMur pályázat együttműködő partnerei közül a Murán a mintavételezést a NYUDUVIZIG Vízvédelmi és Vízgyűjtő-gazdálkodási Osztály Laboratóriuma végzi. A 1987-ben megépült a NYUDUVIZIG Laboratóriuma, amely 1995-től folyamatosan tartja akkreditált státuszát. Az akkreditáltság kiterjed a mintavételre és fiziko-kémiai vizsgálatok elvégzésére. Az előadás bemutatja a Laboratórium meglévő erőforrásait, személyi összetételét és eszközállományát, valamint tapasztalatát a mintavételekben és vizsgálatok kivitelezésében – ezek adják a Laboratórium alkalmasságát a Murán történő mintavételezéshez. Az előadás ezen kívül bemutatja a mintavételi helyeket térképpel, az időpontokat és a vizsgált komponensek listáját. A mintavételek szabvány szerint történnek, a helyes mintavétel főbb pontjait részleteire is kitér az előadás. A prezentáció végén a már megtörtént mintavételek során készített fényképes dokumentáció is megjelenik.

Zsófia Kovács, PhD

assistant professor

University of Pannonia

Sustainability Solutions Research Laboratory

Best regional practices of automatic water quality monitoring systems

Some of the water pollution affecting surface waters is a time-varying and random event, so a purpose-optimized automated continuous water quality monitoring system is essential for their effective detection.

One of the key factors in the concept of these types of systems is the selection of indicator parameters or groups to be measured whose increase in concentration may indicate pollution.

In the case of such water measuring stations, in addition to the complex design and low operation and maintenance costs, the goal is also to sustain ease of use in the long term.

The focus of my research is on the detection of water pollution. In particular, the examination of the impact of various factors on water quality changes, such as the load on small watercourses within cities, the dynamics of the migration of pollution waves, and the effects of extreme weather events/conditions caused by climate change.

It depends on the objectives set that whether we operate an automatic water quality monitoring station placed in a container or an electrode probe or buoy system immersed directly in the water. With the results of the measured parameters of the stations, I managed to detect the pollutant waves migration lasting an hour or two in the

Zsófia Kovács, PhD

assistant professor

University of Pannonia

Sustainability Solutions Research Laboratory

late afternoon and evening and their characteristics, about which we would not receive information with the traditional sampling methods. During these short periods, for example, the value of the concentration of ammonium-N, orthophosphate-P recorded by the stations increased to two to three times the average value.

Using an automatic monitoring station located at the urban storm drain, the peak of the flood wave and the migration curve was determined.

Due to the growing effects of climate change, more progress is needed than ever before in adapting automated water quality monitoring strategies.

Dr. Kovács Zsófia

adjunktus

Pannon Egyetem

Fenntarthatósági Megoldások Kutatólaboratórium

Automata felszíni vízminőség ellenőrző monitoring rendszerek alkalmazásának eredményei

A felszíni vizeket érő szennyezések egy része időben változó és véletlenszerű esemény, ezért ezek felméréséhez elengedhetetlen az adott célra optimalizált automatizált folyamatos vízminőség felügyeleti rendszer.

Az ilyen típusú rendszerek összeállításánál az egyik kulcstényező a vizsgálandó indikátor paraméterek/csoportok kiválasztása, amelyek koncentráció emelkedése képes jelezni egy megjelenő szennyeződést. A vízmonitoring állomások esetében további cél a komplex kialakítás és az alacsony üzemeltetési és karbantartási költségek mellett a könnyű kezelhetőség hosszú távú fenntartása is.

Kutatásom fókuszában a vízszennyezés kimutatása áll. Elsősorban a különböző tényezők vízminőségi változásokra gyakorolt hatásának vizsgálata, mint például a városokon belüli kisvízfolyások terhelése, a szennyezési hullámok vándorlásának dinamikája, illetve a klímaváltozás okozta szélsőséges időjárási események/viszonyok hatásai. A kitűzött céloktól függ, hogy konténerbe helyezett automata vízminőség monitoring állomást vagy közvetlenül vízfolyásba merülő elektróda test vagy bója rendszert működtetünk. A monitoring állomások mért paramétereinek eredményeivel sikerült kimutatnom a késő délutáni és esti órákban egy-két órán át tartó szennyezőhullám-vándorlást és azok jellemzőit, amelyekről a ha-

Dr. Kovács Zsófia

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gyománys mintavételi módszerekkel nem kapnánk információt. E rövid időszakok alatt például az állomások által rögzített ammónium-N, ortofoszfát-P koncentráció értéke az átlagos érték két-háromszorosára emelkedett. A városi csapadékelvezetőnél elhelyezett automata megfigyelő állomás segítségével meghatároztuk az árhullám csúcsát és a migrációs görbét.

Az éghajlatváltozás növekvő hatásai miatt minden eddiginél nagyobb előrelépésre van szükség az automatizált vízminőség-ellenőrzési stratégiák adaptálásában.

Iva Ćurić

Assistant at department at physical chemistry

Faculty of Chemical Engineering and Technology

University of Zagreb

Success of textile wastewater treatment using a hybrid membrane process for discharge into surface waters

In order for textile wastewater (TWW) to be acceptable for discharge into surface waters, it is necessary to use appropriate processes for their treatment. In this study, for the treatment of real TWW, hybrid membrane processes was used. In the first phase, the effluents were treated in a membrane bioreactor with a hollow fibre ultrafiltration (UF) membrane, while a UF flat membrane was used in the second phase. The overall treatment efficiency showed a decrease from 1690 ± 183 mg/L (chemical oxygen demand), 593.40 ± 80.38 mg/L (total organic carbon, TOC), 250 ± 37 mg/L (suspended solids) and 909.0 ± 14.5 mg/L (sulphates) to 38.93 ± 6.99 mg/L, 45.33 ± 22.02 mg/L, 0 ± 0.0 mg/L and 178.18 ± 10.81 mg/L, respectively. In this order, the minimum allowable concentrations for discharge to surface waters were compared with the Croatian Wastewater Ordinance (Appendix 5). Among the tested parameters, only TOC had a higher concentration in effluent sample. It can be concluded that other parameters need to be tested according to the regulation in order to determine the safe discharge of the treated wastewater to surface waters.

Iva Ćurić

asistent na zavodu za fizikalnu kemiju

Sveučilište u Zagrebu

Fakultet kemijskog inženjerstva i tehnologije

Uspješnost obrade tekstilnih otpadnih voda hibridnim membranskim postupkom za ispuštanje u površinske vode

Kako bi tekstilne otpadne vode (TOV) bile prihvatljive za ispuštanje u površinske vode, potrebno je koristiti odgovarajuće postupke za njihovu obradu. U ovoj studiji, za obradu realne TOV-e, korišteni su hibridni membranski procesi. U prvoj fazi efluenti su tretirani u membranskom bioreaktoru s ultrafiltracijskom (UF) membranom u obliku šupljih vlakana, dok je u drugoj fazi korištena UF membrane u obliku ravne plahte. Ukupna učinkovitost obrade pokazala je smanjenje od 1690 ± 183 mg/L (kemijska potrošnje kisika), $593,40 \pm 80,38$ mg/L (ukupni organski ugljik, TOC), 250 ± 37 mg/L (suspendirane tvari) i $909,0 \pm 14,5$ mg/L (sulfati) do $38,93 \pm 6,99$ mg/L, $45,33 \pm 22,02$ mg/L, $0 \pm 0,0$ mg/L odnosno $178,18 \pm 10,81$ mg/L. Ovim redoslijedom uspoređene su minimalne dopuštene koncentracije za ispuštanje u površinske vode s hrvatskim Pravilnikom o otpadnim vodama (Prilog 5). Od ispitivanih parametara samo je TOC imao višu koncentraciju u uzorku efluenta. Može se zaključiti da je potrebno ispitati i druge parametre prema pravilniku kako bi se utvrdilo sigurno ispuštanje obrađene otpadne vode u površinske vode.

Iva Ćurić

asszisztens

Zágrábi Egyetem

Vegyészmérnöki és Technológiai Kar

Hibrid membrán-eljárással történő textil szennyvízkezelés felszíni vizekbe való kibocsátás céljából

Ahhoz, hogy a textiliparban keletkezett szennyvíz visszakerüljön a felszíni vizekbe, megfelelő lépések szükségesek a tisztításához és feldolgozásához. Ebben a tanulmányban a textiliparban keletkezett szennyvíz tisztításához hibrid membrános folyamatokat használtunk. Az első fázisban a kifolyó szennyvizet a membrános bioreaktorban egy ultrafibrációs membránnal kezeltük üreges rostok formájában, majd a második fázisban az ultrafibrációs membránt már sík lepedő formájában használtuk. Ennek a folyamatnak a teljes hatékonysága megmutatta az oxigén kémiai felhasználásának csökkenését: 1690 ± 183 mg/L-ről $38,93 \pm 6,99$ mg/L-re, a szén felhasználásának csökkenését: $593,40 \pm 80,38$ mg/L-ről $45,33 \pm 22,02$ mg/L-re, a lebegő szilárd anyagok csökkenését 250 ± 37 mg/L-ről $0 \pm 0,0$ mg/L-re, valamint a szulfátok csökkenését $909,0 \pm 14,5$ mg/L-ről $178,18 \pm 10,81$ mg/L-re. A felállított sorrend alapján összehasonlításra kerültek a minimális koncentrációt tartalmazó szennyvizek, amelyek visszakerülhetnek a felszíni vizekbe. Az eredmények megfelelnek a Szennyvízkezelésről szóló jogszabályoknak. A megvizsgált paraméterek közül csak a TOC-nak volt magasabb a koncentrációja a kifolyó minták vizsgálatakor. Összegezve megállapítható, hogy szükséges más paramétereket is megvizsgálni a jogszabályban foglaltakkal összhangban, hogy megállapítást nyerjen az a tény, hogy csakis biztonságosan megtisztított szennyvíz kerülhessen vissza a felszíni vizekbe.

Gábor Németh

researcher

University of Pannonia

Soós Ernő Research and Development Center

The flora and fauna of the Landscape Conservation Area along the Mura

The landscape conservation area extends from the estuary of the Kerka to the Drava and includes the area from the border to the south-western edge of the Zala Hills. After hundreds of years of constant cultivation, due to military closures it has regained its natural character, however these habitats require further monitoring and management. Natural plant communities have formed around the backwaters and the area also has protected plants, such as *Epipactis helleborine*. In terms of fauna, the dragonfly population is the best surveyed and the protected *Leucorrhinia caudalis* can be found here, also the area is rich in butterflies and xylophagous beetles. More than 50 fish species are present in the flowing and standing waters, 13 of them are protected. For birds, the migratory period is the most important, but *Haliaeetus albicilla* is present in the area in the whole year. Among the mammals, mainly bats are in notable position, but beavers have also been settled over decades.

Németh Gábor

kutató

Pannon Egyetem

Soós Ernő Kutató-Fejlesztő Központ

A Mura-menti Tájvédelmi Körzet flórája és faunája

A tájvédelmi körzet a Kerka torkolatától, egészen a Drávaig tart, illetve magába foglalja a határtól a Zalai-dombvidék délnyugati pereméig tartó területet. Több száz éves állandó művelés után a katonai lezárások miatt, újból kialakult a természetes jelleg, azonban ezen élőhelyek további monitoringot és kezelést igényelnek. A lápokkal és holtágakkal tarkított területeken természetes és természetszerű növénytársulások alakultak ki és szép számmal fordulnak elő fokozottan védett és védett növények, mint például a széleslevelű nőszőfű (*Epipactis helleborine*). Fauna tekintetében a szitakötők állománya a legjobban felmért és megtalálható a fokozottan védett tócsaszitakötő (*Leucorrhinia caudalis*), továbbá lepkék és xilofág bogarak tekintetében is gazdag. Több mint 50 halfaj van jelen az áramló és álló vizekben, melyek közül 13 védett. Madarak tekintetében a vonulási időszak a legfontosabb, de a réti sas (*Haliaeetus albicilla*) egész évben jelen van a területen. Az emlősök közül főként a denevérek vannak kiemelt helyen, de a hód is megtelepedett.

Gábor Németh

istraživač

Univerzitet Panonia

Soós Ernő Istraživački i razvojni centar

Flora i fauna zaštićenog krajobraza rijeke Mure

Prirodno zaštićeno područje uz Muru prostire se od ušća potoka Kerka čak do Drave, odnosno pripada mu i područje koje se prostire od državne granice do jugozapadnog dijela Zalskih brežuljaka. Ovdje se stoljećima vršila intenzivna poljoprivredna proizvodnja, međutim, zbog zatvaranja granice i vojnog prostora što je trajalo skoro 50 godina, ovdašnja prirodna staništa su se zaštitila, pa je potreban daljnji monitoring i održavanje tog prostora. Na močvarastim područjima i u rukavcima nastanile su se različite brojne biljne vrste koje su zaštićene, kao npr. širokolisna kruščica (*Epipactis helleborine*). Što se pak tiče faune od beskralježnjaka najdetaljnije su istraživani vretenci od kojih spada među zaštićene vrste crni tresetar (*Leucorhinia caudalis*), nadalje ovo područje je bogato u leptirima i kukcima ksilofag vrste. Više od 50 ribljih vrsta se može naći u ovdašnjim vodama od kojih 13 je zaštićeno. Od ptica se značajne ptice selice, ali tu se mogu naći i orlovi štekavci (*Haliaeetus albicilla*) koji provode tu cijelu godinu. Od sisavaca treba istaknuti šišmiše, ali se ovdje nastanio i dabar.

Tamás Kucserka, PhD

researcher

University of Pannonia

Soós Ernő Research and Development Center

Mura monitoring – Pollutant sources, selected substances, sampling plan and database development

The Water Framework Directive (2000/60/EC) aims to reach the good quality of surface and underground water and sustain the good ecological quality. Corresponding to these goals the monitoring of pollutants is more and more important. There is a particular need to develop the monitoring system and expand the knowledge to other aqueous habitats as well. The most significant aims of the project were 1) the determination of the of main pollution sites along the Mura river that crosses the Croatian-Hungarian border (approximately 30 km along the Mura river and its environs, including the Croatian and Hungarian territories); 2) the development of a sampling methodological plan for the selected substances and locations and 3) the creation of an online interactive database to share the results of the project whit the public. These new collections can be put into the practice and can develop a well-working cross-border network for improving water quality.

Dr. Kucserka Tamás

kutató

Pannon Egyetem

Soós Ernő Kutató-Fejlesztő Központ

Mura monitoring - Szennyező források, vizsgálandó komponensek, mintavételi terv és adatbázis-fejlesztés

A Víz Keretirányelv (2000/60/EK) célja a felszíni és felszín alatti vizek jó minőségének elérése és a jó ökológiai állapot fenntartása. E céloknak megfelelően a szennyező anyagok monitorozása egyre fontosabb feladat. Kiemelten szükséges a monitoring rendszer fejlesztésére és az ismeretek kiterjesztésére más vizes élőhelyekre is. A projekt legjelentősebb céljai a következők voltak: 1) a horvát-magyar határt keresztező Mura folyó mentén található fő szennyezőforrások meghatározása (kb. 30 km-es szakasz a Mura folyó mentén, beleértve a horvát és a magyar területeket); 2) mintavételi módszertani terv kidolgozása a kiválasztott anyagokra és helyszínekre, valamint 3) egy online interaktív adatbázis létrehozása a projekt eredményeinek nyilvánossággal való megosztására. Ezek az új eredmények a gyakorlatba is átültethetők, és jól működő, határokon átnyúló hálózatot alakíthatnak ki a vízminőség javítása érdekében.

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Praćenje kvalitete rijeke Mure -Izvori zagađenja, odabrani parametri, plan uzorkovanja i razvoj baze podataka

Cilj Okvirne direktive o vodama (2000/60/EK) je postizanje kvalitetnih površinskih i podzemnih voda, te ekološko održivog stanja. Za postizanje tih ciljeva jedan od najvažnijih zadataka je monitoring onečišćivača. Također jedan od istaknutih zadataka je razvoj monitoring sustava drugih vodenih staništa i širenje novih spoznaja. Najvažniji ciljevi projekta su: 1) identifikacija izvora glavnih onečišćivača u hrvatsko-mađarskoj pograničnoj zoni uz rijeku Muru (cc. 50 km nizvodno uz granicu), 2) izrada metodičkog plana za uzimanje uzoraka za određene tvari i lokacije, 3) stvaranje online interaktivne baze podataka gdje bi se javnosti pokazali rezultati projekta. Ovi novi rezultati mogli bi se primjeniti i u praksi, te bi se na taj način stvorili uvjeti prekograničnog umrežavanja s ciljem postizanja kvalitetnije vode.

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