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WATER ISSUES

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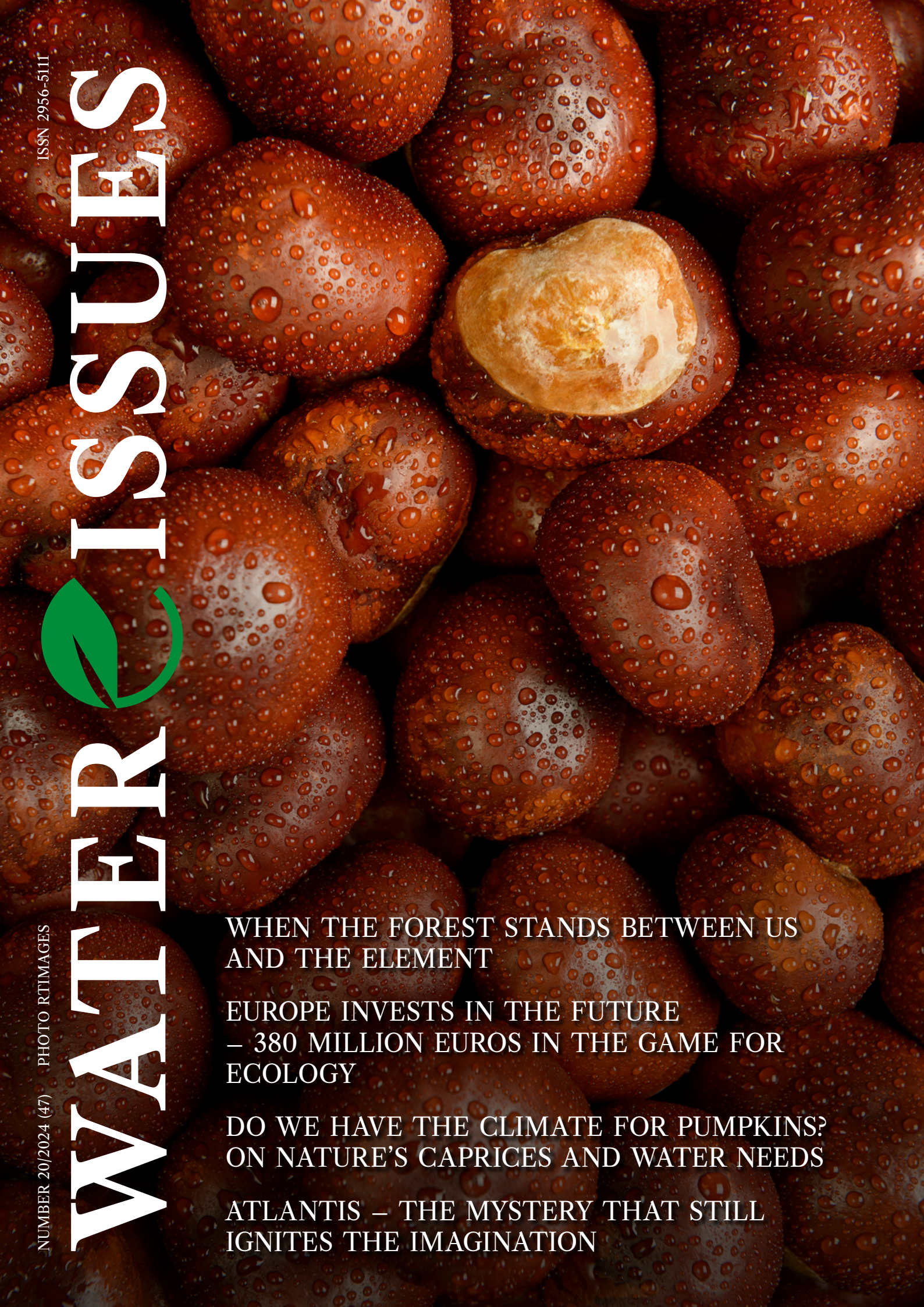

WHEN THE FOREST STANDS BETWEEN US AND THE ELEMENT

EUROPE INVESTS IN THE FUTURE – 380 MILLION EUROS IN THE GAME FOR ECOLOGY

DO WE HAVE THE CLIMATE FOR PUMPKINS? ON NATURE'S CAPRICES AND WATER NEEDS

ATLANTIS – THE MYSTERY THAT STILL IGNITES THE IMAGINATION

MÁLAGA FLOODING - MORE TORRENTIAL RAINS IN SPAIN

Posted on 14 November 2024 by Agata Pavlinec

Two weeks after catastrophic flooding in Valencia, the infamous DANA weather phenomenon is once again coming over the Spanish coast. Meteorologists predict that heavy rainfall will continue until Friday afternoon, this time experiencing primarily the Andalusia region. Dramatic flooding in Malaga has already complicated the lives of thousands of people since Wednesday.

Categories: Issue 20/2024, News, Onet

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The second impact of the DANA low

Spain's national meteorological agency, Aemet, issued a warning Wednesday afternoon of high rainfall resulting from the impact of DANA on the Spanish coast. The Andalusian cities of Malaga, Granada, Castellon and Tarragona were considered particularly at risk, where total rainfall is forecast to reach 180 $^{mm/m2}$.

Unfortunately, it didn't take long for the predictions to come true. Flooding in Málaga became a reality as early as the evening, after 78 $^{mm/m2}$ fell in the city within an hour. The province was placed on its highest red alert status, which had already been changed to orange by Thursday morning. Unfortunately, several hours of heavy rain brought a total of 142 $^{mm/m2}$.

Flash flooding in Málaga

Experiencing the dramatic consequences of the first wave of the DANA phenomenon in Spain, Andalusian authorities responded to the flooding in Málaga in an immediate manner. On Wednesday, 3,000 people living in the immediate vicinity of the Campanillas and Guadalhorce rivers, where the risk of water rising from the banks was highest, were evacuated. As early as 4 p.m., the water flow in the Guadalhorce reached 168,000 liters per second.

However, heavy rainfall managed to paralyze much of the province. By early afternoon, emergency services had to intervene more than 450 times. In the city of Benamargosa, many homes were flooded. Parts of the capital were also flooded, including the main thoroughfare Avenida de Andalucía, which runs through the western part of the city. Water broke into the El Corte Inglés shopping center, and in the eastern part of Málaga, police along with the fire department had to evacuate 80 horses and dogs from a hippy center.

Flooding in Málaga has trapped hundreds of thousands of children at home, after Andalusian authorities decided to close 1,200 schools across the region. The Ministry of Transportation also suspended train service between Madrid and Málaga, as water threatened security systems. A number of local connections have also been canceled. Dramatic footage of the situation in the province is posted in real time on a special x Storm Malaga profile.

> *Guadalmedina cerca de su desembocadura, Málaga. pic.twitter.com/lQTkPmfPCe*
>
> *- Dr. J.◙ (@Juanjo_de_akkad) November 13, 2024*

Valencia underwater again?

Fortunately, the flooding in Málaga was efficiently coordinated from the start and resulted in no fatalities. Now, however, precipitation associated with the DANA low is moving eastward, again threatening Valencia. This morning, Aemet predicted rains of up to 100 $^{mm/m2}$ in 12

hours for the region, and an orange alert is in effect across the province. As of 10 a.m., 80 $^{mm/m2}$ had fallen in Valencia, but so far the areas hardest hit by the flooding two weeks ago are relatively safe.

In the province of Granada, which lies in the path of the shifting low, warnings have been issued for strong sea waves that can reach 3m. There has been local flooding in the capital itself, and in the coastal towns of Motril and Almuñecar, sea water has broken into the streets.

Turbulent weather over the Spanish coast is not letting up, once again proving the reality of climate change. According to Aemet analysts, a red meteorological alert since 2020 has been ordered in the country for only 0.25 percent of precipitation warnings - but its frequency is increasing. In Valencia since 2007, as many as 40 percent of red warnings have been issued during the activation of the DANA phenomenon in September 2019 and October 2024.

WILL FLORIDA FACE ANOTHER HURRICANE?

Posted on 13 November 2024 by Iwona Szyprowska-Głodzik

Categories: Issue 20/2024, News
Tags: Florida, hurricane, Hurricane winds, USA

Will Florida face another hurricane?Although the hurricane season is coming to an end, the latest forecasts suggest that the dangers are far from over. Over the western Caribbean, a tropical system is beginning to form, potentially developing into a hurricane. Meteorologists are closely monitoring its development, anticipating that atmospheric conditions may favor its intensification in the coming days.

Rapid development and concerning forecasts

Data from the National Hurricane Center (NHC) indicate that the tropical storm is rapidly gaining strength, moving northward in the Caribbean with a trajectory toward Florida. Forecasts for the coming week suggest it could evolve into a much stronger storm system, especially as a cold front is moving into the region, which may contribute to its intensification. With no other active tropical storms in the Atlantic, there is a high likelihood that the storm forming over the Caribbean will become a hurricane and then be named Sara.

"It not only has a high chance of turning into a hurricane, but it may very quickly become a major hurricane," said Alex DaSilva, chief hurricane expert at AccuWeather. There are various scenarios associated with this situation in the Caribbean, related to the speed of development and early tracking, which could impact land areas, including making landfall and leading to direct consequences.

Scenario 1: heading toward Central America or Mexico

If the high-pressure dome maintains its position, the storm will likely move toward Central America or southeastern Mexico over the weekend or early next week. In this area, the system may weaken, reducing its intensity before it has the opportunity to regain hurricane strength. In this case, the storm's impact on Florida would be minimal, as it would not reach the intensity required to threaten the region.

Scenario 2: turning toward the Gulf of Mexico and Florida

If the high-pressure dome dissipates sooner, an “open path” may emerge for the tropical system, allowing it to move from the western Caribbean through the strait between Cuba and Mexico, and then toward the southwestern Gulf of Mexico. In this scenario, the system would gain strength and could potentially become a powerful hurricane that may strike Florida. After passing through the strait, it could be directed by steering breezes toward the Florida Keys and the southern part of the peninsula, posing a serious threat to the area.

These scenarios illustrate how the storm’s development in the western Caribbean could lead to varying outcomes depending on atmospheric conditions and its trajectory.

Florida’s hurricane preparedness

Although the tropical system is just beginning to form, Florida authorities are approaching the situation with the utmost caution, especially considering previous hurricanes that have impacted the state in recent years. Residents of coastal areas are encouraged to monitor the situation and prepare for potential threats. Authorities remind people of the importance of having survival kits and adhering to safety

guidelines, including supplies of basic food products and water, as well as securing homes against possible storm effects.

Meteorologists are on high alert to closely monitor any changes in the atmospheric system. The NHC provides updated forecasts and guidance daily, helping local authorities take appropriate measures.

BIODIVERSITY CREDITS. WHY DID THEY SPARK CONTROVERSY AT COP16

Posted on 12 November 2024 by Iwona Szyprowska-Głodzik

Categories: News, Issue 20/2024
Tags: biodiversity, COP, COP29

During COP29 in Baku, particular attention is paid to global environmental financing, including the search for new, effective mechanisms to support nature conservation efforts. Meanwhile, the topic of biodiversity credits was raised during COP16 in Cali, sparking both interest as a potential tool for funding conservation projects and numerous controversies. Although these credits are presented as an opportunity to secure funds for ecosystem conservation, they have raised concerns among local communities and environmental organizations that see a risk of commodifying nature.

Concerns and fears of local communities

Indigenous communities and environmental organizations have voiced strong concerns about biodiversity credits. They argue that the introduction of such credits may lead to the commodification of nature, which would mean the privatization of resources traditionally regarded as common goods. For many indigenous communities, biodiversity credits pose a potential threat to their traditional lands and way of life, which is based on harmony with nature.

These credits may also encourage the exploitation of ecosystem resources in areas with high biodiversity, leading to conflicts over resource access and ultimately causing the degradation of natural habitats. Additionally, there is a risk that wealthy corporations will begin to monopolize these areas, undermining the principles of environmental justice.

The biodiversity credit market and issues with carbon credits

During COP16, similarities to the carbon credit market were also noted, which for years has faced criticism for lack of transparency, abuse, and data manipulation, often aimed at maximizing profits with minimal impact on emissions reduction. Concerns about biodiversity credits stem from the potential risk of repeating these mistakes. Without proper regulations and oversight mechanisms, similar problems could arise.

Experts warn that a lack of control could lead to falsifying ecosystem reports or granting credits for superficial actions that do not bring actual benefits to biodiversity. Without appropriate standards, there is a risk that funds from biodiversity credits will not be used for their intended purpose, resulting in only superficial environmental benefits.

Potential benefits of biodiversity credits

Despite numerous concerns, biodiversity credits are seen by some experts as a promising tool that could support conservation and restoration projects worldwide. These credits could enable the reclamation of degraded or threatened areas due to human activity, supporting global efforts to protect rare species, restore habitats, and expand protected areas.

From an investor's perspective, biodiversity credits present an attractive opportunity to finance projects aligned with sustainable development principles. Investments in ecosystems are viewed as a high-potential area of growth that also brings environmental benefits. Biodiversity credits could encourage the private sector to actively participate in ecological projects, thus fostering a modern approach to financing nature conservation.

Biodiversity credits and global environmental goals

In the context of global challenges related to the climate crisis and environmental degradation, the issue of biodiversity credits takes on particular significance. International goals for 2030 and 2050 include expanding protected areas and halting species extinction. The introduction of effective legal frameworks and financial tools, such as biodiversity credits, could help mobilize resources for ecosystem conservation.

As COP16 participants noted, the success of this initiative would require implementing regulations to ensure the protection of local communities' rights and transparency in investment processes. It is also essential to create mechanisms for monitoring the effectiveness of projects funded through credits, to ensure that actions taken truly contribute to biodiversity conservation and restoration.

https://wodnesprawy.pl/en/cop29-in-the-shadow-of-disinformation-who-are-t/

Will COP16 make biodiversity credits a viable tool for nature conservation?

Discussions at COP16 showed that biodiversity credits are an innovative and controversial tool that could play a significant role in the global environmental protection strategy. However, for them to become a real support for biodiversity, it is necessary to include the voices of local communities and introduce high standards and oversight mechanisms. The future of biodiversity credits depends on whether they can be transformed into a tool supporting sustainable development and ecosystem protection—not just as an investment product, but above all, as an effective means of nature conservation.

THE MYSTERIOUS DEPTHS OF LOCH NESS – THE POWER OF NATURE AND A LASTING LEGEND

Posted on 11 November 2024 by Iwona Szyprowska-Głodzik

Deep within the Scottish Highlands lies Loch Ness, a place renowned not only for its rugged beauty but also for the legends of a mysterious creature that inhabits its dark depths. Nessie, as it is affectionately called by mystery enthusiasts, is the subject of heated debates, scientific research, and endless tales. Do these stories and legends contain even a grain of truth? Let’s dive into the world of Loch Ness and uncover what lies behind one of Scotland's most intriguing locations.

Categories: Issue 20/2024, News
Tags: lake, legend, Scotland

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Loch Ness – impressive and mysterious

Loch Ness is one of the largest lakes in Scotland, stretching 36 km in length across the picturesque Scottish Highlands. Its surface area is about 56.4 km², making it the second-largest lake in the country. However, what sets Loch Ness apart from other bodies of water is its remarkable depth, reaching up to 240 m in places. This allows the lake to hold more water than all the lakes in England and Wales combined.

One of the most distinctive features of Loch Ness is its mysterious, dark color. The water is nearly opaque due to a high concentration of peat particles. This characteristic makes Loch Ness even more intriguing—the water appears almost black, as if hiding undiscovered secrets. This impression is further enhanced by the fog that often rises above the lake’s surface, giving the area an aura of mystery and wildness.

The entire surrounding of Loch Ness emanates raw beauty and a unique atmosphere, attracting both nature lovers and seekers of extraordinary stories. Hills and small towns frame the lake, creating a landscape that is both picturesque and unsettling. For centuries, adventurers and scientists have sought to unravel the mystery of the creature that supposedly inhabits its depths.

Nessie – the legend of the Loch Ness monster

The legend of a monster inhabiting Loch Ness dates back to the 7th century. The first mentions appeared in the accounts of Saint Columba, an Irish monk and missionary who, according to legend, encountered the mysterious creature in 565 AD. According to the tale, when one of his companions attempted to swim across the lake, the monster emerged from the water and began to approach him. Saint Columba made the sign of the cross, and the creature allegedly vanished into the depths. This event, recorded as a miracle, marked the beginning of the tales about Nessie.

However, the real "frenzy" over Nessie erupted only in the 20th century. In 1933, a couple of tourists reportedly saw a mysterious creature on the road near the lake. Soon after, media outlets began publishing more eyewitness accounts, and researchers and adventurers flocked to Loch Ness. In 1934, surgeon Robert Wilson published the famous photograph, which purportedly captured Nessie's head and neck rising from the water. The image quickly gained fame as evidence of the Loch Ness monster, although it was later revealed to be a hoax.

photo: AI/stockcake

Despite this, belief in Nessie's existence persisted. Loch Ness became the site of numerous scientific studies conducted with the latest technologies aimed at exploring the lake. In the 1960s, the first expeditions using sonar were organized to detect potential movements of large objects underwater. With technological advancements, infrared cameras, drones, and other sophisticated equipment were employed. Although the results of these studies did not conclusively prove Nessie's existence, many claim that the evidence gathered suggests the presence of a large, unidentified creature in the lake.

In recent decades, Nessie has become a pop culture icon. It appears in books, films, and even as a tourist mascot for Scotland. The town of Drumnadrochit, located by the lake, has created a dedicated tourist center for the Loch Ness monster, attracting crowds of visitors from around the world. Nessie is also a subject of research for cryptozoologists who are trying to find evidence of unknown species.

Loch Ness today

Today, Loch Ness is one of the most recognizable lakes in the world, attracting adventure seekers and mystery enthusiasts. Every year, hundreds of thousands of tourists flock to the lake, eager to see this famous location with their own eyes. Tourism in the area is thriving—offering boat trips on the lake, hiking trails, and exhibition centers dedicated to Nessie. While science has yet to provide evidence of the monster's existence, its legend endures and draws crowds, adding magic to the rugged beauty of Scotland's landscapes.

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main photo: Ramon Vloon

MOUNT EVEREST IS MELTING – CAN ASIA SURVIVE WITHOUT GLACIERS?

Posted on 10 November 2024 by Iwona Szyprowska-Głodzik

Mount Everest, the world’s highest peak, is part of Asia's crucial water system. The glaciers covering it, which feed major rivers like the Ganges, Brahmaputra, and Indus, have supplied water to millions for centuries. Rising global temperatures have significantly accelerated their melting process, posing a serious threat to water resources in South and Southeast Asian countries. What risks does the loss of these icy reservoirs bring?

Categories: Issue 20/2024, News

Tags: climate change, glaciers, Mount Everest

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Mount Everest – the world’s highest peak

Mount Everest, also known as Chomolungma (Mother Goddess of the Earth or Holy Mother), stands 8,848.86 meters above sea level, straddling the border between Nepal and Tibet, and is the highest peak on Earth. As part of the Himalayas, this mountain range is a component of a complex geographical system with a crucial hydrological role. The region’s cryosphere is essential for water and food security for nearly 2 billion people in Asia.

The Himalayas, often referred to as the Third Pole, store ice masses comparable to those in Antarctica and the Arctic, serving as the water source for rivers that support the ecosystems of South and Southeast Asia. The glaciers covering Everest are highly sensitive to climate change, putting their future at risk.

Climate change and glacier melting rate

The melting rate of glaciers on Mount Everest and throughout the Himalayas has sharply increased in recent decades, directly resulting from global warming. The rise in temperature observed since the 1970s has accelerated the rate of glacier mass loss. According to the study *Observed changes in Himalayan glaciers*, the average melting rate has nearly doubled—from about 0.25 meters of annual thickness loss from 1975 to 2000 to around 0.5 meters per year since 2000.

Glaciers on Mount Everest play a vital role as natural reservoirs, supplying water to rivers like the Ganges, Brahmaputra, and Indus. These vast river systems provide water to India, Pakistan, Nepal, and Bangladesh—countries inhabited by hundreds of millions of people. Glacier water from Everest and the Himalayas is not only essential for drinking water supplies but also supports agriculture, industry, and hydropower production.

Consequences of glacier melting

In the short term, intense glacier melting leads to increased river flow, which can trigger floods downstream. One such example is the 2013 flood in Uttarakhand, India, where rapidly melting glaciers caused catastrophic impacts. These events led to the deaths of over 5,700 people, with thousands reported missing.

However, in the long term, as most glaciers disappear, river flows may drastically decrease, directly impacting the lives of hundreds of millions of people dependent on these resources.

Will Mount Everest’s glaciers survive?

The survival of Mount Everest’s glaciers is uncertain, especially in light of the rapid rise in global temperatures. Scientists predict that the Himalayas could lose up to two-thirds of their ice mass by the end of the 21st century if the world doesn’t curb greenhouse gas emissions. These ice masses serve not only as natural water reservoirs but also as regulators of seasonal water flow in the region. Their disappearance would permanently alter water availability, destabilizing local agriculture, energy production, and drinking water sources.

The International Centre for Integrated Mountain Development (ICIMOD) and other research institutions point out that the loss of glaciers will have a profound impact on the region's geopolitics, as water resources become an increasingly valuable but scarce asset. Facing these challenges, technological and financial support for mountain communities is essential, along with developing adaptive strategies to help adjust to the changing environment.

Main photo: Ankit Mishra / Unsplash

NEW OXFAM REPORT ON HOW BILLIONAIRE EMISSIONS ENDANGER THE HEALTH OF MILLIONS

Posted on 9 November 2024 by Agata Pavlinec

The British organization Oxfam reveals alarming data in its latest report about the carbon footprint generated by the world's 50 richest people. According to the report, these emissions significantly contribute to the climate crisis, leading to economic losses in the trillions of dollars annually and millions of premature deaths.

Categories: Issue 20/2024, News
Tags: carbon, CO2 emissions, report

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Superyachts and private jets

The report, titled *Carbon Inequality Kills*, focuses on emissions generated by billionaires and compares them to the carbon footprint of the average citizen. The results are shocking. The elite, comprising 1% of the global population, is responsible for half of all emissions related to air travel. Jets owned by 23 billionaires produce as much CO⊠ annually as an average person would in… 300 years. Elon Musk alone owns two jets, whose yearly emissions are comparable to the carbon footprint that a citizen of the poorer half of the world would generate over… 5,437 years.

Superyachts are also a significant problem, with their numbers doubling since 2000. Oxfam identified 23 superyachts belonging to 18 billionaires, which annually emit as much greenhouse gas as an ordinary person would over 860 years—that's three times more than private jets. The Walton family, owners of the famous Walmart chain, has three superyachts that covered 56,000 nautical miles in a year, producing as much CO⊠ as 1,700 Walmart employees.

High-carbon footprint investments

The emissions generated by billionaires don't end with luxury travel. A key source turns out to be their investments in controversial, high-emission sectors such as oil extraction, mining, maritime transport, and cement production. In total, each of the 41 billionaires whose investment portfolios Oxfam analyzed is responsible for emissions that an average person would generate through normal consumption over… 400,000 years.

This is significant because the 50 richest people in the world control 43% of global financial assets and 34% of the 50 largest companies on Earth. Their role in shaping the economy's structure—and consequently, greenhouse gas emissions—cannot be overstated. Worse still, Oxfam's research indicates that many companies backed by billionaires actively lobby against climate actions, with only 24% of them declaring net-zero emissions targets.

How to reduce billionaire emissions?

The capital elite contributes significantly to deepening global social inequality. Climate change linked to the activities of the wealthiest 1% could cost the global economy $52.6 trillion by 2050. Low- and middle-income countries will feel the effects most acutely, as emissions from the richest contribute to crop declines, increasing the risk of food shortages and famine.

Oxfam calculated that from 1990 to 2019, the consumption emissions of the world's wealthiest led to crop reductions equivalent to enough calories to feed 14.5 million people over three decades. Meanwhile, the carbon footprint of just four years of billionaire lifestyles would be enough to cause the death of 1.5 million people by 2120 due to climate change.

What can be done? The report's authors call for a progressive income tax that would reach 60% for the wealthiest. This would reduce global emissions by the equivalent of the UK's annual CO output. Additionally, investments in polluting sectors should be taxed. Oxfam also suggests an outright ban on high-emission luxury lifestyles, starting with superyachts and private jets and including sports cars.

Governments need to ensure that polluters bear the costs, with these funds supporting actions to counteract and mitigate the effects of climate change.

SUMMARY OF THE 6TH INTERNATIONAL CITY – WATER – QUALITY OF LIFE CONGRESS

Posted on 8 November 2024 by Fundacja Gospodarki i Administracji Publicznej

Once again, Wrocław became the venue for a debate focused on water and its impact on the quality of life in Polish cities. This year, the issue proved more relevant than ever. The flood that struck southwestern Poland in September not only destroyed the property of many people but also prompted discussions on water management in our country.

Categories: Issue 20/2024, News
Tags: city, congress, flood, water

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Inaugural session: the essential role of water in urban development

Many prominent experts participated in the event. During the inaugural session, Michał Młyńczak, Deputy Mayor of Wrocław, highlighted that "the city of Wrocław has always had a close connection with water, and as the city expands, the significance of other water bodies, such as Ślęza, Bystrzyca, and Widawa rivers, also grows." He added that "Wrocław's rivers are a part of our natural heritage, opening up many opportunities for the development and revitalization of riverside zones." Arkadiusz Wójs, Rector of Wrocław University of Science and Technology, emphasized that while water offers great potential, it also brings significant risks that must be accounted for in water management.

Water resources management in Poland: Challenges and solutions for sustainable urban development and flood safety

Przemysław Koperski, Undersecretary of State at the Ministry of Infrastructure, discussed how water resources should be managed in Poland. He emphasized the need for local and national responses to the changing world and how we must address these challenges together.

International perspectives on water management

International experts also shared insights. Pietro Francesco de Lotto from the European Economic and Social Committee pointed out the limited freshwater resources in Europe. Yenny Vega Cardenas, President of the International Observatory on Nature's Rights, posed the question: "Should the Oder River have rights?" She argued that human activity has disrupted aquatic biodiversity and stressed that immediate remedial actions are essential for restoring biodiversity to the river.

Another major flood: lessons learned and unlearned

Professor Janusz Zaleski, Director of the Flood Protection Project in the Odra and Vistula River Basins, remarked that major floods occur roughly every 13–14 years, giving us time to prepare. He highlighted both successful and missed opportunities, such as the creation of the Racibórz Dolny reservoir, which helped protect cities along the Odra River.

Session highlights: water fees and flood mitigation responsibilities

One of the notable sessions, moderated by Janusz Zaleski, addressed whether water fees should be managed by central or local authorities.

Mateusz Balcerowicz from PGW Wody Polskie noted that drought and flooding occur simultaneously in Poland, presenting challenges for national and local water management. Participants discussed who should set water tariffs, with varying perspectives on whether central authority or local councils should manage them. Izabela Godyń from Cracow University of Technology argued that the water and sewage industry, being a natural monopoly, should be centrally regulated. Other experts discussed the economic complexities of maintaining a stable water and sewage sector.

Water City Index 2024 awards ceremony

On the second day, the Water City Index 2024 awards were presented, ranking Polish cities on water resource management. Created by Arcadis experts, academic staff from the Cracow University of Economics, and the Public Economy and Administration Foundation, this is the only publication on the Polish market that extensively evaluates urban water infrastructure management. This year's rankings are as follows:

- Metropolises: 1. Wrocław, 2. Łódź, 3. Bydgoszcz
- Medium-sized cities: 1. Mrągowo, 2. Augustów, 3. Żywiec
- County-status cities: 1. Słupsk, 2. Gdynia, 3. Gorzów Wielkopolski
- Special mention: Lublin for excellence in water footprint management.

The City – Water – Quality of Life Congress took place on October 15-16 at the Wrocław University of Science and Technology Congress Center. It was organized by the Open Eyes Economy movement and the City of Wrocław in cooperation with the Public Economy and Administration Foundation, Wrocław University of Science and Technology, Wrocław's Municipal Water and Sewage Company, and the Wrocław Convention Bureau.

WHAT DOES DONALD TRUMP'S VICTORY MEAN FOR CLIMATE AND THE ENVIRONMENT?

Posted on 8 November 2024 by Agata Pavlinec

Vote counting in the U.S. presidential election has not yet concluded, but alarming opinions about the future have already surfaced in global media. The fight against climate change took a colossal hit with Donald Trump’s win, writes The New York Times. Analysts are scrutinizing the pre-election promises of the 47th president of the United States, drawing bleak scenarios for our planet. Is there really cause for concern?

Categories: Issue 20/2024, News

Tags: climate, CO2 emissions, Donald Trump, president

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Return to fossil fuels?

Already during Wednesday's election rally, while celebrating his victory, Donald Trump reminded everyone how he plans to make America great again. The United States has more "liquid gold" than any other country in the world. More than Saudi Arabia. We have more than Russia, he said, referring to plans to increase oil extraction and usage to enable a reduction in energy prices and taxes in the U.S. A *Carbon Brief* report forecasts that the president-elect's actions could increase U.S. greenhouse gas emissions by 4 billion tons of CO2 equivalent by 2030—equal to the combined annual emissions of the EU and Japan.

A lack of interest in emissions reduction policies should not be surprising. During his first term, Trump withdrew the U.S. from the Paris Agreement, claiming it placed an unfair burden on American workers and companies. Biden's administration ratified the treaty again, but Donald Trump has already announced that he would withdraw from it a second time. The incoming president is even more fiercely critical of the Inflation Reduction Act, which was the Democrats' most significant achievement in funding green energy.

Dangerous theories

Attempting to stimulate the U.S. economy through increased oil extraction is not an isolated controversy. During his first presidency, Donald Trump called climate change a massive hoax invented by China, while also accusing wind turbines of causing cancer. He also stated that the Green New Deal policy would cost the U.S. $100 billion, a figure with no basis in actual commitments.

In April of this year, trivializing climate change, Trump referenced rising sea levels, saying it's not a serious threat and citing entirely false numbers. He added that the phenomenon is beneficial because more properties would gain access to the sea, thus increasing their value. Regarding electric vehicles, the new president said they wouldn't get far and announced that benefits for EVs would end.

Donald Trump vs. the environment

During his first term, Donald Trump managed to repeal or amend nearly 100 environmentally significant regulations, 28 of which were related to air quality and greenhouse gas emissions. His administration also reduced the scope of environmental protections to increase leasing licenses for natural gas and oil extraction. Representatives of the fossil fuel extraction industry were some of Trump's most generous campaign sponsors and will likely want more.

Should we then expect an ecological disaster following Donald Trump's triumph? Dan Lashof, Director of the World Resources Institute, points out that the transition toward green energy and combating climate change has already begun and enjoys Congressional support, as it creates new jobs and generates enormous profits. It won't be so easy to stop.

The New York Times also highlights that in many states, voters supported climate and environmental initiatives, and changes are already actively being implemented. The burden of achieving ambitious sustainable development goals will now shift to individual states, where the will of the new administration isn't as influential. The BBC reminds us, however, that on November 11, the COP29 climate summit begins in Azerbaijan, with representatives from Biden's administration attending. The British outlet quotes Professor Richard Klein from the Stockholm Environment Institute, who predicts that the U.S. will be unable to make any commitments, leading China to evade them as well. Global climate initiatives could thus find themselves at an impasse.

PRO-ENVIRONMENTAL SUPPORT FOR FARMERS – APPLICATION PERIOD OPEN UNTIL NOVEMBER 20

Posted on 7 November 2024 by Agata Pavlinec

On October 23, the Agency for Restructuring and Modernization of Agriculture (ARiMR) began accepting applications for funding investments that contribute to environmental and climate protection in the agricultural sector. The total support available for farmers amounts to PLN 942.97 million, sourced from the Strategic Plan for the Common Agricultural Policy for 2023-2027. A new feature of the program is the inclusion of group initiatives among eligible beneficiaries.

Categories: News, Issue 20/2024

Tags: ecology, farmers

On October 23, the Agency for Restructuring and Modernization of Agriculture (ARiMR) began accepting applications for funding investments that contribute to environmental and climate protection in the agricultural sector. The total support available for farmers amounts to PLN 942.97 million, sourced from the Strategic Plan for the Common Agricultural Policy for 2023-2027. A new feature of the program is the inclusion of group initiatives among eligible beneficiaries.

Environmental efforts, including collaboration

Intervention I.10.4, "Investments contributing to environmental and climate protection," is a new program aimed at farmers (including individuals, legal entities, organizational units without legal personality, and civil partnership members) as well as groups of farmers. This latter option opens the door for three or more farmers to jointly participate financially in a single investment. The intervention aims to reduce the negative impact of agriculture on the environment and climate, while adapting better to ongoing climate change. Support for farmers will include actions to reduce pesticide use, improve fertilizer efficiency, reduce pollution emissions, improve water management, enhance soil biodiversity, increase carbon sequestration, and mitigate the impact of climate change on the agricultural sector.

Where will the support for farmers go?

The aid provided under I.10.4 CAP Strategic Plan covers actions planned for implementation within 24 months from the date of signing the contract and must not have started before the application submission. The assistance may take the form of a flat-rate payment or a reimbursement of eligible costs (up to 65% or 80% for groups of farmers). The maximum support for farmers under this program until 2027 is PLN 200,000.

What actions can be implemented?

Eligible costs include the construction and reconstruction of agricultural production buildings, the purchase of machinery and equipment, as well as the acquisition and installation of technical infrastructure. Farmer groups may only apply for funding for machinery purchases or non-material investments, such as purchasing licenses. Submitted applications will be evaluated based on their compliance with CAP Strategic Plan guidelines. Additional points will be awarded for larger-scale horticulture or livestock farming, the use of digital solutions, and collaboration within farmer groups. Farms located in Natura 2000 areas also have higher chances of receiving support.

Examples of investments eligible under intervention I.10.4 include:

- purchasing machinery for low-emission fertilizer application,
- purchasing or installing air purification systems for farm buildings,
- building water recirculation systems,
- implementing rainwater management systems,

- purchasing machines for no-till soil cultivation,
- installing anti-hail nets,
- implementing decision support systems based on meteorological data.

Support for farmers aims to promote the use of renewable energy, reduce greenhouse gas emissions, and support the sustainable use of natural resources, especially water, soil, and air. The program also aims to strengthen natural ecosystems, protect habitats, and preserve landscapes.

How to submit an application

Detailed information on legal requirements related to beneficiaries (including rules for group support) and activities covered by the program can be found on the ARiMR website. Applications must be submitted exclusively through the Electronic Services Platform by November 20, 2024. Each application must be accompanied by the appropriate attachments, which should also be submitted electronically via PUE.

COP29 IN THE SHADOW OF DISINFORMATION: WHO ARE THE SUSPICIOUS ACCOUNTS ON PLATFORM X SUPPORTING?

Posted on 6 November 2024 by Redakcja wodne sprawy

Categories: News, Issue 20/2024

COP29, the upcoming United Nations climate summit scheduled for November 11-22, 2024, in Baku, has sparked controversy even before its official start. As global interest in this year's climate talks rises, an investigation by Global Witness reveals troubling activity on social media. Numerous suspicious accounts supporting the Azerbaijani government's narrative have been spotted on platform X.

A network of fake accounts and their mechanisms

Global Witness conducted an investigation exposing a network of accounts on platform X that, while appearing engaged and authentic, are in reality promoting the Azerbaijani government's messaging. These carefully crafted accounts, designed to appear genuine, consistently spread content that builds a positive image of Azerbaijan, responding to critical voices that might damage the government's reputation. Particularly striking is their fervent support for Azerbaijan's pro-environment initiatives, active defense against human rights accusations, and enthusiasm for announced environmental investments.

The analysis revealed that 71 associated profiles use a consistent style—most feature nature-themed profile pictures, often with repeated nature images, giving them an air of authenticity and an interest in climate issues. Posts are published at nearly uniform intervals, consistently portraying Azerbaijan as a leader in sustainable development and a key supplier of gas to Europe. According to Global Witness, these accounts employ automation tools, including bots, allowing rapid, mass content dissemination and enhancing reach. Mutual promotion among profiles further amplifies visibility, suggesting an organized campaign aimed at building a favorable international perception of Azerbaijan.

Gas, politics, and climate

The growing energy crisis in Europe has elevated Azerbaijan to the position of a crucial player, offering itself as an alternative gas supplier. For the country, this serves as an important bargaining chip, especially in the context of COP29, where, in addition to climate issues, energy security will increasingly be addressed. Azerbaijan, whose economy still relies on fossil fuels, sees an opportunity to strengthen its image as Europe's strategic energy partner.

However, experts warn that constructing such a narrative, especially using suspicious social media accounts, could harm efforts to protect the climate. Such messages can not only distract from renewable energy investments but also ease pressure on developing green technologies, shifting the debate toward supporting the gas industry and positioning fossil fuels as a "safe" alternative.

Platform X under scrutiny

In its analysis, Global Witness criticizes platform X for lacking adequate monitoring and account verification mechanisms. The introduction of paid account verification in 2023 may have facilitated suspicious profiles in gaining credibility, increasing their reach and influence. This system allows accounts to shape narratives more effectively, especially among users who regard such accounts as verified and trustworthy.

In response to these findings, Global Witness calls for stricter monitoring measures and identification of similar disinformation campaigns, particularly ahead of internationally significant events like COP29. The organization notes that platform X's algorithms, rather than limiting

the spread of false information, may actually promote engaging, though not necessarily reliable, content that gains widespread popularity on the platform.

https://wodnesprawy.pl/en/29-un-climate-change-conference-cop29/

Manipulation and its consequences for COP29

The disinformation campaign supporting Azerbaijan's pro-government narrative may affect COP29 proceedings and disrupt substantive debate on global climate challenges. If false or coordinated accounts significantly shape the social media narrative, there is a serious risk that part of the international public will be misled. Consequently, the perception of the climate situation and the purpose of COP29 itself could be distorted, potentially weakening support for genuine climate protection efforts in the long run.

RESTORING SAFETY AFTER THE FLOOD: KEY INVESTMENTS IN LOWER SILESIA

Posted on 5 November 2024 by Iwona Szyprowska-Głodzik

The recent floods that struck Lower Silesia caused significant damage—flooded homes, damaged roads, and infrastructure destruction became a daily reality for the region's residents. The effects of this natural disaster not only shook the local community but also highlighted the need to intensify repair and preventive measures aimed at safeguarding against future threats. In response to the crisis, Wody Polskie, in cooperation with local governments, has initiated a series of projects. With government support and local authority initiatives, 182 projects related to flood protection infrastructure reconstruction are underway in Lower Silesia and are expected to be completed by the end of this year.

Categories: Issue 20/2024, News
Tags: flood, safety

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Cooperation to secure Lower Silesia

In light of the increasing number of extreme weather events, Wody Polskie and regional governments have undertaken extensive measures to not only mitigate the effects of recent floods but also to reduce the risk of future disasters.

“We are securing areas at the highest risk of flooding, and our efforts are not limited to just clearing the damage,” explains the spokesperson for the Regional Water Management Authority (RZGW) in Wrocław. “Our priority is a comprehensive approach to flood protection, which includes long-term and preventive actions,” they add.

photo: Wody Polskie

A comprehensive repair plan, 182 projects by the end of 2024

As part of the ongoing efforts, Wody Polskie is implementing 182 projects in Lower Silesia focused on the reconstruction, modernization, and strengthening of flood protection infrastructure. These investments include modernizing flood embankments, reinforcing riverbanks, repairing hydrotechnical devices, and clearing riverbeds by removing blockages. The planned actions involve both immediate repairs and long-term solutions aimed at minimizing the risk of future floods.

Currently, RZGW in Wrocław is managing 150 projects in Lower Silesia and neighboring provinces, with a total budget exceeding 73 million PLN. In Lower Silesia alone, 103 projects worth over 60 million PLN are underway, while in the Opole province, 24 projects valued at around 10 million PLN are being implemented. Additionally, 23 projects with a total value of over 1 million PLN are planned for the Lubusz province.

Meanwhile, RZGW in Gliwice is executing 32 projects worth over 2 million PLN. So far, 18 of these projects have been completed at a cost of 400,000 PLN, and 14 projects with a budget exceeding 1.7 million PLN are still ongoing. In the area managed by the Gliwice RZGW, the projects include seven tasks in the Opole province and seven in the Silesian province.

The new retention reservoir in Kątki on the Czarna Woda River

On October 30, 2024, in Wałbrzych, Wody Polskie and the local governments of Lower Silesia signed a letter of intent to build a dry flood control reservoir, Kątki, on the Czarna Woda River. The project aims to collect excess rainwater during intense rainfall, reducing the risk of flooding in the most vulnerable regions. The planned Kątki reservoir, with a capacity of over 1 million cubic meters of water, will significantly reduce flood waves, providing protection for residents of the municipalities of Marcinowice, Sobótka, and Kąty Wrocławskie. The reservoir will feature a 390-meter-long earth dam, allowing controlled water retention up to a capacity of 1.225 million cubic meters and flooding an area of over 50 hectares during high water levels.

Investments on the Biała Lądecka River and Morawka Stream worth 35 million PLN

One of the largest projects in Lower Silesia involves clearing the Biała Lądecka River and the Morawka Stream. Under agreements signed by Wody Polskie, over 35 million PLN will be allocated to improving the flow capacity of these watercourses. The work will include removing natural and artificial blockages, widening and deepening riverbeds, reinforcing riverbanks, and modernizing hydrotechnical infrastructure.

In addition, protective works are planned, including the construction of new and modernization of existing retaining walls and culverts, which play a critical role in protecting coastal areas from flooding during heavy rainfall. The project will also involve removing aquatic vegetation and bottom sediments.

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main photo: Wody Polskie

DRAMATIC FLOODS IN SPAIN – CAUSES, CONSEQUENCES, AND THOSE RESPONSIBLE FOR THE CATASTROPHE

Posted on 4 November 2024 by Agata Pavlinec

Categories: News, Issue 20/2024
Tags: flood, Spain

An unprecedented catastrophe – this is how global media describe the floods in Spain, which in the past week alone have claimed the lives of at least 217 people. The enormous losses and chaos prevailing in the southern part of the country raise numerous questions about the causes of the disaster and responsibility for its course. In the town of Paiporta in the Valencia region, distraught and desperate residents threw mud at King Felipe VI during his visit on Sunday.

The largest natural disaster

The October floods in Spain quickly transformed into the largest national catastrophe in the country's recent history and the deadliest flood in Europe in the last quarter-century. The immediate cause was a typical autumn atmospheric phenomenon for the western Mediterranean known as DANA. Torrential rains – amounting to as much as 490 mm of water per square meter within eight hours – led to the flooding of the Valencia region, where at least 213 people perished in the flood wave. Additional victims were found in the province of Albacete, in the Castile-La Mancha region. Five thousand soldiers are still searching the areas affected by the disaster for the missing.

In Valencia, where rain is still expected, schools remain closed, and road traffic is seriously restricted. On Monday morning, kilometers of traffic jams formed on roads and highways. The army is transporting water, food, and essential supplies by trucks and helicopters to residents most affected by the tragedy. Streets and underground parking lots are flooded, and municipal infrastructure has suffered severe damage. The Spanish Ministry of Defense's X profile continuously updates with reports of the painstaking process of uncovering cities buried in mud.

> *El Escuadrón de Apoyo al Despliegue Aéreo #EADA @EjercitoAire continúa desarrollando acciones de limpieza y apoyo donde es necesario, en este caso, en Catarroja. pic.twitter.com/8MMgozfLvy*
>
> *— Ministerio Defensa (@Defensagob) November 4, 2024*

Climate change as a cause?

Ernesto Rodríguez Camino from the Spanish Meteorological Society, in a statement to the British Guardian, made it clear that natural disasters are becoming visibly more frequent and intense. The World Meteorological Organization (WMO), referring to the floods in Spain, stated that extreme weather events will become more common as the hydrological cycle has been disrupted. Climate change, in particular, fuels local phenomena such as DANA, where increasingly warm air masses over the Mediterranean play a dominant role. Every 1-degree rise in global warming means an additional 7% of water vapor in the air!

This year's torrential rain could not, of course, have been avoided. Critics, however, point out that assistance arrived too late and was poorly distributed. The first military reinforcements focused only on three towns, while firefighters were the only responders in other cities. Residents were left without food, water, and electricity, and looters and thieves took to the streets. Due to poor organization, two helicopters flying in to help from Andalusia were turned back, and many volunteers and firefighters from other regions could not take action. It is hardly surprising that the regional government faces mounting criticism.

Floods in Spain and the warning system

Sunday's riots in towns within the Valencia region, visited by the royal couple and the Spanish Prime Minister, triggered a wave of public accusations. Residents of flooded municipalities claim they were not warned in time, leading to unnecessary loss of life. Sharp words emerged, such as "murderers."

The Spanish Ministry of Internal Affairs and Civil Protection (INUNCAT) sends warnings to the mobile phones of residents in regions most threatened by heavy rainfall. The Aemet meteorological agency also issues risk warnings. This time, however, alerts only reached people on Tuesday evening, when water was already on the streets and most citizens were returning from work or shopping. Panic erupted, and for many, it was too late for rescue.

According to WMO representative Clare Nullis, timely warnings are critical to avoiding losses on the scale observed in Valencia. Additionally, people need to know how to respond quickly to such signals. She believes it is the Spanish authorities' duty to analyze the events of recent days and the oversights associated with them. This assessment was supported by Hannah Cloke, a hydrology professor at the University of Reading in the UK, who stated: "The warning system in Valencia failed with fatal consequences." She also added that it is high time to tighten flood alarms – from often-ignored mobile notifications to loud sirens.

RESERVOIR WISŁA CZARNE AWAITS MODERNIZATION

Posted on 3 November 2024 by Agata Pavlinec

Categories: Issue 20/2024, News
Tags: Reservoir, Wisła

Reservoir Wisła Czarne awaits modernization – on October 25th, Wody Polskie signed an agreement for works expected to last until mid-2025, aiming to strengthen flood protection in the Podbeskidzie region. Although the reservoir is under strict protection, it's worth taking an autumn walk along the dam crest, which offers a beautiful panorama of the Beskid Śląski peaks. This is an excellent opportunity to get to know this unique area better and its significance for the local ecosystem.

A brief history of the Wisła Czarne reservoir

Located 7 kilometers from the Czech border, the Wisła Czarne reservoir was completed in 1973. Its total capacity is 5.06 million m^3, and the catchment area size is 30 km^2. The dam is located on the Mała Wisła, about 300 m below the junction of the Biała and Czarna Wisełka rivers, with a maximum water level set at 551.9 m above sea level.

Since its inception, the reservoir has served as flood protection and a water supply source. The earth dam is about 36 m high, and water is drawn from the reservoir to the Water Treatment Station in Wisła Czarne via a system of suction baskets.

The Silesian Voivodeship Encyclopedia notes that the construction of the reservoir was challenging due to the complex geological structure of the area. About 50 hectares of land were expropriated, and nearly 20 hectares of forests were cleared. Additionally, 12 farms and a school building were dismantled.

During its half-century of operation, the Wisła Czarne reservoir has proven to be a valuable element in the flood protection system. During the 1997 flood, it underwent repairs and lacked several concrete slabs, yet it withstood the pressure of the accumulated water. In 2010, it was nearly entirely filled – only 36 cm remained before an overflow.

photo: Wody Polskie

The scope of modernization of the Wisła Czarne reservoir

"Modernization of the Wisła Czarne reservoir – drainage of the airside slope, overflow, piezometer network stage I, stage II" is a project being implemented by Wody Polskie with the support of EU funds under the Rural Development Program for 2014-2020. The total investment value is PLN 10.938 million and will include modernizing the existing earth dam and associated structures.

The need for modernization stems from the deteriorating technical condition of the Wisła Czarne reservoir. According to the RZGW in Gliwice, the necessity of limiting the water level in the reservoir has recently posed a threat to flood reserves and drinking water resources. The planned work will improve the functionality of the facility.

According to Deputy Minister of Infrastructure Przemysław Koperski, the project will increase the potential for potable water supply for 60,000 people in the Cieszyn County. At the same time, the risk of agricultural land flooding due to dam failure will be reduced, and the reservoir's water retention capacity will be fully restored. This will positively impact water reserves crucial during periods of hydrogeological lows and prolonged agricultural drought.

An autumn walk along the dam

The Wisła Czarne reservoir, also popularly known as Lake Czerniańskie, is under strict protection due to its potable water intake – swimming, camping, and fishing are prohibited. However, visitors can stroll along the 270 m long dam crest, though access will be temporarily and locally restricted during the modernization period.

The surroundings of the reservoir encourage walking and cycling, with beautiful views of the Beskid Śląski peaks and lush forests. The route around the entire reservoir is about 5 km long and appealing year-round. The dam itself is also attractive after dark, thanks to beautiful lighting.

In the immediate vicinity, visitors can tour the Presidential Castle in Wisła-Czarne, and on the hill above it stands a wooden observation tower with a panoramic view of the reservoir. Moreover, the Barania Góra nature trail and the charming Czarna Wisełka Valley are worth visiting. It's remarkable how the artificial reservoir seamlessly blends with the natural landscape of Podbeskidzie.

A visit to the Wisła Czarne reservoir is also a treat for enthusiasts of hydrotechnical facilities. In 2017, the RZGW in Gliwice allowed guided tours of the site for the first time. Visitors could explore the gallery and descend 20 meters below the water's surface. The event was met with great interest, and one can only hope it will be repeated in the future.

WARSAW MERMAID – AN ORNAMENT OF THE CAPITAL. BUT IS THAT ALL?

Posted on 2 November 2024 by Patrycja Draguć

Categories: Issue 20/2024, News
Tags: legend, symbol, Warsaw

Have you had the chance to visit the famous mermaid while in Warsaw? We're sure you've seen her image at least once, even if only in a photograph! She is one of the oldest and most recognizable symbols of the Polish capital. The history of the Warsaw mermaid dates back to the Middle Ages – over the centuries, she has become not only an icon but also a guardian of the city. Her legend is more than just a tale; it is a symbol-rich coat of arms, reflecting the culture, history, and resilient spirit of Warsaw.

The history of the Warsaw mermaid – where did the legend begin?

The first mentions of the Warsaw mermaid date back to the 15th century when she appeared on city seals. At that time, she was depicted as a half-woman, half-bird figure, linking her to other mythical creatures, such as the Greek harpies. Over the years, her image gradually evolved, and by the 18th century, the mermaid took on her current form – a half-woman, half-fish holding a sword and shield, symbolizing her readiness to defend the city. Thus, she became the patroness of Warsaw, associated with strength, courage, and the resilience of its citizens.

The legend of the Warsaw mermaid

It is said that the legend of the Warsaw mermaid reaches far back in time. This story tells of two mermaid sisters who set out to explore the world – one, longing for warmer waters, traveled as far as Copenhagen, where she still adorns the port, gazing into the distance. The other sister, captivated by the charm of unknown lands and, as legend has it, a curiosity about people, swam into the Vistula River. The river's gentle waves led her to the area of modern-day Warsaw. Enchanted by the natural beauty and the sight of the growing city, she decided to stay. The locals welcomed her warmly, almost as one of their own, as if she had always been part of this place. But as in all legends, a villain appeared – a greedy merchant, seeing in the mermaid's presence an opportunity for easy profit, captured her, intending to make a fortune from her uniqueness.

However, the people of Warsaw did not stand idly by. Together, they freed the mermaid from the merchant's clutches, and she, grateful for their help, made a promise: she would guard the city and its people, always ready to defend them. And so, the Warsaw mermaid became a symbol not only of the city but also of the resilience and courage of its inhabitants. For Warsaw, like the mermaid, has its extraordinary stories and mysteries, and at its heart beats a fighting spirit, which, though only in legend, sounds like a promise for eternity.

Years and centuries passed. The village turned into a city, bustling, wealthy, and fortified.
And this city, later the capital, took her as its emblem in memory of the strange adventure with the mermaid, and to this day, that emblem adorns the Warsaw city hall
(fragment of the poem *Syrena*, *Warsaw Legends*, author Artur Oppman)

Defender of Warsaw and protector of the people – the symbolism of the mermaid

The Warsaw mermaid is more than just a figure from legend. She also reflects the identity of Warsaw and its inhabitants. Her image can be found on monuments, coats of arms, coins, and other symbols associated with the city. During the partitions and World War II, the mermaid

became a symbol of hope and resistance. Her image was used on posters and flyers, meant to keep the fighting spirit of Warsaw's citizens alive. As a figure who dared to fight for her freedom and home, the mermaid embodies resilience, which remains a significant element of Warsaw's mentality to this day.

The symbolism of the Warsaw mermaid has many layers. On the one hand, she represents strength and courage; on the other, beauty and delicacy. The mermaid symbolizes feminine power, which is both tender and fierce. Her shield and sword are clear references to her readiness for defense, while also reminding us of Warsaw's difficult history, as a city repeatedly destroyed yet always rising again.

What does the Warsaw mermaid mean to the capital's residents today?

Today, statues of the Warsaw mermaid can be admired in several locations around the city, with the most recognizable ones in the Old Town Market Square and by the Świętokrzyski Bridge on the Vistula River. It's worth noting that the Warsaw mermaid continues to inspire artists and creators. Her image is incorporated into new artworks, posters, and even murals. Thanks to this constant presence, the mermaid has become not only a symbol of the city but also a source of inspiration and pride. The history of the Warsaw mermaid is a tale of a mythical creature that chose Warsaw as her home, becoming its guardian and a symbol of resilience. For the people of Warsaw, she is more than just a legend – she represents strength, courage, love for the city, and its turbulent history.

HOW TO DECORATE GRAVES ECOLOGICALLY FOR ALL SAINTS' DAY

Posted on 1 November 2024 by Marta Maj

Categories: Issue 20/2024, News
Tags: Eco-friendly, environment, environmental protection

All Saints' Day is a time when we care for the resting places of our dearly departed with particular attention. We usually express remembrance by bringing flowers, wreaths, and lighting candles on graves – however, these traditional forms of commemoration generate considerable waste, from plastic to artificial decorative elements that take decades to decompose. With climate change and growing environmental awareness, more people are opting for alternative, more eco-friendly ways to decorate graves, choosing natural materials and minimalist decorations.

Eco-friendly alternatives to paraffin candles

On November 1st, cemeteries light up with the glow of thousands of candles. Lighting candles on the graves of loved ones carries deep symbolism – the light of the flame was once meant to guide souls returning to visit the living between October and November. For centuries, candles were made from beeswax; nowadays, a cheaper, synthetic alternative – paraffin, derived from petroleum – is commonly used. Burning paraffin in candle inserts emits many harmful compounds and contributes to severe air pollution.

Paraffin wax can be replaced with less harmful stearin or natural soy wax. Non-toxic candle inserts are harder to find than paraffin ones, but they can be made at home. Another alternative is electric candles, powered by regular or solar batteries. These lamps provide strong, long-lasting light, and for battery-powered candles – once the batteries are depleted, they can simply be replaced, allowing the candle to be reused.

Eco-friendly grave decorations

Flowers and bouquets on graves are an integral part of All Saints' Day, yet their choice significantly impacts the environment. Cut flowers, though beautiful, come with high ecological costs – they require intensive watering, fertilization, and pesticide use, and once cut, they remain fresh for only a few days. Industrial cultivation and the transportation of flowers, especially those imported from distant regions, also increase carbon dioxide emissions, diminishing their ecological value.

An alternative is potted plants, which can be reused. Decorating graves with such plants, then transplanting them into a garden or park, allows them to continue growing, extending their lifespan and reducing environmental strain. Potted plants can live for many years, making their cultivation more ecologically sensible than the production and short life of cut flowers.

Artificial flowers are also becoming an increasingly popular solution and, with proper use, may be less harmful to the environment than cut flowers. Made from synthetic materials, they can be used for years – simply refresh and arrange them in different ways. They can be hand-washed or even pressed through a cloth to restore their original appearance. When choosing artificial flowers, remember that their ecological value increases with their repeated and long-term use.

The most eco-friendly way to decorate a grave for All Saints' Day is to make a bouquet from natural materials and items already at home. Evergreen branches with pine cones, acorns, chestnuts, hawthorn berries, or rowanberries tied with raffia or ribbon look beautiful, very modern, and perfectly align with eco-friendly philosophy. You can also create flowers from colorful autumn leaves. A walk in the park or forest is enough to collect all the necessary materials without impacting your wallet or the environment. These decorations are fully biodegradable, using only what nature provides, and do not require water or fertilizers.

Cemeteries are places where the memory of loved ones remains alive, and the moments spent at graves allow for a subtle connection with those who have passed. Caring for these spaces is a way to nurture memories and a responsibility towards the future – of our planet and future generations. Eco-friendly alternatives to traditional grave decorations harmoniously combine the care for memory with environmental stewardship, creating a bridge between past and future.

WATER IN THE FOREST - FROM MONOCULTURES TO DIVERSITY IN NATIONAL FORESTS

Posted on 31 October 2024 by Agnieszka Hobot

Poland's forest area is more than 9.2 million hectares, much of which is managed by a single institution - the State Forests. Forests are not only the green lungs of our country, but also people's silent allies in the fight against the elements. What measures are State Forests taking to counter droughts and floods? Which tree species best promote water retention? Do monocultures really increase the risk of natural disasters? Krzysztof Rostek, head of the Department of Silviculture at the Directorate General of State Forests, talks about the role of water retention in Polish forests, especially in the face of accelerating climate change.

Categories: Issue 20/2024, Issue topic

Tags: climate change, disasters, Drought, environmental catastrophe, flood, forest, water

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Krzysztof Rostek, head of the Department of Silviculture at the General Directorate of State Forests, talks about the role of water retention in Polish forests, especially in the face of accelerating climate change.

Agnieszka Hobot: Could you explain how the State Forests view the relationship between forests and water management?

Krzysztof Rostek: State Forests is deeply aware of the interdependence between forests and water management, and our work on small-scale retention dates back to the 1990s. last century. We were one of the first institutions in Poland that not only noticed the need for water conservation, but also took concrete steps towards its implementation. We carried out the initial projects with our own resources and with the support of the National Fund for Environmental Protection and Water Management, the Provincial Funds for Environmental Protection and Water Management, the EcoFund.

From the late 1990s to 2005, we built and restored more than 1,100 water reservoirs with a capacity of more than 8 million[cubic meters], as well as more than 2,000 water damming facilities. The effectiveness of these activities prompted us to create nationwide programs - the *Small Lowland Retention* Project and the *Small Mountain Retention* Project, which were implemented from 2007 to 2015. Under these initiatives, more than 7,000 facilities were built to store and/or slow down water runoff, with a total capacity of about 45 million[m^3]. Funding for these activities came 85 percent from EU funds, with the State Forests financing the remaining 15 percent.

The popularity of the program led to its continuation in 2016-2023. Although the number of new or upgraded reservoirs was smaller at the time - about 800 facilities - a number of solutions to prevent erosion in lowland and mountainous areas emerged, with a significant impact on the protection of aquatic ecosystems.

It is worth noting that a total of more than 15,000 facilities built and planned for construction will store about 62 million[cubic meters of] water, and the total cost of small retention projects will be more than PLN 1.5 billion.

We are currently working on the third edition of the project, and are planning a new initiative to protect and restore hydrogenic habitats. These activities are intended not only to support water management, but also the long-term protection of valuable habitats. The project, which is being carried out in cooperation with other entities under the LIFE program, will also include the identification of non-treasury lands, which will enable us to take a comprehensive approach to the protection of forests, and thus water resources.

A.H.: What specific activities under this project are planned and in what area?

K.R.: The latest project will be implemented nationwide, and will be coordinated by the Center for Coordination of Environmental Projects. We have already conducted a preliminary identification of the possibility of implementing the activities, which will first focus on Natura 2000 areas and the so-called green infrastructure elements.

We have also introduced a major innovation in the area of water management - with the amendment of key documents on state forest management, such as silvicultural principles, the forest protection manual and the forest management manual, we have added the possibility of creating water management plans in individual forest districts. These plans will allow for more comprehensive management of water resources. We realize that expert support is necessary to make these activities substantive and effective. Our goal is for the documents to translate into concrete results.

A.H.: What about the effectiveness of the activities you are implementing? Especially in the context of monitoring their effects. You mentioned the value of water retention, but after all, there are many activities other than the construction of reservoirs that are crucial for water management in forests. How do you assess their effectiveness? How long does it take to determine that an improvement has occurred in a given forest area?

K.R.: Small water reservoirs are limited in scope, so monitoring is mainly based on scientific studies of their environmental impact. Importantly, we also focus our activities on facilities that have retained value and can perform retention functions. Traditional land reclamation from the post-war period until the 1990s was often carried out incorrectly, so we now ensure that all land reclamation work is carried out with the utmost care and in a way that benefits the environment. Modern, well-conducted land reclamation can bring tangible benefits, strengthen resilience to climate change threats in lowland and mountain forest ecosystems.

We monitor the effects of our activities in a number of ways - we use the results of scientific research and observe the impact of the implementation of the completed facilities on forests. It is worth noting that water management is not the only aspect of our work. We also carry out reconstruction of forest stands - especially where spruce and pine monocultures dominate, often unsuitable for the habitat. Unfortunately, this is not always met with understanding from the public. Reconstruction of forest stands is a long-term process, lasting up to 100-150 years, because we implement it during the generational replacement of the forest. Reconstruction of younger stands is carried out only where forests are dying.

We realize that timber harvesting is a topic of public controversy, but we believe that consistently explaining the goals and showing the results of our activities will help to better understand the issue.

pic. Wirestock/depositphotos

A.H.: You mentioned the monoculture prevailing in Polish forests. What species play a key role in terms of drought or flood protection? Does the choice depend on regional conditions, or mainly on catchment areas and habitats?

K.R.: The choice of tree species depends not so much on regional conditions as on specific habitats. First of all, we have a very high proportion of pine trees - more than 60 percent of the stands in Poland. Mainly because it was planted in areas marginal for agricultural production, with poor boning (sixth class). Often nothing else will survive in such areas, although we sometimes introduce deciduous admixtures there, such as birch or sessile oak.

In more fertile habitats, however, we have more options, and there we plant deciduous species, such as oaks, beeches and alders - the latter are particularly water-bound and tolerate periodic flooding well. As for spruce, it is a species that arouses a lot of emotion at the moment, especially in mountainous areas, where it was often planted on a massive scale in the 19th and 20th centuries, in pursuit of quick profit, and at the expense of species more adapted to local conditions, such as fir or beech. We now have serious problems with spruce throughout Europe - as do the Czechs, Slovaks, Austrians, and Germans. These countries, too, are now moving away from spruce monocultures.

Spruce has a shallow root system and is sensitive to lowered groundwater levels, so it suffers when there are moisture deficits in the upper soil layers. However, we are not giving it up completely. In silviculture, we apply the principle of species diversity, planting stands as diverse as possible. This way, when a species begins to show adaptation problems, others will be able to take over its functions in the ecosystem.

A.H.: Following up on what you said about shallow groundwater shortages and drought, do you think climate change has had a significant impact on the condition of forests over the past 10 years?

K.R.: Undoubtedly, climate change is having a significant impact on the condition of forests. The turning point was 2015, when the drought phenomenon made itself known in an exceptionally severe way. At the same time, it should be noted that trees respond to drought more slowly than other plants. In the following years, 2017-2019, the drought led to a massive drought in various regions of the country. At that time, about 25 percent of the timber harvested came from trees dying due to lack of water.

We are also seeing an increase in the activity of pests that previously did not pose an economic problem. An example is the bark beetle, which years ago was only marginally mentioned in entomology textbooks. After the droughts of 2015-2016, it initially began to overrun the stands of eastern Poland on a massive scale, causing them to die. Later, the phenomenon spread throughout the country. Another example is mistletoe, which until a dozen years ago did not cause damage. Now it is found en masse in stands all over the country, and it is very worrying that it is starting to attack even young, 5-6 year old trees, which was unthinkable not long ago.

Extreme weather events, such as hurricanes and tornadoes, are also becoming more frequent. An example is the 2017 hurricane that swept through the Tuchola Forest, damaging more than 120,000 hectares of forest and leaving behind 10 million[cubic meters of] fallen and broken trees. Many forest districts almost ceased to exist. In such situations, the force of the wind is enormous, and regardless of the species of trees, losses are inevitable.

A.H.: In the context of the recent flooding, there have been reports that water retention in forests can support flood protection. I wanted to ask about the experience of the State Forests in this regard - to what extent can forests slow down surface runoff and how does stand composition affect this relationship?

K.R.: Indeed, there have been allegations that the flooding may have been the result of poor forest management by the State Forests, which is completely unfounded. With precipitation in excess of 470 mm in four days, or nearly 500 liters per [1m2], no forest can help or manage to retain such a huge amount of water. Forests have natural retention capacities - tree crowns, trunks, undergrowth and soil help store water - but not with such intense and sudden precipitation.

In the Sudetenland, where spruce trees predominate, accusations of inadequate stand reconstruction are also unjustified. Even if we started changes on a massive scale, the effect would be similar in the face of such a downpour. I would add that dead wood and soil can also absorb water perfectly well, but in this case they were so dried out that their retention capacity dropped to almost zero. Imagine that after five days of heavy rainfall, the soil at a depth of 30 cm was still completely dry.

As for the future, we plan to continue measures to prevent the effects of drought and flooding - as we have been doing for years. The forest has its natural retention capacity, but it is not unlimited. Countering the effects of drought and flooding requires extensive measures, such as

age-differentiation of forest stands to ensure a healthy forest structure. Every year, Poland's forest area increases, even though the land for afforestation is gradually shrinking. Our goal now is to preserve healthy stands of different ages so that forests can serve future generations in the best possible condition.

EU INVESTS MORE THAN €380 MILLION IN 133 NEW LIFE PROJECTS

Posted on 31 October 2024 by Karol Kucharski

The European Commission has awarded more than €380 million for 133 new projects across Europe under the LIFE Environment and Climate Action Program. This amount represents more than half of the total investment needs for their implementation, which total €574 million. The rest of the funding comes from national, regional and local authorities, public-private partnerships, businesses and civil society organizations.

Categories: From the European Commission, Issue 20/2024, Onet
Tags: EU, KE, LIFE, project

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LIFE projects

LIFE projects contribute to the achievement of a wide range of climate, energy and environmental goals of the European Green Deal, including the EU's goal of achieving climate neutrality by 2050 and halting and reversing biodiversity loss by 2030, while ensuring Europe's long-term prosperity. This investment will have a lasting impact on our environment, economy and the well-being of all Europeans.

In its 32 years of existence, the LIFE program has co-financed more than 6,000 environmental and climate projects across the EU and associated countries. We wrote about previous initiatives that have received LIFE funding in a previous article: LIFE will support 12 strategic European projects: 223 million euros in funding.

Thematic areas of new LIFE projects

The European Commission has selected as many as 133 LIFE projects out of 653 applications submitted under LIFE 2023. The funds will be distributed as follows:

- 143 million euros (of which the EU will provide 74 million euros) to contribute to a closed-loop economy and improved quality of life, with 26 projects aimed at reducing water consumption, industrial and household waste production, air pollution and noise pollution;
- nearly €216 million (€144.5 million EU contribution) for nature and biodiversity projects aimed at restoring freshwater, marine and coastal ecosystems and habitats, as well as improving the conservation status of birds, insects, reptiles, amphibians and mammals;
- About €110 million (nearly €62 million EU contribution) for enhancing climate resilience, mitigation, management and information;
- 105 million euros (€99 million EU contribution) for governance and market solutions to accelerate the transition to clean energy.

Examples of projects supporting environmental protection

Among the 26 projects selected to promote a more closed-loop economy and quality of life, the €7.5 million LIFE GRAPhiREC project aims to recycle graphite from battery waste in Italy. It is expected to generate €23.4 million in revenue and save €25 million in production costs. Spain's LIFE POLITEX project will invest €5 million to reduce the fashion industry's environmental footprint by turning textile waste back into new textiles. The €9.8 million DESALIFE project from the Canary Islands seeks to promote drought resilience by producing fresh water from the Atlantic Ocean. Wave-powered buoys deployed off the coast of the Canary Islands will pump 1.7 billion liters of desalinated fresh water ashore.

Another 25 projects aim to support nature and biodiversity. Two of them, LIFE4AquaticWarbler and LIFE AWOM, involve Belgium, Germany, Spain, France, Lithuania, Hungary, the Netherlands, Poland, Portugal, as well as Ukraine and Senegal, with a combined budget of nearly €24

million to save the rare water warbler bird, in line with the EU's 2030 Biodiversity Strategy.

Climate resilience and mitigation projects include IMAGE LIFE and LIFE VINOSHIELD. With a combined budget of €6.8 million, the initiatives in Spain, France and Italy will help world-renowned wineries and producers of famous cheeses such as Parmigiano Reggiano, Camembert de Normandie and Roquefort become more resilient to the effects of extreme weather events. The projects show how Europe's agricultural industry can adapt to climate change and water scarcity.

In addition, 59 projects address the transition to clean energy. The LIFE DiVirtue program, a three-year digital training series worth €1.25 million, is working toward a more efficient and innovative construction sector and building industry. The project specifically uses virtual reality (VR) and augmented reality (AR) to help construction students and professionals realize zero-emission buildings and renovations in Bulgaria, the Czech Republic, Greece, Croatia and Romania.

ANNUAL REPORT ON THE EU BUDGET FOR 2023.

Posted on 31 October 2024 by Karol Kucharski

The European Court of Auditors (ECA) has published its annual report on the EU budget for 2023. In its opinion, it gave a positive assessment of the EU's annual financial report. According to the prepared document, among other things, the 2023 EU budget made investments worth 159 billion euros (38 percent of total spending) in the area of climate action. Thus, carbon dioxide pollution of our environment was reduced by about 87 million tons per year.

Categories: From the European Commission, Issue 20/2024, Onet
Tags: budget, EU, report

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ECA report and its significance

Each year, the European Court of Auditors audits the income and expenditures of the EU budget and provides its opinion on the extent to which the annual accounts are reliable and whether income and expenditures are implemented in accordance with the rules. On the basis of the audit, it issues a statement of assurance, which it is required to present to the European Parliament and the European Council.

The publication of the ECA's annual report and the submission of the Integrated Financial and Accountability Reporting (IFAR) package to the European Parliament give rise to the annual budget discharge procedure to take stock of its management and summarize the activities implemented.

The IFAR package includes five Commission reports that provide a comprehensive overview of how the EU budget is used. These reports are key to ensuring transparency and accountability from the perspective of how taxpayers' money is used.

In the discharge procedure, the European Parliament takes into account the IFAR package, the ECA's annual report and any relevant special reports, and then decides whether to grant, delay or refuse discharge of the budget.

Annual report on the EU budget for 2023. - highlights

In 2023. total spending from the EU budget reached €191.2 billion. After taking into account spending from funds allocated to the Reconstruction and Resilience Facility (€48 billion), payments made by the EU in 2023 totaled €239.2 billion.

The Reconstruction and Resilience Facility (RRF) - the centerpiece of NextGenerationEU (NGEU) - has provided member states with funds earmarked for more than 700 milestones and targets in 2023, including in connection with 22 growth-enhancing reforms implemented in line with country-specific recommendations. In addition, the introduction of NGEU Green Bonds, which raised 49 billion euros by the end of 2023, strengthened climate finance and expanded the EU's market for sustainable financing.

The current budget, which covers 2021-2027, has allocated nearly €15 billion through 2023 for the development of high-speed broadband and 5G networks, improving digital connectivity and offering citizens and businesses better access to the digital single market.

In 2023. four member states received more than 755 million euros from the European Union Solidarity Fund to support reconstruction and rehabilitation - a tangible demonstration of the EU's solidarity with citizens affected by natural disasters.

In support of Ukraine in its struggle against the war until the end of 2023. The EU and its member states have provided Ukraine and its people with nearly €85 billion in aid. This amount included the disbursement of €18 billion in highly concessional loans, part of an unprecedented package of support implemented through the MFA plus facility.

In addition, the European Commission has allocated 2.4 billion euros for humanitarian aid, including quadrupling support for Palestinians affected by hostilities in the Middle East. A total of more than 100 million euros has been allocated for them.

Every year, the European Parliament and the Council agree on the EU's general budget in the context of the Multiannual Financial Framework (currently the MFF for 2021-2027). We wrote about the arrangements for next year in a previous article: EU Budget 2024.

EU financial report 2023. - ECA conclusions

The ECA approved the financial statements because it found them to be reliable (issued an unqualified opinion), as it did for all fiscal years from 2007 onward. The Court concluded that the 2023 financial statements present fairly, in all material respects, the Union's financial position and results for the year under review, as well as its cash flows and changes in net assets.

The auditors found that there was no material error in revenue. Regarding expenditures, the Court issued two separate opinions: on the EU budget and on the Reconstruction and Resilience Facility (RRF), the main pillar of the EU's Next Generation EU (NGEU) pandemic recovery package. The estimated error rate in EU budget spending was 5.6 percent, a significant increase over previous years (4.2 percent in 2022, 3 percent in 2021 and 2.7 percent in 2019 and 2020). As in the previous four years, the Court's auditors found that in 2023 the error was so large that they were forced to issue a negative opinion on EU budget spending.

The RRF is implemented in a completely different way than spending from the EU budget. While beneficiaries receive payments for undertaking certain activities or reimbursement for costs incurred, under the RRF, Member States receive funds for satisfactorily achieving predetermined milestones or targets. Because of this distinction, the Court has formulated a separate opinion on RRF expenditures, and has devoted a separate chapter of its annual report to the issue.

The auditors found irregularities in 16 of the 452 milestones and targets covered by the audit, as well as errors in 6 payments made to 6 member states. In addition, they found persistent weaknesses in the reporting and control systems of the Member States that pose a risk to the adequate protection of the EU's financial interests. Accordingly, the Court issued a qualified opinion on the RRF.

WHAT PLANS DOES THE NEW ENVIRONMENT COMMISSIONER HAVE - THERE WILL BE A HEARING

Posted on 31 October 2024 by Monika Zabrzeńska-Chaterera

On September 17, 2024, we learned of the proposal submitted to the European Parliament for the new composition of the European Commission, including the candidate for the position of Commissioner for the Environment, Water Scarcity Resilience and a Competitive Closed Economy - Jessike Roswall of Sweden. However, before the composition of the new commissioners is officially appointed, they will hold hearings in the European Parliament. The hearing of the environmental commissioner candidate is scheduled for November 5, 2024, from 6:30 to 9:30 p.m. So what are the plans and priorities of the new environmental commissioner we will find out soon.

Categories: From the European Commission, Issue 20/2024, Onet
Tags: environment, KE, water

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However, before the composition of the new commissioners is officially appointed, they will hold hearings in the European Parliament. Hearing of a candidate for commissioner for the Labor Party. environments is scheduled for November 5, 2024, from 6:30 to 9:30 p.m. So what are the plans and priorities of the new environmental commissioner we will find out soon.

What questions were asked prior to the questioning of the new Commissioner for the Environment. environments

Questions submitted in writing to the candidate for the new Environmental Commissioner raised issues in the following areas:

- General competence, European commitment and personal independence,
- Management, portfolio and cooperation with the European Parliament.

The answers to these questions can be found on the website of the candidate for the new Environmental Commissioner - Jessica Roswall of Sweden.

General competence, European commitment and personal independence

In the area of general competence, the following questions were asked:

- What personal qualifications and experience are particularly relevant to becoming an environmental commissioner and promoting the general European interest, especially in the area for which she will be responsible?
- How will it contribute to the implementation of the European Commission's policy guidelines?
- How will it implement and integrate gender issues into all policies in its area of responsibility?
- How will it implement youth issues?
- Will she guarantee her independence and how will her actions - past, current or future actions she has taken, is taking and intends to take - not affect the performance of her duties at the European Commission?

Questions asked by the Committees on Environment, Public Health and Food

Safety

- What concrete steps does it intend to take in the context of Europe's "water scarcity resilience" strategy, so as to address water efficiency, scarcity, pollution and water-related risks?
- How does he plan to take into account the peculiarities of individual member states, including in terms of agriculture, in solving the problem of the relationship between water and healthy ecosystems, also taking into account available technologies?
- What actions does it intend to take to achieve and maintain high water quality standards, enforcing the existing legal framework?
- What specific measures does it intend to take under the circular economy legislation to create market demand for recyclables and establish a single market for waste? What is the expected impact of these measures on the EU's environmental footprint, resource use and competitiveness?
- What specific sectoral actions - on critical raw materials and textiles, for example - does he intend to take, including in the context of imports from third countries?
- How does it intend to implement the Zero Pollution Action Plan so that all sectors are properly covered where needed, and does it anticipate using additional measures?
- When is a proposal to revise REACH scheduled to be presented that will provide simplification while ensuring better health and environmental protection and a competitive industry?
- What is the plan for PFAS - so as to minimize danger to people and the environment while providing a clear and workable framework for the industry?
- Is it committed to full and timely implementation and enforcement of existing nature legislation, and to meeting the EU's international obligations?
- How does it intend to ensure an adequate level of funding to implement policies, including the reserved Nature Restoration Fund?
- How will it prepare the assumptions for nature credits?
- How - in a way that is sustainable and consistent with the goals set out in the European Green Deal - will the updated Bioeconomy Strategy unlock the potential of the European bioeconomy? What concrete steps does it intend to take to implement a science-based strategy that will significantly contribute to the EU's economic competitiveness while respecting environmental and natural resources?

Questions asked by the Committees on Agriculture and Rural Development

- How does he plan to strengthen agriculture's resilience to water scarcity so that agricultural production can be increased?
- Agriculture and forestry are the EU's largest soil-using sectors, which at the same time contribute significantly to the EU's climate

and biodiversity goals. Therefore, the question arises, how does the Commissioner intend to balance biodiversity protection and conservation efforts on the one hand, and maintain agricultural production and ensure food security and sustainable use of biomass on the other?

- What is his vision for food and agriculture?
- How will it ensure that the agriculture and forestry sectors are integrated into the bioeconomy strategy?

Questions asked by the Committees on Industry, Research and Energy

- What actions will be proposed as part of the "water deficit resilience" strategy for the energy, industrial and digital sectors?
- How does it plan to contribute to the implementation of the Green Deal Industrial Plan?
- What actions does he anticipate taking under the closed-circuit economy legislation, especially with regard to critical raw materials?
- How does it plan to achieve the ambition of zero pollution and what measures should be included in the new package for the chemical industry?
- What are the plans for PFAS?
- How does he intend to further develop the New European Bauhaus?

Questions asked by the Commissions for the Internal Market and Consumer Protection

- What is its vision and what specific actions does it plan to take, including legislative measures, to achieve its goals of establishing a single market for waste and increasing efforts to develop a single market for sustainable products?

More information about the new commissioners, including their portfolios, and the political leadership of the European Commission can be found on the European Commission website.

How commissioners are elected

The Council of the European Union, in consultation with the newly elected President of the European Commission, adopts a list of candidates for commissioners presented by the countries of the European Union. The candidates then present themselves before the relevant committees of the European Parliament in line with the topics included in the candidate's portfolio. The members of the parliamentary committees then decide, by voting, whether the commissioner candidates are suitable for the position. They forward their assessment to the President of the European Parliament.

Subsequently, the European Parliament votes to support the entire composition of the European Commission, i.e. the President, the High Representative of the Union for Foreign Affairs and Security Policy and the rest of its members. If the result of the vote is positive, the European Council appoints the president of the European Commission and the commissioners.

Each commissioner is responsible for a specific area, analogous to ministers in the government. Each of the 27 commissioners has an equal voice in decision-making, although they do not have individual decision-making powers (unless specifically authorized to do so).

The Commission President sets the Commission's political direction, works with the Commissioners to set strategic goals and develop the annual work program. Vice-Presidents act on behalf of the President and coordinate the Commission's work. They set priorities to ensure that Commissioners work closely and flexibly together. Commission members cannot be bound by any instructions coming from their countries of origin - they are politicians who are designated by the European Council (deciding by qualified majority) and approved by the European Parliament. The final stage of the full Commission is appointment by the European Council.

The new commission is expected to begin work in early December 2024.

COMPENSATION FOR POOR AIR QUALITY

Posted on 31 October 2024 by Monika Zabrzeńska-Chaterera

On October 14, 2024, the European Council adopted a directive establishing updated air quality standards across the European Union (EU) while agreeing to tighten existing EU air quality standards. The solutions proposed in the legislation are intended to contribute to achieving zero emissions by 2050 and to prevent premature deaths caused by poor air quality.

Categories: From the European Commission, Issue 20/2024, Onet
Tags: air quality, contaminants

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In addition, according to the adopted proposals, European Union (EU) citizens will be able to seek compensation for damage to their health when requirements and standards relating to air quality are not met. Thus, the new directive is intended to ensure fair and equal access to justice for those affected or likely to be affected by its implementation.

Air pollution in the EU

The European Commission points out that air pollution is the biggest threat to environmental health in Europe. As the explanatory memorandum to the proposal for the new directive indicates, each year some 300,000 premature deaths in Europe and a significant number of non-communicable diseases such as asthma, cardiovascular diseases and lung cancer are caused by air pollution.

In addition, the proposal for the new directive points out that air pollution threatens the environment by causing acidification, or eutrophication of waters, destroys the ozone layer, and thus causes damage to forests, ecosystems and crops. Eutrophication caused by nitrogen deposition affects biodiversity and the quality of waters, often a source of drinking water.

Air quality standards in the EU

In the EU, air quality is assessed using uniform methods and criteria. The revised directive introduces further improvements in air quality monitoring and modeling. In addition, air quality standards are to be regularly reviewed in accordance with the latest scientific evidence to assess whether they remain appropriate and relevant to needs and knowledge.

The EU has an air quality monitoring network of about 16,000 measurement points, where pollutants are measured on the basis of common criteria defined in the existing air quality directives. The existing air quality directives set EU air quality standards for 12 air pollutants: sulfur dioxide, nitrogen dioxide/oxides of nitrogen, particulate matter ($_{PM10PM2.5}$), ozone, benzene, lead, carbon monoxide, arsenic, cadmium, nickel and benzo(a)pyrene.

As part of the new directive, additional measurement points have been introduced to collect data on new air pollutants such as ultrafine particles, soot (BC), ammonia ($_{NH3}$) or particulate oxidation potential to promote scientific understanding of their health and environmental impacts.

Review of air quality directives

October 26, 2022. The European Commission has proposed revising the air quality directives. The aim of the proposal was to bring air quality standards in line with the recommendations of the World Health Organization (see WHO Air Quality Guidelines). In addition, the revision made the following assumptions:

- The EU is on track to achieve zero air pollution by 2050.

- regular review of air quality standards is envisaged, in accordance with the latest scientific evidence
- Further improve the legal framework
- Support local authorities in achieving cleaner air by strengthening monitoring, modeling and air protection plans
- Providing greater clarity on access to justice, redress of grievances, effective penalties and better public information on air quality.

On February 20, 2024, the Council Presidency and representatives of the European Parliament reached an interim political agreement on a proposal to set EU air quality standards. Subsequently, on October 14, 2024, the European Council adopted a directive combining the existing two directives into one to update air quality standards across the European Union.

New air quality directive

The new directive identifies the health of EU citizens as a priority, setting new air quality standards for pollutants to be achieved by 2030, which are in line with World Health Organization (WHO) air quality guidelines.

Pollutants causing respiratory problems identified in the directive include $_{PM10}$ and $PM2_{.5}$, nitrogen dioxide, and sulfur dioxide. Therefore, the annual limit values for pollutants with the greatest documented impact on human health, i.e. $PM2_{.5}$ and $_{NO2}$, have been reduced from 25 µg/m³ to 10 µg/m³ and from 40 µg/m³ to 20 µg/m³, respectively. The directive ensures fair and equal access to justice for those affected by its implementation, and in fact the lack of effective implementation.

Member states will be required to ensure that citizens have the right to seek and receive compensation when their health has been affected by violations of air quality regulations.

When the new regulations will come into force

The text of the directive will be published in the Official Journal of the EU and will enter into force on the 20th day after its publication. Member states will then have two years from the date the directive enters into force to transpose it into national law. Meanwhile, by 2030. The European Commission is to review the air quality standards. Subsequent reviews will be made on the basis of the latest scientific evidence after 2030 every five years.

The directive also gives some derogations - postponing the deadline for achieving air quality limit values. In order to request a derogation, member states will have to include air quality forecasts in their air quality action plans (to be established by 2028), demonstrating that the exceedance will be kept as short as possible and the limit will be reached by the end of the derogation period at the latest.

The legal basis for EU action on air quality is provided by Articles 191 and 192 of the Treaty on the Functioning of the European Union (TFEU) on the environment. Under these articles, the EU is authorized to act to preserve, protect and improve the quality of the environment, protect human health and promote measures at international level to deal with regional or global environmental problems.

For more information, visit the European Commission website.

EUROPEAN UNION SUPPORTS INVESTMENT IN TIMOR-LESTE'S WATER SECTOR

Posted on 31 October 2024 by Agata Pavlinec

Thanks to close cooperation between representatives of the EU, the European Investment Bank and the local government, three new investment projects have been developed to support the socio-economic development of Timor-Leste. The latest meeting of the Steering Committee of the Project Preparation and Implementation Program (PPIP) in this regard was held on October 24. One of the initiatives in question concerns support for Timor-Leste's water management.

Categories: Business and economics, Issue 20/2024
Tags: EU, support, water sector

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New EU aid for East Timor

Relations between the European Union and Timor-Leste date back to 1999, but closer cooperation did not begin until 2006. It was then that representatives of the Timorese government signed the Cotonou Agreement on partnership between the EU and African, Caribbean and Pacific countries. Recall that it aims to eradicate poverty, promote sustainable development and economic integration.

For almost 20 years, representatives of the EU and Timor-Leste have met annually at Political Dialogue sessions to discuss achievements and new challenges in the partnership. So far, however, assistance has consisted of a limited array of instruments: grants, technical and budgetary support. Now, as part of the implementation of the innovative GlobalGatewaystrategy, assistance from the EU has been expanded to include loans and guarantees, and EU Ambassador Marc Fiedrich speculates that in the future it may also include private investment.

The budget for the PPIP project preparation program, managed by the European Investment Bank, is €5 million, of which €4.75 million is technical assistance from the EU, while €250,000 comes from Cotonou Agreement funds.

Three projects: forestry, waste and water

Under the new cooperation, three key projects have been prepared to actively promote sustainable development in East Timor. The first is in the forestry sector, and aims to convert underutilized state-owned areas in the municipalities of Covalina and Bobonaro to increase the production of wood for firewood and construction. In the process, thousands of jobs will be created for members of local communities.

The second project focuses on the development of the state's waste management system. It aims to implement safe and effective waste management methods to reduce the amount of pollution entering the environment.

Under the third project, key municipalities are to gain better access to clean water. The initiative will be implemented in urban and rural areas, responding to local needs, including sanitation. Together, the three projects will require an investment of 260 million euros.

pic. jackmalipan/depositphotos

Why is this initiative so important?

The new era in partnership between the EU and Timor-Leste has been met with much favorable feedback. European Investment Bank (EIB) Vice President Ambroise Fayolle said the focus on the forestry, water and waste management sectors will not only help meet the most pressing social needs, but also lay the groundwork for stable economic growth. The EIB, as the financial arm of the EU, will provide the funds necessary to turn these projects into tangible investments, in line with its "Gateway to the World" strategy.

Timor government officials also expressed deep satisfaction with the development of the cooperation. Minister of Planning and Strategic Investment Gastão Francisco de Sousa stressed that the new projects have great potential for the long-term development of urban and rural environments and are in line with national priorities in each sector.

Timor-Leste's Minister of Agriculture, Forestry and Fisheries Marcos da Cruz expressed gratitude for the commitment of the EU and EIB, adding that the development of commercial forestry on state-owned wastelands will be an important step toward increasing employment and profits from forest management, as well as re-greening the island. State Administration Minister Tomás do Rosário Cabral, in turn, referred to the project to develop a waste management system, pointing to the urgent need to protect the terrestrial and marine environments, as well as reduce the health risks associated with the ballast of unmanaged garbage.

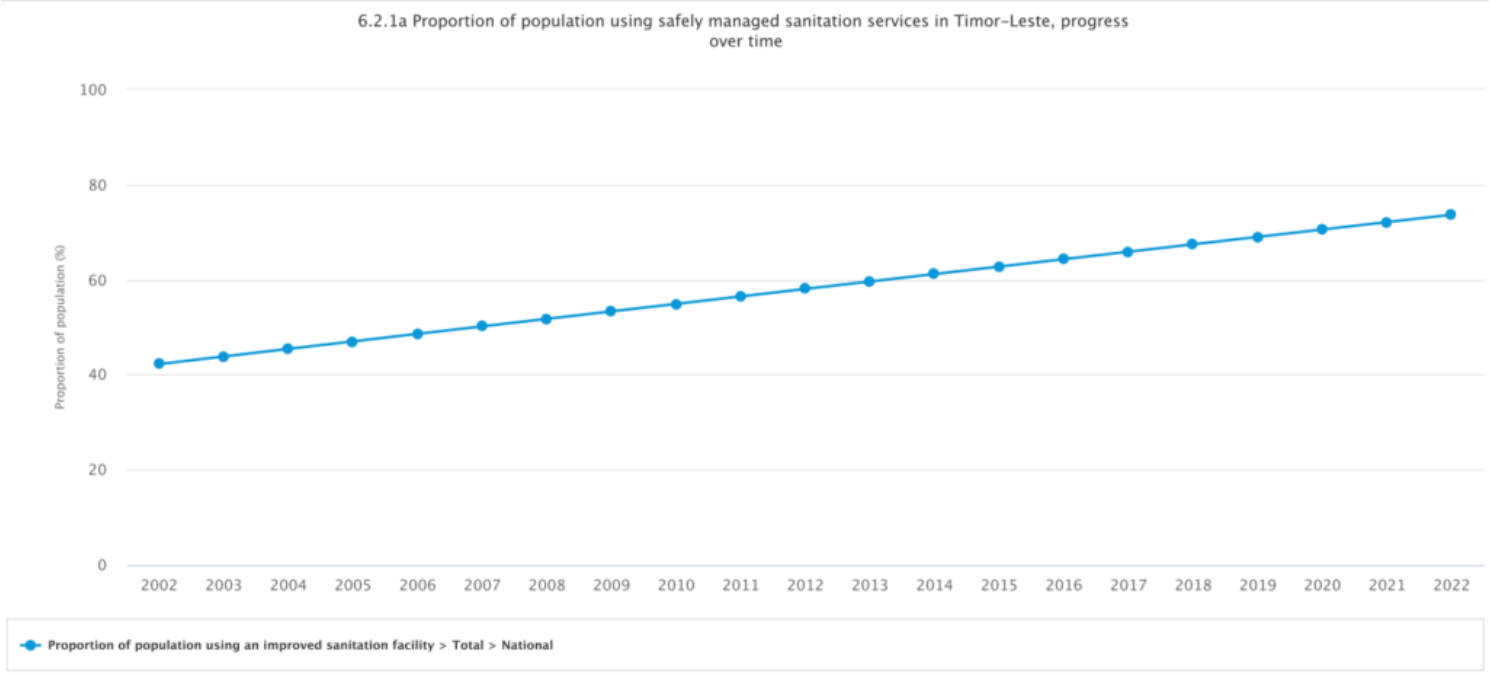
Challenges facing East Timor

According to UNICEF , in Timor-Leste 80 percent of the rural population and 96 percent of the urban population have access to water. In reality, however, this is access at the most basic level, that is, to an improved water source within a 30-minute round trip. This information does not mean that the water is clean and safe. In 2 percent of rural households, it still takes more than half an hour to get water.

The state of sanitation is even more dramatic, with only 49 percent of rural residents and 74 percent of Timor-Leste's urban population using it. In addition, the practice of taking care of one's physiological needs in nature is still common in 27 percent of rural households. The consequences are serious and far-reaching - during the preparation of the 2016 demographic census, it was found that as many as 11 percent

of all children under the age of 3 suffered from diarrhea.

OZN's monitoring of the implementation of the Sixth Sustainable Development Goal (6th SDG) reports that only 28 percent of Timor-Leste's population has a sink and soap at home. The implementation rate of integrated water resources management was only 14 percent in 2023. While development progress over the past two decades has been visible and consistent, huge investments in water and wastewater infrastructure are still needed.



Graph showing changes in Timor-Leste's population with access to safe sanitation services over the past two decades; source: https://www.sdg6data.org/en/country-or-area/Timor-Leste, based on data from WHO and UNICEF

"Gateway to the World" strategy - investments for the water sector

Europe's Gateway to the World strategy aims to support global initiatives related to digitalization, climate and energy, transportation, health, education and research in regions of the world where lack of capital for infrastructure investment is a problem. It has a budget of 300 billion euros for the period 2021-2027 for its implementation. Some of these funds will be used for water projects.

In October this year. The EIB announced €100 million in loans to support investments in water supply, sewerage construction, waste management improvements and stormwater management in Caribbean countries. An additional 24.4 million euros will support the construction of wastewater treatment plants and the repair of water supply networks in five districts in Guyana. The African island of São Tomé received €14 million in support a year ago to improve its water infrastructure.

It is safe to say that the Gateway to the World strategy is Europe's response to global challenges from which it is difficult to insulate itself in today's world - from the staggering water and energy crisis to the challenges of spreading disease and social inequality. Still, the initiative has many opponents, pointing to arbitrary settlements that further exacerbate global inequality and tangibly benefit select European companies.

WILL FLOATING WIND FARMS HELP ACHIEVE NET ZERO EMISSIONS TARGETS?

Posted on 31 October 2024 by Agata Pavlinec

Categories: Business and economics, Issue 20/2024
Tags: United Kingdom, wind energy, windmills

The UK faces a huge energy, economic and environmental opportunity. Work has just begun at the Port of Bristol to build a new deep-water terminal that will manufacture, assemble and ship floating wind farms out to sea. The impressive venture is one of the most important steps toward meeting net-zero emissions targets, and at the same time an important developmental boost for the entire region.

New terminal will support three large wind farms

The Bristol Port Company (BPC) is a company that bought the local port from Bristol City Council in 1990 and turned it into a modern enterprise employing nearly 600 people and offering high-quality cargo handling services. As part of the expansion of its operations on October 8 this year. BPC officially announced plans to build a new terminal within the Avonmouth docks.

The Bristol Wind Terminal, slated for completion in 2030, will include the infrastructure needed to manufacture, collate, integrate and deploy floating wind farms. It will first support three new windmill farms being built in the Celtic Sea as part of The Crown Estate's fifth round of siting proceedings.

The project envisages the installation of 260 turbines, each of which will be 300 meters high and placed on a drifting platform the size of a soccer field. More than 1,000 anchors and 321 km of mooring limbs will take care of their stabilization. In addition, more than 800 km of cables will connect the turbines to the power grid. Ultimately, the three new farms are expected to provide 4.5 GW of renewable energy, which will power 4 million British homes.

Construction of the terminal itself will begin in 2027 and will include a new wharf, a slipway for launching the resulting structures, and a widened breakwater. The planned infrastructure will enable the production of both steel and concrete floating turbine parts.

The economic importance of the project

Three new floating wind farms in the Celtic Sea are expected to generate an additional 5,300 onshore jobs - new jobs will be created not only in Bristol's port, but also in the supply chain associated with the development. The region could add as many as 40,000 by 2040. new jobs. The entire investment is expected to inject £1.4 billion into the British economy.

According to Gus Juspert, managing director at The Crown Estate, the UK off-shore sector is already an example of global success. Floating wind farms represent new opportunities for the entire country and the region around the Celtic Sea. It is worth noting that the next round of differential contracts for offshore wind in the UK will bring further investment of £1.5 billion. The Crown Estate's total portfolio stands at £16 billion, and according to Juspert, the UK economy will gain as much as £25 billion in the long term from the expansion of the farms. In 2030. The off-shore energy sector in the Islands is expected to employ more than 100,000 people, including many highly skilled professionals from various industries.

pic. Marek Slusarczyk, CC BY 3.0, wikimedia

British domination of the seas

Ed Miliband, the UK's zero emissions secretary, has expressed the view that floating wind farms are today the dominant global technology that will play a key role in efforts to achieve energy independence, create new jobs and deal with climate change. The UK is already the second (after China) biggest off-shore wind power in the world.

According to The Crown Estate's 2023 report, 2,766 wind turbines with a total capacity of 15 GW are already operating in UK territorial waters, providing power for 14.2 million homes. Last year they produced a total of 49 TWh of electricity. It's hardly surprising, then, that in just one year the share of offshore wind power in the UK's energy mix rose from 14 to 17 percent. A further 12 percent of energy is generated by onshore turbines, and 14 percent comes from nuclear power plants. As a result, fossil fuels accounted for less than 40 percent of the country's energy sources in 2023. Renewable energy has thus reduced the amount of carbon dioxide emissions by 18.5 million tons.

British wind farms are distributed in various locations along the coast - from the northeast to the very south. This diversification is proving to be a very apt strategy, as it makes it possible to take advantage of different wind conditions throughout the year. According to data from The Crown Estate for 2023, the strongest month was July, when energy production exceeded the average by 39 percent, while May was 35 percent below the monthly average.

How will floating wind farms change Britain's energy industry?

The Crown Estate is by no means resting on its laurels and promises further development of off-shore wind energy. Already there are plans to increase the capacity of farms in the Celtic Sea to 12 GW. This year, offshore windmills are expected to cover the energy needs of 56 percent of British households. The target is for all British offshore turbines to reach 50 GW in 2030 - 268,000 square [kilometers] of seabed will be developed, an area twice the size of England, Wales and Northern Ireland.

Floating wind farms make it possible to take advantage of wind potential in more remote waters with great depth. Their production is very economical, and the construction process itself does not require specialized knowledge of marine engineering.

The key to success, however, is not only the efficiency of the farms themselves, but also the transmission network. In recent years, there has been a steady increase in the availability of energy from off-shore farms. Unplanned power outages still occur, however, and are, according to The Crown Estate, one of the biggest challenges for years to come.

Other challenges include extending the life of existing offshore turbines and repowering, that is, erecting new turbines to replace those going out of service. Life extension, in particular, has very significant benefits, avoiding the use of 136 tons of steel, 8 tons of glass and 4 tons of polymers per MW of energy produced. In addition, emissions can be reduced by 470 tons of $_{CO2}$ per MW by this means.

A benefit to the marine environment?

It is difficult not to view off-shore energy through the lens of marine ecosystems. After all, even floating wind farms require anchoring to the bottom, interfering with the underwater world. With an eye toward mitigating the effects of this intervention, The Crown Estate launched a pioneering Whole of Seabed Program in 2023 to map the seabed using modern technology. The program will help determine in which zones off-shore energy can be reconciled with natural habitats.

Already since 2003, information has been collected as part of the Marine Data Exchange, a publicly available database on, among other things, geophysical features of the bottom, sedimentology, but also species of fish, birds and marine mammals. In 2023. It was used by more than 5,000 users, and total data resources amounted to 268 TB, with an estimated value of 1.54 billion British pounds. With the development of off-shore energy, the British want not only to achieve the goal of zero net emissions, but also to ensure a secure future, including for the environment.

DO WE HAVE A CLIMATE FOR PUMPKINS?

Posted on 31 October 2024 by Monika Zabrzeńska-Chaterera

Pumpkins, which have a number of meanings and quite a few benefits, are a very popular vegetable in our country. They originated in America and have always been considered a symbol of eternal life, resurrection, fertility and fertility. Already the Celts believed that the night before All Saints' Day was a time of transition, during which the veil separating the worlds of the living and the dead fell. During this time, they would place hollowed-out vegetables in front of their homes - originally turnips, rutabagas, potatoes and beets, but now mainly pumpkins - with menacing faces cut out and candles inside to ward off wandering spirits.

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Pumpkins, in addition to their characteristic shape, also have a positive effect on our health. In order for us to enjoy the unique taste of this vegetable and benefit from its health-promoting properties, we need to provide it with the right conditions, including water. Will the increasingly observed water shortages and droughts allow to maintain the production of this vegetable in Poland? Will pumpkin adapt to climate change and thus not become a luxury?

What we know about pumpkin

Pumpkin is an annual plant, belonging - along with about twenty other species - to the cucurbit family. Its fruits, usually yellow or orange, often assume colossal sizes - up to 200 kilograms! As for its taste, its greatest advantage is its versatility and neutrality. It is often used for preserves or as a decoration.

The species most commonly found in Poland are the giant pumpkin (which can grow up to 800 kilograms), the musk pumpkin and the common pumpkin. The former is native to Central and South America. It was cultivated as early as 3,000 BC. It probably derives from the wild species Cucurbita lundelliana Bailey and Cucurbita martinezii Bailey.

It came to Europe via Spanish sailors in the 16th century, and was later spread to other continents. Musk pumpkin is native to Mexico or the northern regions of South America (Peru, Ecuador). It was probably the earliest cultivated species of pumpkin (since about 5000 BC). The common pumpkin is one of the oldest cultivated plants, native to Central America and the southern states of the United States. It was grown mainly as a vegetable or forage crop, but the ornamental varieties available today make interesting decorations for garden arrangements. In their composition, pumpkins contain a lot of water (about 95 percent), carbohydrates and protein.

Climatic conditions favorable for pumpkin

Pumpkins are extremely thermophilic plants, mainly because they come from the subtropical climate zone. They are sensitive to frosts - the problem is already 0°C, and prolonged cooling leads to the death of young plants. A drop in air temperature below 10°C results in dropping of buds and even overcooling of shoot tops. Pumpkin during the growth period needs a lot of water - it is advisable that the rainfall is at the level of 400 mm (throughout the growing period of the pumpkin).

Growing pumpkins

Pumpkin has several growing requirements. It is a thermophilic plant - for proper development it needs adequate space and a sunny position. It grows best in places sheltered from the wind, on permeable, humus and fertile soil, with neutral pH and good air-water relations, maintaining humidity (80-90 percent), preferably with a not too high level of ground water (80-90 cm). From June to July it is recommended to fertilize the pumpkin with a compound or organic fertilizer. Harvesting of pumpkins depends on the variety - it begins in September and lasts until the first frost.

Water needs of pumpkin

The high water requirements of pumpkin are due to the production of a huge amount of fresh mass in the growth process, a large evaporation area and a shallow root system. They need most of it during flowering and fruit setting and growth - about 400 mm of rainfall or irrigation with this amount of water. For a satisfactory yield, pumpkins need 1000-1500$^{m3\ of}$ water per hectare. Seedlings are irrigated every 2-3 days, preferably with distilled, lukewarm water. Water the soil, not the leaves, to reduce the risk of fungal diseases.

With water shortage, fruits do not grow and become less juicy, and the yield decreases. This is because fruit buds turn yellow and shrivel, dry matter content and sugars increase. Excess water is also unfavorable, as it causes intensive vegetative growth of plants and rotting of fruit buds.

Pumpkin responds well to soil moisture at 80-90 percent of field water capacity. Ideally, it should remain at a constant level up to about 50 cm for about 2 weeks before harvest. Reducing humidity during the harvest period improves the ripening and consumption value of the vegetable. Too high, prolonged soil moisture causes root hypoxia, increased pH (pH), poorer uptake of magnesium and micronutrients, and therefore a decrease in yield quality.

Pumpkins and their health properties

Pumpkin is a versatile vegetable. It is an ingredient, and often even the basis, of soups, sauces, cakes, salads, pates, purees and preserves. Giant pumpkin and musk pumpkin are characterized by properties that are not only flavorful, but also medicinal and even cosmetic. Edible are not only the fruits, but also the seeds and flowers.

Pumpkin fruits are valued for their easy digestibility, low calories and health-promoting properties. The flesh contains β-carotene, which has beneficial effects on heart, brain and memory functions. In addition to it, pumpkin contains a lot:

- Carotenoids - provitamin A (mainly β-carotene), which is most abundant in those with yellow or orange flesh;
- vitamins: C, E, K, PP, as well as B1, B2, B6;
- folic acid;
- mineral elements: K, P, Ca, Mg, Na, Fe and Zn.

Pumpkin seeds contain 35-50 percent oil on a dry weight basis, rich in Omega-3 unsaturated fatty acids. The seeds also contain phytosterols, easily digestible protein, dietary fiber and β-carotene. Their GI is 25. Fresh pumpkin seeds, thanks to their kucurbitacin content, help get rid of pinworms, tapeworms and other parasites.

Pumpkin is a source of fiber useful in preventing constipation and lowering cholesterol levels. Its consumption supports the maintenance of healthy skin, promoting the healing of the epidermis and preventing the aging process. A major advantage of pumpkins is that they do not store heavy metals, so they can also be used in the nutrition of young children.

Pumpkin - superstitions

The pumpkin, which wards off evil spirits on Halloween, also has a number of other purposes. In the past, it was considered a symbol of eternal life, fertility and harvest, as well as a metaphor for light.

Since it has many meanings, many superstitions have arisen based on it.

- To ensure good luck and abundance for the household, place a pumpkin at the threshold of the house.
- To ensure fertility and abundance of crops, on All Saints' Eve, pumpkin seeds should be buried in the field where you plan to grow.
- To ensure money, carry an odd number of pumpkin seeds in your wallet - such a seed heralds a fortune.
- Burning a few pumpkin seeds will protect household members from unexpected accidents.
- Pumpkin can help wean us off people who affect us badly.
- In some regions of Poland, before the wedding night, the groom would bite into pumpkin seeds and then... put on a pumpkin mask to make sure he would live up to his marital duties....

Pumpkin as decoration

Pumpkin, because of its color, shape and size, is increasingly used as a decoration. Most of us find it difficult to imagine autumn decorations without it. It adds charm not only to gardens, vegetable beds or terraces, but also to rooms. Pumpkins, placed in pots or wicker baskets on the terrace or veranda and combined with heather, chrysanthemums and decorative cabbage, create impressive autumn arrangements. When the flesh is hollowed out and various patterns are cut into the skin, and candles or LED lamps are lit inside, they create atmospheric lighting. After the season, the leftover pumpkin is worth composting - in the spring it will be a valuable source of nutrients for the soil.

In the coming time of autumn nostalgia, let's not forget about pumpkin. The question remains, however, whether pumpkin will adapt to the changing climate in an era of increasing extreme events, such as water shortages and droughts.

Methodology for integrated production of giant and musk pumpkin (first edition) approved under Article 57 (2) (2) of the Law of March 8, 2013 on plant protection products (OJ. of 2020. pos. 2097 as amended.) by the Chief Inspector of Plant and Seed Protection, January 2023.

NANOPLASTICS - WHEN SIZE MATTERS

Posted on 31 October 2024 by Edyta Łaskawiec

The smaller the plastic particles, the more likely they are to cross the blood-brain barrier, reach organs and tissues and accumulate in them. And this increases the risk of their negative effects on our health. Thanks to the development of increasingly sophisticated analytical methods, researchers are able to see the scale of the previously overlooked problem of the smallest microplastics - the so-called nanoplastics.

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Tags: microplastic, micropollutants, nanoplastic, plastic

The smaller the plastic particles, the more likely they are to cross the blood-brain barrier, reach organs and tissues and accumulate in them. And this increases the risk of their negative effects on our health. Thanks to the development of increasingly sophisticated analytical methods, researchers are able to see the scale of the previously overlooked problem of the smallest microplastics - the so-called nanoplastics.

What are nanoplastics?

Nanoplastics are defined as plastic particles ranging in size from 1 to 100 nanometers (sometimes up to 1,000 nanometers) . Like microplastics, they enter the environment from waste and everyday products - paints, cosmetics, biomedical products, detergents and fabric softeners, 3D printing and many others. Nanoplastics are distinctly different from microplastics, both in their physicochemical properties and biological reactivity. It is estimated that the abundance of nanoplastics in the environment is several orders of magnitude higher than microplastics. There may be more than 300 million tons of them in the global environment .

In addition, growing evidence suggests that ingested nanoplastics cross the intestinal barrier and travel to secondary tissues. It is worth mentioning that microplastics are largely physically retained by the gut . Therefore, researchers suggest that smaller particles pose a greater threat to ecosystems and human health. However, data on the concentrations of nanoplastics in human bodies are limited. It is difficult to identify them in tissues, even after the death of the carrier. Representative nanoplastics, made of polyethylene, polypropylene, polystyrene, polyvinyl chloride or polyethylene terephthalate, have a density similar to water (0.88-1.50 $^{g/cm^3}$), which favors their transport in suspension rather than their deposition .

In addition, the tiny particles have a strong tendency to aggregate, i.e. they quickly attach to larger colloidal systems consisting of organic or inorganic molecules. These include. natural clay materials, humic acids, polysaccharides, but also biological particles - bacteria, fungi or chemical pollutants from industry and consumption (those originally found in plastics, as well as those sorbed from the environment).

And during the degradation and decomposition of polyethylene, among other things, peroxides are formed (which are cytotoxic, meaning they have toxic effects on living cells). Like microplastics, nanomaterials also interact with their surrounding environment, so their physical and chemical parameters can change. Because of this, we are more often exposed to nanoplastics, whose properties differ significantly from the pristine plastics used in consumer products (and often in scientific research). There is still little research on nano-contaminants of environmental origin .

When does a nanoplastic become toxic?

The toxicity of nanoplastics largely depends on their transformation at the nano-bio interface, as a result of physical, chemical and biological interactions with various biomolecules (e.g., proteins, lipids, carbohydrates) in membranes, organelles, cells, tissues or physiological fluids . The eco-corona and protein corona formed as a result of transformation significantly affect their physicochemical properties and biological activity, and facilitate the induction of negative health effects, because their composition is crucial in the transport of nanoplastics around living organisms, including blood plasma.

In studies with crowned polystyrene nanoplastics (13-135 nanometers), researchers have confirmed their higher genotoxicity and cytotoxicity in human blood than virgin plastics of these sizes . Degradation of microplastics to nanoplastics probably also occurs in the human body, but it is unclear to what extent nanoplastics can be degraded in the acidic environment of the stomach and neutral environment of the intestines .

Researchers also still disagree on how nanoplastics can cross the blood-brain barrier. The discrepancies in research results are probably the result of individual differences in the properties of the plastics. Perhaps even a subtle change in research methods yields different experimental results.

The main route for micro- and nanoplastics to enter the human body is through ingestion, oral exposure and through the gastrointestinal tract. But nanoplastics can also enter the body through inhalation and absorption through the skin. Previous studies show that only a small fraction of micro- and nanoplastics are able to pass through the alveolar wall into the capillaries and eventually into the bloodstream. The situation is similar in the case of skin - there is insufficient evidence for the penetration of particles through damaged skin, sweat glands or hair follicles .

Much more research is being done on the interaction between nanoplastics and the digestive system, and on their accumulation in selected organs. Most microplastics from the digestive tract are removed naturally. However, studies show that plastic particles smaller than 100 nanometers can cross the intestinal barrier. After crossing it, they enter the circulatory system. The largest blood vessel in the human body, the aorta, is about 25,000 µm in diameter, and the smallest capillary is about 8 µm, allowing nanoplastics to be carried, circulate in the blood and eventually accumulate in organs, tissues and body fluids. But it also raises concerns about the effects of nanoplastics on the circulatory system .

https://wodnesprawy.pl/czy-mikroplastik-moze-rozprzestrzeniac-choroby-w-o/

What does a nanoplastic do?

The number of studies on the effects of micro- and nanoplastics on living organisms continues to grow, but only a small fraction of them report on the effects they can have directly in humans. The particles are transported to various organs, including the liver, so they are sometimes suspected of having hepatotoxic effects , as well as inflammatory response, oxidative stress and cellular dysfunction, leading to potential liver damage and dysfunction. In addition, these molecules react with other toxins or substances present in the body, exacerbating their negative effects on this organ .

Preliminary studies have confirmed that micro- and nanoplastics inhibit lipid digestion and reduce vitamin D3 absorption. The main reason is that they can agglomerate nutrients and reduce their bioavailability or affect the activity of relevant enzymes. In addition, a stable gut microbiome is essential for human health, and micro- and nanoplastics can cause an imbalance of this microbiome. In vivo exposure experiments on model animals have shown that plastic particles alter bacterial counts in the gut of mice. In addition, higher levels of mitochondrial depolarization have been demonstrated on human colonic epithelial cells, resulting in intestinal barrier dysfunction, metabolic dysfunction, inflammation, and may eventually lead to the development of related diseases .

Experiments on animals or cells have shown that micro- and nanoplastics can lead to increased secretion of pro-inflammatory cytokines, disrupting immune homeostasis and ultimately leading to immune system disorders and causing autoimmune diseases .

Studies have confirmed that nanoplastics, by interacting with proteins found in the brain, may be responsible for changes associated with some types of dementia and Parkinson's disease , which is now being called the fastest growing neurological disease in the world. Many data suggest that environmental factors may have a significant role in this, although most have not been identified .

Studies in wild and model organisms have linked exposure to micro- and nanoplastics to infertility, inflammation and cancer, but the actual broad health effects in humans are currently unknown . Most human health research has focused on in vitro studies using human and other mammalian cell lines. Experiments show that nanoplastics, once absorbed, can be mistaken by immune cells for viruses, inducing an inflammatory response. Hence, effects such as oxidative stress, immune reactions, genotoxicity, DNA damage, neurotoxicity and

reproductive impairment are observed .

However, the findings should be interpreted with caution, as cancer cells show marked differences in metabolism and reactive oxidative stress, and the magnitude and type of exposure to nanoplastics varies strongly and depends on lifestyle and diet, location, presence of other contaminants, type of plastics, their origin, age and many other factors

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In the article, I used, among others. z:

F. Dang et al, *Key knowledge gaps for One Health approach to mitigate nanoplastic risks*, Eco-Environment & Health, Volume 1, Issue 1, 2022, 11-22, https://doi.org/10.1016/j.eehl.2022.02.001

E.D. Tsochatzis et al, *Microplastics and nanoplastics: Exposure and toxicological effects require important analysis considerations*, Heliyon, Volume 10, Issue 11, 2024, e32261, https://doi.org/10.1016/j.heliyon.2024.e32261

Y. Feng et al, *A systematic review of the impacts of exposure to micro- and nano-plastics on human tissue accumulation and health*, Eco-Environment & Health, Volume 2, Issue 4, 2023, 195-207, https://doi.org/10.1016/j.eehl.2023.08.002

P.A. Stapleton, *Microplastic and nanoplastic transfer, accumulation, and toxicity in humans*, Current Opinion in Toxicology, Volume 28, 2021, 62-69, https://doi.org/10.1016/j.cotox.2021.10.001

Z. Liu et al, *Anionic nanoplastic contaminants promote Parkinson's disease-associated α-synuclein aggregation*, Science Advances, Volume 9, Issue 46, 2023, 1-20, https://www.science.org/doi/10.1126/sciadv.adi8716

M.B. et al, *Beyond microplastics - investigation on health impacts of submicron and nanoplastic particles after oral uptake in vitro*, Microplastics & Nanoplastics, 2, 16, 2022, 1-19, https://doi.org/10.1186/s43591-022-00036-0

Chi-Yun Chen, Zhoumeng Lin, *Exploring the potential and challenges of developing physiologically-based toxicokinetic models to support human health risk assessment of microplastic and nanoplastic particles*, Environment International, Volume 186, 2024, 108617, https://doi.org/10.1016/j.envint.2024.108617

WATER AND ENERGY: INSEPARABLE RELATIONSHIP VERSUS CLIMATE CHANGE

Posted on 31 October 2024 by Maja Czarzasty-Zybert

Water and energy are in an inseparable relationship. Water is used to produce energy, and energy is needed to produce and move water. The energy sector accounts for about 10 percent of the world's total freshwater consumption, and is dependent on energy to maintain the global supply. It is needed to extract water from lakes, rivers and oceans, to lift it from aquifers and pump it through pipes and canals, and to purify and deliver it to users.

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Whether it's water consumed and needed in households, used to produce goods, including food, or needed for energy production, two things are clear: water needs energy, and energy needs water. This is called the water-energy nexus, and it is crucial to sustaining human life on Earth.

The water we consume

Water is a staple of our daily lives. From the one we use in our homes to drink, shower or cook, to the one needed to grow crops and produce food. It's always the same water that must be collected, purified, transported and reused in the most efficient way possible. This is where we see the close connection between water and energy. We need to purify as well as treat our water resources so that communities can consume them safely - but this process requires a lot of energy. The International Energy Agency (IEA) predicts that the energy sector will be twice as water-intensive by 2030 as it is now.

One form of water treatment is desalination. Currently, more than 2.3 billion people live in water-scarce countries. This process can provide them with clean drinking water, but it requires supplying a significant amount of energy. Some experts believe that desalination produces too many harmful emissions to be a valuable option. However, if we could power the process with clean energy sources, it could become more widely accepted.

The Middle East has one of the lowest levels of freshwater consumption per capita in the world. With population growth and easy access to seawater, desalination has become the main approach used there to address shortages. Desalinated water covers most of the daily demand in many countries in the region, including Qatar, Kuwait, Bahrain, Oman and Saudi Arabia, and new projects to increase capacity are underway.

Jordan is planning a major installation in the Gulf of Aqaba that will increase the amount of water obtained from 4 billion to 350 billion liters per year - enough to supply a city of 2.5 million people. Saudi Arabia is considering building a new city for 9 million people in the northwestern part of the country by 2045, which will depend on desalinated water from the Red Sea and the Gulf of Aqaba.

In the IEA's projections, based on current policy settings, the growing demand for desalination will increase its share of the Middle East's final energy consumption to 10 percent in 2030 and 15 percent in 2050, up from the current 7 percent. In 2030, the energy needed for desalination in the region is expected to be equivalent to about 80$^{\text{bcm of}}$ natural gas.

Water needed for energy production

Another key area where the two overlap is energy production. Hydropower is a strong and obvious example. Clean and renewable, it depends solely on water, but is the only one that does not consume it. The other ways are water-intensive. For example, a traditional power plant burns fuel - be it coal, oil or natural gas - to boil water, generate steam, and from that generate electricity. Water is also the coolant there.

Another important form of energy using water is hydrogen, especially green hydrogen, which is produced using renewable energy. It is the most abundant element in the universe. The important thing is that it doesn't release greenhouse gases (GHGs) when burned, which is why experts believe it should be part of the energy transition. However, hydrogen production requires a large amount of treated water, which

must be purified before use. It is placed in an electrolyzer, where it is separated into oxygen and hydrogen, which can then be used for heating, power and industry.

And of course, we can't forget nuclear power. Power plants use the process of splitting atoms to generate heat, generate steam and spin turbines to produce electricity. So, if we are to consider nuclear power as part of our energy arsenal, water will be a key factor in the decision.

Climate change increases pressure on energy and water

Climate change will continue to exacerbate water stress. Changing precipitation patterns, along with more frequent droughts and floods, are challenging resource management, while rising sea levels, combined with groundwater extraction, are leading to saltwater intrusion in places where it was previously absent. Rising temperatures and drought can locally increase pressure, causing spikes in water demand. Energy infrastructure that was built for cooler, calmer climates can become unreliable or insufficiently resilient when temperatures rise and weather events become more extreme.

The increasing burden of climate change is expected to result in greater energy consumption for water supply. More desalination plants are expected to come online, and governments have begun major transportation projects to move water to where it is scarce. If desalination develops in a highly energy- and emissions-intensive way, this could lead to a vicious cycle and more emissions, and thus more extreme weather.

Most forms of energy production require water. And while solar and wind power don't need it in the direct generation process, mining minerals and metals to produce components for green technologies already requires water. The bottom line is that water is essential to energy.

Our water and energy future

The symbiotic relationship between water and energy is critical. This is especially true as we fight the global water crisis while continuing the energy transition. At times it seems as if these two goals are in conflict - and sometimes they are. But at the end of the day, we always need water and energy, and we need to protect the planet for future generations. So ensuring reliable, affordable and sustainable access to resources is critical to the development, prosperity and stability of the societies of the future.

Policies, partnerships and cooperation are therefore key to achieving these goals. Governments can replace unnecessary energy and water subsidies with more targeted support, encouraging more efficient use of these resources and lowering associated emissions. Meanwhile, partnerships and cooperation can facilitate access to resources where they are needed most and promote conservation by reducing waste and inefficient practices.

An integrated approach to energy and water management can help reduce risk across the board. Many of the clean technologies that are being deployed to provide electricity around the world can also be used to provide access to water. For example, water pumps powered by decentralized photovoltaic cells can replace more expensive diesel pumps, and mini-grids can power filtration technologies such as reverse osmosis systems to produce clean drinking water. Switching from fossil fuels to renewable energy sources can reduce water demand in the energy sector. The mining industry will help by reducing its water demand and using more efficient treatment technologies.

Measures to conserve water and use it more efficiently also reduce energy demand. Water reuse and recycling can lower treatment requirements and reduce the associated energy demand. Energy and water management should go hand in hand.

We need to work together if we want to solve some of the biggest challenges in the water-energy nexus. To succeed, the water and energy industries must work in tandem, because what affects one directly shapes the other. Our future depends on the decisions and actions we make today.

Maja Czarzasty-Zybert, PhD - a graduate of the Faculty of Law and Administration at the University of Warsaw. Her adventure with energy law began in the Legal Office of the Energy Regulatory Office, where she was involved in, among other things, representing the President of the Energy Regulatory Office before courts, providing interested parties with answers resolving doubts about the application of energy law, conducting administrative proceedings on the granting of licenses. Subsequently, in the course of her professional practice to date, both in Polish and international law firms and as an in-house counsel, she has been involved in advising entities in the energy sector.

ATLANTIS - A MYSTERY THAT HAS FASCINATED THE WORLD FOR CENTURIES

Posted on 31 October 2024 by Iwona Szyprowska-Głodzik

Atlantis has been a subject that has fascinated scientists, treasure hunters and mystery enthusiasts for centuries. The ancient legend of a powerful empire lost in the depths of the ocean stirs the imagination and invites questions. Did Atlantis really exist? And if so, where was it located? The story of Atlantis, pioneered by Plato more than 2,000 years ago, still lives on in scholars' discussions and cultural myths.

Categories: From the world, Issue 20/2024
Tags: Atlantis, ocean

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The mythical roots of Atlantis

The story of Atlantis comes from the dialogues *Timaeus* and *Kritias* by Plato, which were written in the 4th century BC. In these texts, Plato describes Atlantis as an extremely advanced and powerful civilization that existed 9,000 years before his time. Atlantis was said to have been located beyond *the Pillars of Heracles*, at the site of the modern Strait of Gibraltar.

Atlantis, according to Plato, was a state distinguished by advanced technology and immeasurable natural wealth. The inhabitants had access to gold, copper and other valuable raw materials, which ensured a life of luxury and unparalleled abundance. This unique civilization developed not only technologically, but also organizationally, for example, it had extensive canal systems, massive secular and sacred buildings. However, over time, prosperity led its inhabitants to pride and moral decay. In response to this degeneration, the gods, according to Plato's story, decided to punish Atlantis by bringing disaster. Overnight, the entire country disappeared into the depths of the ocean.

Plato, however, gave no concrete evidence for the existence of Atlantis, which meant that for centuries his story was seen more as a philosophical parable than an actual account. However, there is still a body of researchers and explorers who believe that this land may have been an actual civilization, traces of which are still hidden in the depths of the oceans today.

Atlantis - reality or myth?

Many historians and archaeologists believe that Atlantis is only a myth, created by Plato. The philosopher may have been inspired by events that took place in his time. The land as a moral metaphor was a tool that Plato used to convey the doctrine of the disastrous consequences of pride and disobedience to the gods. In this way, it became a parable about human weaknesses and the dangers that can result from overconfidence.

On the other hand, there are researchers who believe that Atlantis actually existed, and that its extinction may have been the result of an actual cataclysm - a volcanic eruption, an earthquake, a tsunami. Archaeological and geological discoveries that appear from time to time fuel the speculation, although there is still no hard evidence to support these theories.

Location theories - where was Atlantis lost?

One of the key elements in the debate over Atlantis is its location. Plato placed it west of the Mediterranean Sea, which would indicate a location initially in, and later in, the Atlantic. However, over the centuries, many theories have emerged suggesting that Atlantis may have been located in different parts of the world. One popular one links Atlantis to a volcanic eruption on the island of Thera (now Santorini) in Greece, around 1600 BC. The catastrophe destroyed a large area of the island and the Minoan civilization. Many researchers believe that the eruption of Theria may have inspired Plato's tale of the sudden collapse of a powerful civilization.

Other hypotheses locate Atlantis off the coast of Spain, around the Caribbean Sea, or even in the Antarctic region. Some suggest that Atlantis may have been a submerged part of the land, such as Doggerland, an area that connected Britain to mainland Europe before it was flooded by the waters of the North Sea.

In 2011. A group of Spanish and American scientists claimed to have discovered the ruins of Atlantis in a swampy area in southern Spain. Using advanced radar technology, the researchers discovered underground structures that resembled Plato's descriptions of Atlantean architecture. However, despite sensational headlines in the media, there was insufficient evidence to conclusively confirm the discovery.

Modern technologies in the service of exploration

Thanks to advances in technology, the modern search for Atlantis has gained a new dynamic. Researchers are using advanced sonar to accurately map the ocean floor, as well as satellites and underwater drones that can penetrate previously inaccessible ocean depths where ruins of lost civilizations could be found.

One of the most famous discoveries was the news that underwater structures had been found off the coast of Cuba in 2001. Sonar images showed formations resembling ancient structures, which generated enormous media and researcher interest. The discovery fueled theories that Atlantis may have been located in the Caribbean region. Unfortunately, the research did not yield conclusive results, and work on the project was discontinued.

Other modern searches focus on the Atlantic and Mediterranean regions, where some researchers believe there may have been centers of ancient civilizations destroyed by natural disasters.

Atlantis in popular culture

Whether Atlantis really existed or is merely a myth, it has gained a permanent place in popular culture. It has become the inspiration for countless books, movies, TV series and computer games. The myth of Atlantis continues to inspire fascination and stimulate the imagination.

Science fiction literature, adventure films and even conspiracy theories - Atlantis has become a symbol of mysteries, lost civilizations and undiscovered technologies, from the novels of Jules Verne to contemporary film productions. Atlantis remains a cultural icon that fascinates both younger and older audiences.

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The future of the riddle of Atlantis

The question of the existence of Atlantis still remains unanswered. Although each new discovery creates a sensation, the lack of hard evidence leaves the mystery unsolved. Will the truth ever be discovered? Perhaps the technology of the future will make it possible to unveil the secrets that hide the still unexplored depths of the oceans.

Meanwhile, the legend of Atlantis is a reminder of the fragility of civilization and how the forces of nature can destroy even the most developed empire in an instant. It can be not only a fascinating tale, but also a warning to modern societies to be more respectful of nature and its power.

THE FASCINATING WORLD OF DIVING MOOSE

Posted on 31 October 2024 by Justyna Błach-Sachnik

The Great Lakes are not only stunning landscapes and an abundance of flora and fauna, but also phenomena that can infuriate even seasoned nature lovers. Among their inhabitants are moose, which gracefully plunge as deep as 5 meters. What prompts these majestic animals to explore the underwater depths? What secrets are hidden in the waters of the Great Lakes? We invite you to discover their mysterious world.

Categories: From the world, In this issue, Issue 20/2024

Tags: diving, Great Lakes, moose

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The world of diving moose - land giants in an aquatic kingdom

The Great Lakes are teeming with life, but it's the moose - proud, massive, seemingly typically terrestrial creatures - that attract attention as guardians of these aquatic kingdoms. Although they appear to have been created for quiet wanderings on land, they surprise with their impressive adaptations: they plunge into the depths in search of food, diving to depths that remain unreachable for other land mammals. It's not only an unusual sight, but also a nifty way to survive - a strategy written into their nature, allowing them to use lakes as an abundant larder, accessible only to a few.

Why do moose dive?

Moose dive mainly in search of food, and their underwater menu is full of delicacies. In the Great Lakes they can find the real treats - algae. It is these green underwater plants that provide them with valuable nutrients such as proteins and minerals that support their health and fitness.

Moose can dive to 5.5 meters, and sometimes even deeper! This kind of skill is no accident. During their underwater safari, they can swim more than 19 km, exploring the bottom of lakes in search of plants. Even a very young moose calf is able to follow its mother during a long swim, occasionally resting its mouth on her. It's a beautiful sight that shows the strong bond between parent and offspring, and also demonstrates the importance of survival skills.

However, diving is not just about finding food. Moose use the waters as a natural way to cope with the heat. When the heat is pouring from the sky, a dip in the cool water is the perfect way for them to refresh themselves. Also during the summer season, when insects are at their most insistent, water becomes a refuge for them. In addition, these majestic animals often go to islands to avoid predators. Female elk in particular, when they give birth to cubs, seek such refuges to keep their offspring safe in the first days of life.

The wonderful ecosystem of the Great Lakes

The fauna of the Great Lakes is a veritable mosaic of life - from tiny, almost invisible plankton organisms that float in the water, to large predators among the fish, such as the popular walleye (American pikeperch). But life is not only underwater. Gulls and cormorants flit along the shores, and ospreys wheel in the air, for which the lakes are a table full of life. Coastal wetlands provide ideal breeding conditions and are a reservoir for many species of waterbirds. The diversity of the Great Lakes attracts researchers and nature lovers who continue to discover the mechanisms that regulate life in one of the largest freshwater ecosystems on Earth

What makes moose capable of diving?

The diving abilities of elk are the result of evolutionary adaptation. These animals have been equipped with long legs and special hooves that help them navigate through underwater vegetation. Moose can hold their breath for up to 30 seconds, which allows them to move freely in the water.

They are also able to close their nostrils, which allows them to feed on the bottom. This is possible due to the pressure difference between water and air. The breathing rate of a swimming moose slows down, which allows them to stay under the surface for longer periods of time. Moose spend a great deal of time in the water, which prolongs their lives. Standing in it all day relieves stress on bones and joints, thereby reducing the risk of osteoporosis and inflammation.

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Moose and algae, or an unusual symbiosis

Algae act as major producers in aquatic ecosystems. Through the process of photosynthesis, they convert carbon dioxide into oxygen, which affects the amount of oxygen in the water that is necessary for other organisms to live. Their ability to produce organic matter forms the basis of the food chain, providing energy for various groups of organisms, from small invertebrates to large mammals such as moose. Many species of algae show high sensitivity to environmental changes, including water temperature, nutrient levels and pollution, making them an important indicator of ecosystem health. Changes in algal populations can therefore signal problems such as eutrophication caused by excess nutrients, toxic pollution or the effects of climate change.

Thus, the Great Lakes are not only a place to admire moose diving for food, but also an area ideal for observing the complex interactions between different organisms, as we also wrote about in the previous issue. Therefore, it is worth delving into the mysteries of this unique ecosystem and discovering what wonders the underwater world hides.

Moose diving in the Great Lakes is a phenomenon that combines natural beauty and fascinating evolutionary adaptations. Understanding their behavior and relationship with the ecosystem allows us to appreciate the richness of nature that these remarkable areas offer. We encourage you to discover the secrets of the Great Lakes and admire their inhabitants - both on land and underwater.

LAKES STOP FREEZING AND WHY SHOULD WE CARE?

Posted on 31 October 2024 by Agnieszka Kolada

Summer is long behind us, with winter on the doorstep. Lake area residents and limnologists may be asking themselves - will the lakes freeze over this year, when and for how long? Long-term measurement series indicate that it is likely to be later and for a shorter time than in the past, if at all. A synthesis of historical lake ice cover data, combined with global climate models, indicates that by 2080, more than 230,000 of the 1.4 million lakes larger than 0.1 square kilometers could be periodically or permanently ice-free. For lakes at lower latitudes, the number of days with ice could drop by as much as 80 percent. Just why should we even care? Because these changes have critical consequences for water quality, fisheries and biodiversity, weather and climate, as well as important cultural and socioeconomic aspects of human activity.

Categories: In this issue, Issue 20/2024, Science
Tags: ice, lakes, water quality, winter

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The ice cover on the lakes is disappearing, but does it matter?

Most of the world's lakes freeze over, and the median duration of ice cover is 218 days. However, in response to climate change, the phenomenon is becoming less frequent and lasts shorter and shorter. According to scientists, the duration of ice cover has shortened by 31 days over the past 165 years, and thousands of lakes that have historically had ice cover every winter happen not to freeze at all . Over the past 25 years, the rate of ice disappearance on lakes has accelerated significantly, by as much as 45 days per century in some regions of the Northern Hemisphere.

Although the problem of shortening winter ice in lakes due to climate warming is quite well documented , including in Poland , its social, economic and environmental consequences are still poorly recognized . One reason for this state of affairs is the relatively low availability of winter limnological research, which until recently was niche in nature. This was often due to certain logistical difficulties, but also to the misconception of winter as a period of dormancy and "rest" of the ecosystem.

The disappearance of the ice caps observed in recent years and technological advances have admittedly significantly stimulated the development of winter lake studies, but our knowledge of the effects of the phenomena occurring then is still very limited. And they are very significant, and in many ways, as demonstrated by American scientists on the basis of a comprehensive review of the issue that has just appeared in the *Climate Change* section of the journal *Science* . The results of the work of Hampton and co-authors prove that the disappearance of ice on lakes is not at all indifferent to our functioning.

Ice on the lake is important for water quality

One of the consequences of the disappearance of ice cover on lakes is the reconstruction of geochemical cycles and ecological processes in them. A longer period of exposure to warm air and solar radiation causes the water to heat up faster, leading to a longer growing season and stronger summer thermal stratification. These phenomena, in turn, affect the internal dynamics of nutrients and contaminants, which are important for water quality. Faster-setting and longer-lasting thermal stratification and the lack of full spring mixing of the waters lead to rapid depletion of oxygen resources in the overlying layers (consumed, for example, in microbial decomposition processes of organic matter). When water at the sediment boundary is deprived of oxygen, nutrients (mainly phosphates) and other contaminants (e.g., some metals) trapped in the sediments are released and become bioavailable.

The mobilization of additional nutrient resources and higher temperatures, in turn, promote blooms of phytoplankton, including cyanobacteria. And the effects of their presence in lakes are well known to us. Cyanobacteria can produce toxins that adversely affect human and animal health, limiting recreational use and making it difficult to treat water for drinking purposes. Metals released from the sediment can directly threaten drinking water quality, especially if the intake is in or near an anaerobic zone. They can also bioaccumulate or biomagnify in the food chain, threatening consumers (including humans) who eat fish from these lakes. Of course, long periods of lake ice also promote deoxygenation of the bottom layers and can contribute to the release of substances bound in the sediments, but studies suggest

that water quality problems resulting from shortened periods are more severe.

All this should effectively dampen unwarranted enthusiasm for higher summer temperatures - yes, the water in the lakes will be warmer, but in all likelihood dirtier and with more frequent blue-green algae blooms.

Importance of ice for biodiversity

Lake ice forms a specific ecological niche. The prevailing conditions there are characterized by low temperatures (<4°C), relatively stable throughout the water column, limited light availability and protection from ultraviolet radiation. At the ice-water boundary and in the ice itself, specific sympagic habitats (cryophilic organisms, associated with the ice) are formed, inhabited by specific microbial communities and increasing the biodiversity of seasonally ice-covered ecosystems.

The disappearance of the ice cap changes habitat conditions, which obviously affects organisms and thus taxonomic composition and diversity. First of all, it promotes range expansion and invasions of species adapted to warmer environments, including fish, invertebrates and plants , but also strongly affects the structure of phyto- and zooplankton and bacterial communities, both in winter and during other seasons. Ice-associated organisms are an important food source for representatives of higher trophic levels, so their disappearance will have consequences for the entire trophic network. The rearrangement of biological assemblages can lead to a complete reorganization of ecosystems, likely resulting in a regime shift toward new ecological states .

The alternation of ice-covered winter periods and warm open water seasons allows cold- and warm-water fish with distinct ecological niches to coexist in the same lakes. Species native to seasonally freezing lakes have developed the necessary physiological and behavioral adaptations that organisms native to warmer regions lack. The disappearance of ice phenomena will favor species of warmer environments, leading to the withdrawal of cold-loving ones, with consequences for fish stock composition and diversity.

Some animals use the ice cover of lakes to implement critical life stages for survival, such as reproduction or migration. Therefore, the loss of ice and its associated niches can contribute to a reduction in the seasonal taxonomic diversity of biological assemblages on an annual or multi-year scale.

The importance of ice for the quality of fisheries management

Since the disappearance of the ice cover results in the reconstruction of ichthyofauna assemblages, it will not be without consequences for human fisheries management. Fish species inhabiting seasonally ice-covered lakes are often culturally and economically important. Many of them are important sources of food, and catch rates for some species (such as the common pike) are higher in winter than in summer.

Weaker ice cover, or lack thereof, can negatively affect winter fishing in a number of ways. First, access to fish in winter often depends on the longevity of the ice, and thinner and weaker cover can be dangerous and risk collapse. Second, altered ice conditions can affect the timing and success of fish reproduction. Shorter ice cover and higher winter temperatures have been linked to earlier spawning, reduced survival of eggs and larvae, and smaller gonads. Thus, fish that prefer a cooler habitat and can survive during winter periods, including culturally important cold-water salmonids, are most at risk from warmer winters.

In addition, the nutritional value of fish as a source of omega-3 and omega-6 fatty acids decreases as temperatures rise, due to changes in their food base. At higher temperatures, zooplankton and other primary consumers store less fatty substances . Consuming food with lower nutritional value can affect the metabolism and growth rate of fish at different stages of their development . This also has consequences for humans, as fish not only lose their nutritional value, but also change their taste qualities. And this can affect consumer preferences and

choices. Fish harvested from the same fisheries no longer taste the same as they used to.

The importance of ice for many socio-economic and cultural aspects of human activity

Few people are aware of how many cultural and social aspects of human activity are associated with lake ice, such as recreation (e.g. ice fishing), cultural identity, traditions and even aesthetic experiences. Many of these have quite real economic dimensions. For example, it was estimated that in 2011 anglers in the United States spent about $240 million on ice fishing equipment, and in Sweden this form of recreation generates about 0.03 percent of gross domestic product (about $880 million).

In some areas of the world, ice cover is an essential component of transportation infrastructure, especially for isolated northern communities, as well as some commercial ventures (e.g., ice roads are widely used in oil and gas exploration in the remote north).

The minimum thickness of ice safe for humans is about 10 cm of strong black ice. Historical data indicate that the period of time it lasted in this form on the lakes of the northern hemisphere averaged 152 days. When global air temperature rises by 1.5° to 3°C, this time is shortened by an average of 13-24 days, and at lower latitudes it can drop by as much as 80 percent. The quality of the ice is also changing toward white ice, which is mechanically weaker than black ice, increasing the risk of collapse and drowning. So climate change threatens the transportation infrastructure and migration routes provided by winter ice routes.

For high-mountain and alpine communities, the disappearance of ice on lakes is associated with a change in the environmental conditions that have shaped their cultural identity, social traditions and economy for centuries. Climate warming will mean a change in their way of life. Whether they will live better or worse is another question. But certainly different.

Importance of ice for climate phenomena

The presence or absence of ice on lakes is not without consequences for weather and climate phenomena. Ice cover effectively insulates lakes from the atmosphere, impeding gas exchange at the water-air interface. Lakes with longer ice cover tend to be colder at other times of the year as well, which slows temperature-dependent biological processes and has consequences for the carbon cycle and greenhouse gas emissions. There is evidence that ice cover increases carbon retention. It also delays atmospheric emissions of methane, which is converted to carbon dioxide by microbial oxidation in the presence of oxygen. Some studies also suggest that colder lakes with longer ice cover have lower annual emissions of nitrous oxide, another greenhouse gas .

Lake ice affects the global water cycle by preventing water loss through evaporation. The results of Zhao and co-authors show that global water loss by evaporation from lakes increased at a rate of 3.12 ^{km3} per year from 1985 to 2018, with 23 percent of the increase attributed to increased evaporation from open water due to the disappearance of ice cover on lakes. Although the loss also occurs above the ice cap, through sublimation, losses due to evaporation from open water are usually much greater.

Continuing trends of ice cap disappearance will increase the rate of evaporation on a global scale. And the water that evaporates from a lake may return to the Earth's surface in the form of precipitation in a completely different, sometimes very remote location. This means that the lack of ice could be a significant contributor to lake water deficits and declining mirror levels, quite commonly observed recently in our country as well.

Ice cover on the lake matters to us

Aspects and effects of the disappearance of ice cover on lakes can still be listed in abundance, although many of them are not fully recognized. Multi-year measurement series clearly indicate that lakes freeze later, thaw earlier, or both occur. The rate of ice disappearance has clearly accelerated over the past 25 years, and we can expect this phenomenon to accelerate further in the face of future climate scenarios. And this will have significant implications for the physical, chemical, biological and social aspects of freshwater systems. As a result, we may find that our favorite lake splashes and ripples beautifully in the winter, but blooms with blue-green algae in the summer, and the fish caught in it are no longer what they once were.

In the article, I used, among others. z:

1. Hampton S. E., Powers S. M., Dugan H. A., et al. (2024). Environmental and societal consequences of winter ice loss from lakes. Science 386, eadl3211, 10.1126/science.adl3211.

2. Smol J. P., Wolfe A. P., Birks J. B., et al. (2005). Climate-driven regime shifts in the biological communities of arctic lakes. PNAS, 102 (12) 4397-440, https://doi.org/10.1073/pnas.0500245102

3. Woolway R.I., Dokulil M.T., Marszelewski W., et al. (2017). Warming of Central European lakes and their response to the 1980s climate regime shift. Climatic Change 142: 505-520.

4. Choiński A., Ptak M., Skowron R., Strzelczak A., (2015). Changes in ice phenology on Polish lakes from 1961 to 2010 related to location and morphometry. Limnologica, 53, 42-4. https://doi.org/10.1016/j.limno.2015.05.005.

5. Rahel F.J., Olden J.D., (2008). Assessing the effects of climate change on aquatic invasive species. Conserv Biol. 22(3): 521-33. doi: 10.1111/j.1523-1739.2008.00950.x.

6. Hayden B., Harrod C., Sonninen E., Kahilainen K. K., (2015). Seasonal depletion of resources intensifies trophic interactions in subarctic freshwater fish communities. Freshw. Biol. 60, 1000-1015. doi: 10.1111/fwb.12564.

7. Schneider T., Grosbois G., Vincent W. F., Rautio M., (2017)Saving for the future: Pre-winter uptake of algal lipids supports copepod egg production in spring. Freshw. Biol. 62, 1063-1072. doi: 10.1111/fwb.12925.

8. Taipale S. J., Pulkkinen K., Keva O., et al. (2022). Lowered nutritional quality of prey decrease the growth and biomolecule content of rainbow trout fry. Comp. Biochem. Physiol. B Biochem. Mol. Biol. 262, 110767. doi: 10.1016/j.cbpb.2022.110767.

9. Kortelainen P., Larmola T., Rantakari M., et al, (2020). Lakes as nitrous oxide sources in the boreal landscape. Glob. Change Biol. 26, 1432-1445. doi: 10.1111/gcb.14928.

10. Zhao G., Li Y., Zhou L., Gao H., (2022). Evaporative water loss of 1.42 million global lakes. Nat. Commun. 13, 3686. doi: 10.1038/s41467-022-31125-6.

MEASLES, OR THE THING ABOUT FRESHWATER MEGAFAUNA

Posted on 31 October 2024 by Adam Kapler

In Water Matters we have repeatedly pointed out the growing problems with the relatively large animals of marshes, lakes and rivers. There has been mention of sizable fish as a kind of climate rescuers and indicators of the good condition (in this case: connectivity) of rivers; we have sounded the alarm about the extinction of more species of freshwater dolphins and fish; we have shown the multiple effects of beaver-builder management. The largest representatives of freshwater fauna are becoming more numerous and more frequently seen, but unfortunately not in their original habitat, but mainly in aquacultures and zoos. Work is underway to domesticate a number of species, from giant salamanders to caimans - not to mention fish!

Categories: Issue 20/2024, Science
Tags: fauna, lakes, marshes, rivers

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Not only on land and not only in the ice age

The term *megafauna* (from the Greek for giant animals) is used almost exclusively at the intersection of archaeology and paleontology to refer to the largest land animals. Most of them - from mammoths and saber-toothed tigers to sack lions and varanasi-megalans - became extinct 100-40,000 years ago due to climate change, human expansion and a few other species (e.g.: the roseate crocodile in Australia and Oceania). Only a few - such as giraffes and bison - have survived to our time. Even fewer are left whose populations are recovering (e.g.: moose, beaver), or at least are stable (e.g.: Baikal seal).

In global science and zootechnics, the term megafauna is increasingly being used more broadly to refer to the heaviest marine, migratory and freshwater animals. Representatives of the oceanic megafauna will therefore be whales, giant squid, the most magnificent turtles, tunas and sharks. The inhabitants of fresh and brackish waters are much smaller. In the latter group, a body weight of 30 kg or more is considered the limit for belonging to the megafauna. This indicator usually refers to vertebrates other than birds, which, due to their pneumatic bones and air sacs in their lungs, remain noticeably lighter than mammals or fish of the same body length. A lower weight criterion would be appropriate for *Aves*. Maybe only 2 kg (the weight of many heron species)? Maybe 5 kg (the weight of a mute swan)?

Wetters wanted! In the river, lake, soup and canned food

Freshwater megafauna is receiving more and more attention. Why? Because it is a promising source of food for humans, while providing a number of ecosystem services to wildlife and the human economy. In popular science podcasts or newspaper articles, many representatives of this group are jokingly referred to as *murrelets*. In fact, their influence on the dynamics of river flows, the extent of water bodies, the physical structure and chemistry of bottom sediments, and the course of the shoreline consists in digging burrows, spreading nests, erecting dams, etc., thus, figuratively and literally, in stirring up water and the bottom .

Within the megafauna, we find both apex predators and the largest plant- and herbivores. They are linked to other organisms by a series of indirect interactions, known scientifically as *indirect trophic cascades and paratrophic cascades*. Protecting megafauna can mitigate climate change, as well as save smaller and lesser-known species. Despite growing environmental awareness, more species of the heaviest fish, reptiles or mammals are becoming extinct before our eyes. From 1946 to 2006, for example, populations of the Ganges gavial declined by 96-98 percent (from some 5,000-10,000 individuals to fewer than 250) . We summarized the most recent losses among freshwater dolphins and fish (including particularly impressive ones like the Yangtze sturgeon and Chinese paddlefish) in *Aquatic Affairs* .

Ludoist or heroine?

However, not everyone is looking for *the murrelets* to get to know them better and save them for future generations. The more people settle on the water' s edge, the more frequent and the fiercer the conflicts between *Homo sapiens* and animals become. In *Water Matters* we have already written more than once about real and imaginary problems with the beaver and cormorant in Poland. There are growing reports of fatal

attacks on humans by hippos. River dolphins, especially the pink ones, are blissful on a computer screen, but in reality they can severely injure.

In the United States, the presence of crocodile destroyfish is becoming a pressing socio-political issue, dividing society as much as attitudes toward tigers in India or wolves in the EU. Some see these fish as a deadly threat to bathing children and hard-working fishermen (as well as pests that tear up fishing nets, gnawing up the catch, not to mention poisonous eggs for humans). For the second, the crocodile destroyer is an irreplaceable regulator of the abundance of other species, a pillar of the entire ecosystem, and a symbol of river and wetland conservation. For thirds, it is a forward-looking slaughter species, the breeding of which will put less of a strain on the environment than the aquacultures of other predatory fish that lack the ability to breathe atmospheric air .

Holes in embankments, gaps in knowledge

River and lake megafauna are generally declining, while scientific papers about them are increasing. Unfortunately, the literature documenting the ecology of this group is as out of balance as a river after a golden algae bloom. There is no shortage of works on animals crucial to wildlife, drought prevention or flood safety in highly developed countries, such as beavers, sturgeons and noble salmon. Much attention is paid to flagship species of national parks and zoos that will probably become extinct in our lifetime despite millions of dollars spent on their protection, like Javan rhinos, or became extinct a few decades ago, like the Thai barasinga .

Instead, there is a lack of works on megarabs (weighing more than 30 kg), mega turtles (e.g.: arrau) and crocodiles of the Global South. Little attention has been paid to a synthetic assessment of the impacts of all megafauna on biotopes (non-living nature). A reliable assessment of the impact of the heaviest animals on ecosystems, climate and economics is hampered by the shrinking ranges of megafauna, the decline in numbers, and the loss of record-breaking large (usually, therefore, the most prolific) individuals .

Sometimes the oldest fishermen no longer remember what species were in their waters just a few hundred years ago, or how huge the fish, "mud devils" or caimans still caught today, as long as they could reach maturity. (We, too, were amazed, looking at some of the catfish and pike spawners that died during blooms in the Oder River...). Filling these gaps in the knowledge of scientists, ranchers, and environmental engineers, and then whole societies, will improve the protection of human life and property.

It should also make a significant contribution to improving food security, as well as mitigating the undesirable effects of climate change. Even with us in the European Union, we have a lot to explore! And to implement! Methods to mitigate beaver-human conflicts, such as nets to protect dikes and dykes of fish ponds, as well as repellents and electric fencing to protect fish ponds from otters, are waiting to be developed .

That's the biggest embarrassment to make two want to do it at once!

Dozens of representatives of freshwater megafauna are much more numerous today than they used to be, as well as entering new areas. However, this is true of human-reared species - from sturgeon, salmon and carp, to giant salamanders and many alligators, to water buffalo and Canadian beavers .

Some have become extinct within their former homelands, while others are well on their way to extinction. The effects of their domestication on native wildlife, the economy and human health have still not been fully studied. In the case of certain taxa, like the Amazonian arapaima and the giant salamanders of the Far East, only domestication has shown that we are dealing with several distinct species. Although they look and taste identical from a human perspective, reproductive isolation separates them.

Offspring of different evolutionary lines will be infertile or will not arise at all. Careless introductions or tolerating escapes from aquacultures of reproductively isolated forms, while occupying the same ecological niches, brings deplorable consequences for native populations of their relatives. A prime example is the giant salamanders of Japan, increasingly displaced by their cousins from China. Although the importation and release of these giant Chinese amphibians in the Land of the Cherry Blossom is absolutely prohibited by law, it is nevertheless quite common . In South America, on the other hand, the selection of new varieties of arapaim encountered unexpected difficulties when specimens from distant river basins proved mutually infertile .

Fish bite best in murky water. Especially in a new place

While *coarse fish* are declining in their original homelands, some are doing surprisingly well in new places. Nearly half of the 134 freshwater megrims that have survived to this day have been deliberately used to stock remote river basins where they have never been found before. Some 70 percent of these acclimatizations have been permanently successful - self-renewing populations have been established, capable of continuing to survive without human assistance and even despite increasing human pressure. As you can easily guess, this was not good news for native species of fish, invertebrates and seaweeds.

Scientists have identified about 10 different mechanisms by which alien megarabs devastate established native wildlife. The most readily apparent are predation, herbivory and competition. In addition, there are interspecies interactions that are more difficult to study, such as the spread of diseases and parasites, loss of spawning and wintering grounds, disruption of nutrient cycling necessary for other species, and finally hybridization leading to infertile or poorly adapted to local conditions hybrids .

In the article, I used, among other things. z:

1. Alfaro, R., Gonzales, C., Ferrara, A. (2008). Gar biology and culture: status and prospects. Aquaculture Research, 39, 748-763.

2. Carvajal-Vallejos, F. M., Carolsfeld, J., Montellano, S., Koop, B., & Nelson, J. (2023). Looking for a home in foreign waters: population genetic structure of the introduced Arapaima gigas in Bolivia. Neotropical Hydrobiology and Aquatic Conservation, 4(1), 27-44.

3. Chen, X., Jähnig, S. C., Jeschke, J. M., Evans, T. G., & He, F. (2023). Do alien species affect native freshwater megafauna? Freshwater Biology, 68(6), 903-914.

4. Chen, X. (2024). Freshwater megafauna in a changing world: An alien species perspective (Doctoral dissertation) https://refubium.fu-berlin.de/bitstream/handle/fub188/43408/PhD%20thesis_Xing%20Chen_30.04.2024.pdf?sequence=1

5. Du, K., Wuertz, S., Adolfi, M., Kneitz, S., Stöck, M., Oliveira, M., ... & Schartl, M. (2019). The genome of the arapaima (Arapaima gigas) provides insights into gigantism, fast growth and chromosomal sex determination system. Scientific Reports, 9(1), 5293.

6. Fukumoto, S., Ushimaru, A., Minamoto, T. (2015). A basin-scale application of environmental DNA assessment for rare endemic species and closely related exotic species in rivers: a case study of giant salamanders in Japan. Journal of Applied Ecology, 52(2), 358-365.

7. He, F., Svenning, J. C., Chen, X., Tockner, K., Kuemmerle, T., le Roux, E., ... & Jähnig, S. C. (2024). Freshwater megafauna shape ecosystems and facilitate restoration. Biological Reviews 99, 1141-1163.

8. He, F., Thieme, M., Zarfl, C., Grill, G., Lehner, B., Hogan, Z., ... & Jähnig, S. C. (2021). Impacts of loss of free-flowing rivers on global freshwater

megafauna. Biological Conservation, 263, 109335.

9. He, F. (2019). Diversity and risk patterns of freshwater megafauna: A global perspective (Doctoral dissertation) https://refubium.fu-berlin.de/bitstream/handle/fub188/25169/Thesis_Fengzhi_He.pdf?sequence=3 .

10. James, D., Contreras-Sanchez, W., Solomon, D. (2012). Development of More Sustainable Practices for the Culture of Gars and Other Air-Breathing Fish. Vol. 27, no. 3. Oregon State University.

11. Lang, J., Chowfin, S., Ross, J. (2019) . Gavialis gangeticus. IUCN Red List of Threatened Species. 2019: e.T8966A149227430.

12. Yan, F., Lü, J., Zhang, B., Yuan, Z., Zhao, H., Huang, S., ... & Che, J. (2018). The Chinese giant salamander exemplifies the hidden extinction of cryptic species. Current Biology, 28(10), R590-R592.

AQUATIC PUBLICATION REVIEW (28)

Posted on 31 October 2024 by Iwona Szyprowska-Głodzik

Water is one of the most precious resources on Earth, and climate change, pollution and intensive use of natural resources are forcing us to find new solutions to protect it. From innovative purification technologies to satellite tools that monitor droughts to methods of flood forecasting and water ecosystem protection, science is constantly providing new ideas. In this review of publications, we discuss research that introduces novel approaches to water conservation. From effective treatment using biocarbon and wood chips, to advanced drought monitoring using satellite technology, to comparing artificial intelligence methods in accurate flood forecasting. We also highlight the ways in which fishing communities are adapting to changing climatic conditions and the difficulties of monitoring food resources in river ecosystems.

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Water is one of the most precious resources on Earth, and climate change, pollution and intensive use of natural resources are forcing us to find new solutions to protect it. From innovative purification technologies to satellite tools for monitoring droughts to methods for predicting floods and protecting aquatic ecosystems, science is constantly providing new ideas.

In this review of publications, we discuss research that introduces novel approaches to water conservation. From effective treatment using biocarbon and wood chips, to advanced drought monitoring using satellite technology, to comparing artificial intelligence methods in accurate flood forecasting. We also highlight the ways in which fishing communities are adapting to changing climatic conditions and the difficulties of monitoring food resources in river ecosystems.

1. study combines woodchips and biochar to clean water of pharmaceuticals, nutrients

University of Illinois College of Agricultural, Consumer and Environmental Sciences (2024), Study combines woodchips and biochar to clean water of pharmaceuticals, nutrients. Science Daily.

Faced with the growing problem of water pollution from pharmaceuticals and excess nutrients, scientists have developed an innovative treatment method using a combination of wood chips and biocarbon.

This combination can effectively reduce pollution levels. Due to its porous structure, biocarbon has a large adsorptive surface area, which facilitates the retention of contaminants. Wood chips, on the other hand, are a natural material that supports the purification process by increasing the efficiency of the biocarbon. The results of laboratory and field tests suggest that this method could find wide application in practice, especially in agricultural areas where pharmaceuticals and nutrients are often flushed into ground and surface water.

2. A new Multivariate Drought Severity Index to identify short-term hydrological signals: case study of the Amazon River basin

Lenczuk A., Ndehedehe C., Klos A., Bogusz J. (2024). A new Multivariate Drought Severity Index to identify short-term hydrological signals: case study of the Amazon River basin. Remote Sensing of Environment, 315, 15, 2024, 114464.

The Amazon basin has begun using an innovative Drought Severity Index (MDSI), which uses advanced satellite data and GPS observations to monitor hydrological changes. The index analyzes the vertical displacement of the Earth's crust with the help of GPS measurements, as well as data from the GRACE mission, which tracks changes in the Earth's gravitational field, allowing precise assessment of water resource levels. The MDSI shows high consistency with traditional climate indicators such as the Standard Precipitation Index (SPI) and the Drought Index (SPEI), but offers the ability to analyze hydrological dynamics.

The index is based on an advanced mathematical model, the Frank Dome, which combines GPS-DSI and GRACE-DSI data, enabling the identification of hydrological events with higher accuracy than traditional methods. MDSI can extract more drought and flood events, providing a detailed picture of the water situation in the Amazon region. In addition, the new index has proven to be highly consistent with actual river flow data, demonstrating its reliability and accuracy. The use of MDSI gives specialists a more comprehensive tool for analyzing extreme hydrological events, which is crucial for water resources management and decision-making in the face of climate change in the Amazon region.

3. reservoir-based flood forecasting and warning: deep learning versus machine learning

Sooyeon Yi, Jaeeung Yi (2024). Reservoir-based flood forecasting and warning: deep learning versus machine learning. Applied Water Science (2024) 14:237.

Floods are one of the most serious water-related hazards, especially in areas prone to rapid precipitation or snow melt. Traditional forecasting methods, based on hydrological models, are often too imprecise to effectively predict their timing and intensity. Developments in artificial intelligence are opening up new opportunities for flood forecasting, particularly through the use of deep learning and machine learning technologies.

The study, published in *Applied Water Science*, focuses on improving flood forecasting in urban areas. It was conducted in the Han River Basin in Seoul, South Korea, to compare the effectiveness of several flood forecasting models based on data from different watersheds. The authors tested both non-depth learning (random (RF) and support vector regression (SVR)) and deep learning (LSTM and GRU) models, with the best results using GRU in a scenario involving three reservoirs with long lead times.

The study's authors concluded that the optimal approach is to use a two-stage forecast model: initial forecasts should be based on data from several reservoirs to ensure a long lead time, while closer to the anticipated flood event, more accurate forecasts can be based on a single reservoir. This approach enables faster issuance of warnings and better preparation for potential evacuation, allowing authorities to respond more effectively and reduce the risk of flooding and damage to urban areas.

4. Not All Those Who Wander Are Lost - Responses of Fishers' Communities to Shifts in the Distribution and Abundance of Fish

Papaioannou E.A., Selden R.L., Olson J., McCay B.J., Pinsky M.L. and St. Martin K. (2021) Not All Those Who Wander Are Lost - Responses of Fishers' Communities to Shifts in the Distribution and Abundance of Fish. Front. Mar. Sci. 8:669094.

Climate change is not only affecting terrestrial ecosystems, taking the form of drought or flooding, but also marine environments, where changes in temperature and water levels have a direct impact on the behavior of marine organisms. Fishing communities, which have benefited from the resources of the seas and oceans for generations, are facing challenges related to fish migration, changes in fish abundance and fishing conditions.

A new study shows how fishermen can adjust their fishing practices using spatial mapping of the sea. The technology allows them to track changes in marine ecosystems and select fishing sites to minimize their environmental impact. Spatial mapping takes into account changes in water temperature, resource availability and fish migration, allowing fishing communities to better plan their activities and avoid areas at risk of overfishing. Adapting to changing climate conditions is crucial to the future of fishing and the sustainable use of marine resources.

5. food for fish: Challenges and opportunities for quantifying foodscapes in river networks

Ouellet V., Fullerton A. H., Kaylor M., Naman S., Bellmore R., *et al.* (2024). Food for fish: Challenges and opportunities for quantifying foodscapes in river networks. WIREs Water. 2024; e1752.

River ecosystems play a key role in maintaining diverse food chains, providing food resources for fish. However, accurately monitoring and quantifying food resources such as plankton, small invertebrates and detritus is challenging, especially in the face of climate change. A study published in *WIREs Water* provides a detailed analysis of the difficulties encountered and the opportunities for surveying and managing food

resources in river networks.

The authors develop the concept of *foodscapes*, focusing on three key components: food abundance, availability and quality. They attempted to answer three fundamental questions: why it is difficult to estimate food availability, the consequences of uncertainty in these estimates, and what methods exist or are developing to quantify food resources. Their study emphasized the importance of accurate data and a better understanding of the role of food in fish survival, especially in the context of changing water temperatures.

Modern techniques are described, such as environmental DNA (eDNA) analysis, which allows species present in rivers to be identified from water samples. This method offers great potential for monitoring biodiversity and food resources, enabling more precise determination of food availability for fish. In addition, advanced hydrodynamic models make it possible to predict how water flows and changing river morphology affect the distribution of food in different parts of the river network.

The study's conclusions can contribute to better management of river ecosystems, as well as support efforts to protect biodiversity and sustainability of fish populations in times of climate change and increased environmental stress.