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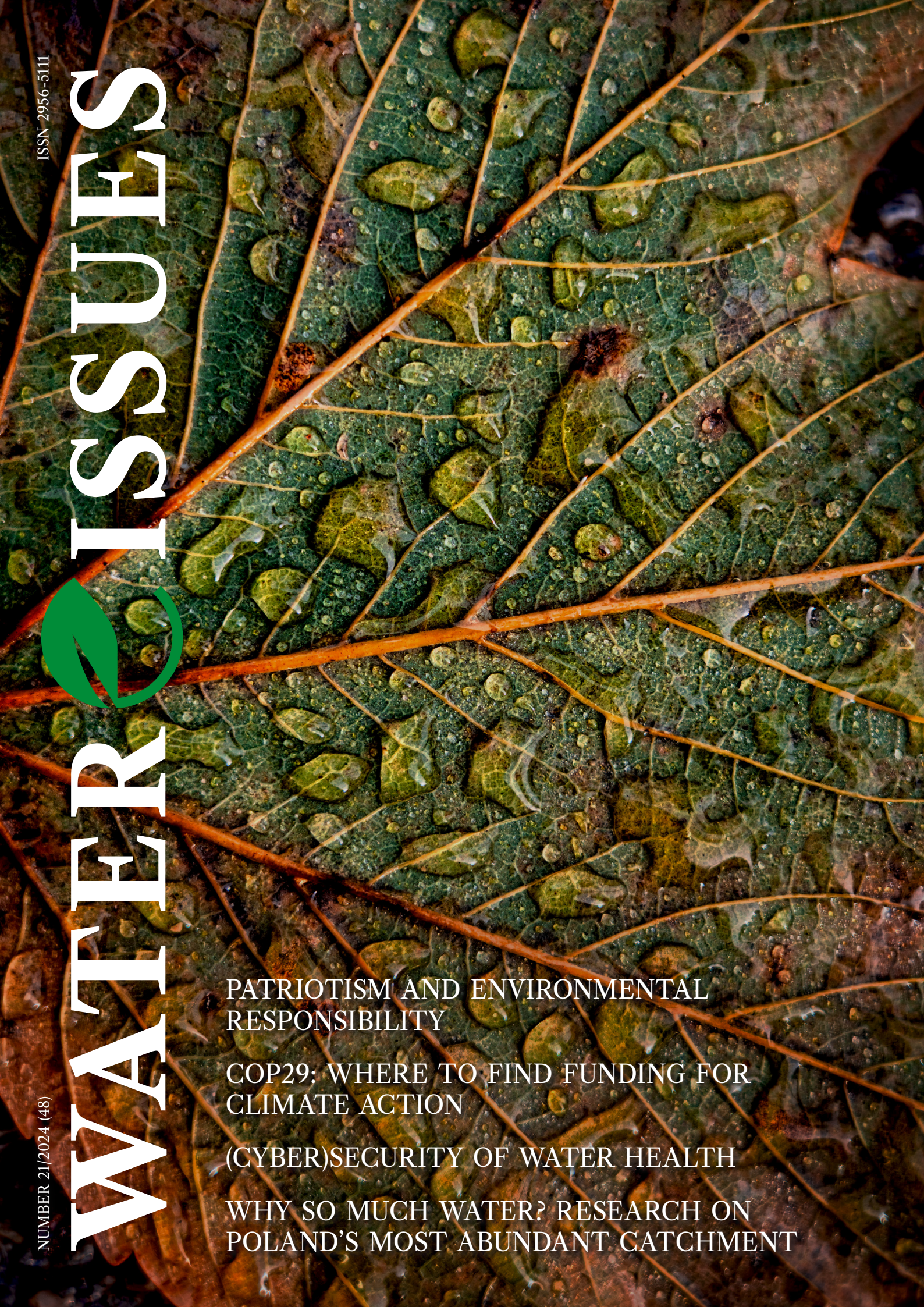

PATRIOTISM AND ENVIRONMENTAL RESPONSIBILITY

COP29: WHERE TO FIND FUNDING FOR CLIMATE ACTION

(CYBER)SECURITY OF WATER HEALTH

WHY SO MUCH WATER? RESEARCH ON POLAND'S MOST ABUNDANT CATCHMENT

STOP THE DROUGHT. WHAT IS BEHIND THIS SLOGAN?

Posted on 28 November 2024 by Zespół redakcyjny

Drought - a problem that is becoming increasingly acute, not only for farmers, but for each of us. In the face of advancing climate change, the question is no longer "if" but "how" we can effectively counter its effects. At the "Stop the Drought" conference, experts from various sectors - from government institutions to NGOs and the scientific community - discussed the most important measures we need to take to avert disaster. Is river restoration the key to success? What role can education and cooperation between different sectors play? We present the most important conclusions of the debate, which show that only joint action will allow us to meet one of the greatest challenges of the 21st century.

Categories: Issue 21/2024, News
Tags: climate change, Drought, Retention

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Is river restoration the key to success? What role can education and cooperation between different sectors play? We present the main conclusions of the debate, which show that only joint action will allow us to meet one of the greatest challenges of the 21st century.

When do we talk about drought?

Drought, according to the Natural Disaster Law, is defined as a natural disaster (an event associated with natural forces) that can escalate to a natural disaster. Hydrological drought, on the other hand, according to the International Hydrological Dictionary issued by the WMO - is a period of exceptionally dry weather, long enough to cause water shortages, as evidenced by low flow rates, lowering of the water table in lakes, a decrease in soil moisture and a decrease in groundwater levels.

Stop drought, start retention

Counteracting the effects of drought is the responsibility of the government, local governments and the Polish Waters. The key document in this regard is the Plan for Counteracting the Effects of Drought (PPSS), which is being developed by the Polish Waters as part of the Flood and Drought Protection Strategy. Work is currently underway to update this document, with completion expected in 2027.

The first conference of the PPSS update project was held today. The event, organized by Wody Polskie (Polish Water), aimed not only to inaugurate the project work, but also provided an opportunity to discuss the measures needed to counter the increasingly severe effects of drought in Poland.

Lessons from the debate - what's next?

The debate showed how complex the problem of drought is and how many areas require joint involvement - from European policy, to local action, to public education. As Joanna Kopczynska, president of Polish Waters, stressed, nature-based solutions will be considered first in the PPSS update. This aspect appeared in most of the speeches and in the final debate, during which scientists, officials and practitioners jointly considered what steps should be taken to effectively counteract the effects of the drought.

Getting involved in the process of creating the Drought Plan is possible now, before the final document, which will undergo six months of public consultation. Until December 2, 2024, conference participants can submit their expectations for the aPPSS under development by filling out the form available at stopsuszy.pl.

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pic. main: Wody Polskie

UN PREPARES FIRST-EVER TREATY TO CURB PLASTIC POLLUTION

Posted on 27 November 2024 by Agata Pavlinec

Categories: News, Issue 21/2024
Tags: plastic, polution

In the South Korean city of Busan, the final round of negotiations to reduce plastic pollution has begun. Under the leadership of the United Nations Environment Programme (UNEP), representatives from 170 countries and over 600 organizations are participating. The goal is to finalize a treaty aimed at reducing the burden of plastics on the world. However, achieving consensus will not be easy.

Two years of negotiations

The discussions in Busan, held from November 25 to December 1, mark the fifth session of the UN International Negotiating Committee (INC-5). The first round took place in Uruguay in 2022, followed by sessions in Paris, Nairobi, and Ottawa. Now, South Korea serves as the battleground for two opposing viewpoints: a broad coalition led by the EU and 66 countries advocating for drastic reductions in plastic pollution by curbing production, and major oil producers like Saudi Arabia and Russia opposing such limits.

In an attempt to inspire delegates, UN Secretary-General António Guterres remarked:
"Our world is drowning in plastic. Each year, we produce 460 million tons of plastic, most of which ends up discarded immediately. By 2050, there could be more plastic than fish in the oceans. Microplastics in our bloodstream are causing health issues that we are only beginning to understand."

What's on the table?

The only point of agreement among participants is that the amount of plastic in the world is becoming a colossal problem. The disagreement lies in how to tackle this issue.

According to a coalition led by Norway and Rwanda, strict global controls on the design, production, and use of plastics—particularly single-use plastics—are essential. This group includes island nations like Micronesia, whose shores are already littered with tons of plastic waste. They argue for a shift away from plastics in favor of alternative, biodegradable materials.

On the other side of the table are countries advocating for tackling plastic pollution by preventing it from entering the environment, rather than limiting production. This approach is supported by industry leaders who favor transforming plastics and improving recycling methods to align with the principles of a circular economy. One particularly contentious proposal is the ban on plastic bottle caps, which many nations oppose.

Complicating matters are the recent U.S. presidential elections. Donald Trump's victory raises doubts about the U.S. joining the treaty. According to the president-elect, the United States should increase oil production, with plastic being one of its byproducts. Even before the talks began, American delegates shifted their official stance from supporting global limits to favoring national plans to reduce plastic in the environment.

Curbing plastic pollution won't be easy

The proposed treaty includes many controversial aspects that negotiators must address. Should single-use plastic products be completely banned, or merely restricted? Should the use of hazardous chemicals that enhance the functionality of plastics be prohibited? A significant challenge is also ensuring financial support for poorer countries to adapt to new regulations and retrain millions of people involved in waste collection worldwide.

UNEP Executive Director Inger Andersen openly describes this as a moment of truth, reminding participants that some synthetic materials can take up to 1,000 years to decompose in the environment, weakening ecosystems, clogging urban drainage systems, and harming human health. Without change, global plastic production could reach 736 million tons by 2040, surpassing population growth.

POLSKA MOC BIZNESU 2024 CONGRESS: SHAPING THE SOCIO-ECONOMIC FUTURE

Posted on 26 November 2024 by Katarzyna Mitrowska

Categories: Issue 21/2024, News
Tags: congress, economics

On December 2nd, the Polska Moc Biznesu 2024 Socio-Economic Congress will take place at PGE Narodowy in Warsaw – one of the most important business events in the country. The Congress brings together business leaders, representatives of public administration, non-governmental organizations, and the academic community to jointly create solutions supporting an economy based on sustainable development and social responsibility.

Organized by the Clean Air Foundation and the Foundation for Positive Ideas, the Congress emphasizes practical solutions that can be implemented in any organization. Agata Śmieja, President of the Clean Air Foundation, and the event's producer, Artur Beck, highlight the initiative's critical importance for the future of Poland's economy.

We want to show that sustainable development and environmental care can coexist with dynamic economic growth, says Agata Śmieja.

The Congress creates a space for dialogue between various sectors, fostering innovative solutions that drive development, adds Artur Beck.

Distinguished guests at the congress

This year's edition will feature prominent figures, including Tomasz Siemoniak – Minister of the Interior and Administration, Special Services Coordinator; Agnė Bilotaitė – Minister of the Interior of the Republic of Lithuania; Adam Struzik – Marshal of the Mazowieckie Voivodeship; Adam Nowak – Undersecretary of State at the Ministry of Agriculture and Rural Development; Paweł Gancarz – Marshal of the Dolnośląskie Voivodeship; Katarzyna Kierzek-Koperska – Member of Parliament; Wojciech Kostrzewa – President of the Polish Business Council; Rafał Dutkiewicz – President of Employers of Poland; Małgorzata Adamkiewicz – CEO of Adamed; and Rafał Sonik – entrepreneur, athlete, and philanthropist.

Honorary patronages and academic support

The Polska Moc Biznesu Congress is under the honorary patronage of the Ministry of Industry, the Ministry of the Interior and Administration, the Ministry of Infrastructure, and the Ministry of Funds and Regional Policy. Academic partners include the University of Warsaw, the Warsaw School of Economics, the AGH University of Science and Technology in Kraków, the Warsaw University of Life Sciences, Adam Mickiewicz University in Poznań, and the Warsaw University of Technology. UNEP/GRID provides substantive patronage for the event.

Four thematic paths – BE SAFE, BE VALUE, BE SMART, BE READY

The Congress's overarching theme focuses on four key areas of the modern economy:

- BE SAFE: Addressing economic stability and security in the face of global crises. Participants will explore tools to strengthen Poland's position, discussing energy security, renewable energy sources, and building retrofitting as a means to reduce energy costs and improve air quality.

- BE VALUE: Centering on social responsibility and leveraging local resources to create economic value. Topics will include diversity, human rights, and mental health. Experts will also discuss the circular economy as a pathway to sustainable consumption and production.

- BE SMART: Preparing Poland for future challenges, including the upcoming EU presidency. Discussions will cover digitization, artificial intelligence, and technological innovations, with an emphasis on responsible data management and cybersecurity. Sustainable business practices and the role of women in shaping innovation will also be explored.

- BE READY: Focusing on civil protection and defense, outlining Poland's priorities on the European stage, developing as a regional investment HUB, and ESG policies. Experts will also address sustainable financing and migration policies, crucial for the future labor market.

Inspirational speeches and the social dimension of the congress

The Congress will feature power speakers who inspire action and offer fresh perspectives on key challenges. This year's speakers include Robert Sonik, Anna Schluz, and Bartek Czyczerski. Additionally, the *Social Stream* segment will showcase projects by non-governmental organizations supporting sustainable development and addressing social challenges.

Competition and gala ceremony

The Congress will conclude with a gala ceremony honoring the winners of the DNA – Helping is in Our Genes competition, which recognizes NGOs and companies for their contributions to building a better future. This year's edition focuses on supporting people and areas affected by the floods in southern Poland. The DNA statuette symbolizes commitment and social responsibility, serving as a prestigious recognition for those actively helping those in need. The gala will also highlight the importance of solidarity in times of crisis and inspire further charitable initiatives.

Why participate?

The *Polska Moc Biznesu 2024* Congress offers a unique opportunity to gain practical knowledge, engage in inspiring debates, and build valuable connections. This event combines innovation with responsibility, setting new directions for Poland's economic development.

For more information and registration, visit: polskamocbiznesu.pl.

ICE SWIMMING – WHAT DOES IT MEAN AND WHAT ARE THE EFFECTS OF BATHING IN COLD WATER?

Posted on 26 November 2024 by Wojciech Nowak

Categories: Issue 21/2024, News, Promocja
Tags: ice, winter

Ice swimming, or immersing oneself in icy water during the autumn-winter season, is gaining popularity in Poland as a form of recreation and physical activity. Preparing for ice swimming requires not only proper equipment but also strong mental readiness. Why is this so important?

How to prepare?

Preparing your body helps avoid thermal shock and minimizes the risk of injuries. Before taking your first plunge, it's advisable to acclimate to the cold by starting with brief showers in slightly cool water. A warm-up before entering the water improves circulation and prepares your body for the cold bath.

What accessories are needed for safe ice swimming?

Safety is a priority in ice swimming, so investing in the right accessories is essential. Many products are available on the market, and one recommended company offering ice swimming gear is **DiveFactory24**. What should you consider?

- A warm, waterproof swimsuit.
- Special water shoes to protect your feet from the cold and sharp objects.
- A quick-drying towel.
- A hat to prevent heat loss through the head.
- A thermos with hot tea for quick warmth after leaving the water.
- A mat for changing clothes to avoid contact with cold surfaces.

Using DiveFactory24's offerings, you can equip yourself with high-quality ice swimming gear, making the experience safer and more comfortable.

How does ice swimming affect physical and mental health?

Immersion in cold water can offer health benefits on multiple levels. It improves blood circulation, which is particularly important during the winter months. Regular ice swimming also strengthens the immune system, as confirmed by numerous studies. But how does it affect mental well-being?

One key benefit is stress reduction and combating depression through the release of endorphins, often referred to as "happiness hormones."

Additionally, cold baths increase adrenaline levels, boosting the body's energy.

Contraindications for ice swimming

Despite its many advantages, ice swimming isn't suitable for everyone:

- Individuals with heart conditions, high blood pressure, or respiratory illnesses should exercise caution.
- Those with chronic illnesses should consult a doctor before beginning their ice swimming journey.
- Certain medications and sensitivity to cold may also pose challenges.

Understanding your health limitations and ensuring proper precautions are crucial for safe practice.

What are the social benefits of ice swimming?

Ice swimming offers not only health benefits but also an excellent opportunity to build social connections. The growing popularity of this activity has led to the creation of numerous ice swimming clubs organizing group swims. What values can we gain from them?

Swimming in a group strengthens interpersonal bonds, lifts spirits, and fosters a sense of belonging. Participants often engage in charitable activities, such as swimming for good causes, further reinforcing the sense of community.

Effects of ice swimming on skin and metabolism

Regular ice swimming can work wonders for your skin. Cold water tightens pores, promoting skin firmness and elasticity. But that's not all. Cold baths boost metabolism, supporting weight loss. They act as a natural booster, mobilizing the body to burn more calories. Thus, ice swimming can be an effective element of a healthy lifestyle and diet.

With proper preparation, ice swimming can become a safe and healthy habit.

CIRCULAR MONDAY: A SUSTAINABLE ALTERNATIVE TO THE MADNESS OF BLACK FRIDAY

Posted on 25 November 2024 by Piotr Nejman

On Monday, November 25, Circular Monday is celebrated in 40 countries worldwide, including Poland, as a global initiative promoting conscious shopping in response to Black Friday. Annually observed on the Monday preceding Black Friday, Circular Monday aims to draw attention to the problem of excessive consumption and promote more sustainable purchasing choices. The idea originated in Sweden. The event engages over 1,300 companies, organizations, and ambassadors who collectively strive to promote an alternative to the consumerist lifestyle.

Categories: Issue 21/2024, News
Tags: BlackFriday, CircularMonday, shopping

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Education and changing consumption attitudes

In contrast to mass consumption, Circular Monday encourages choosing products that are durable, easy to repair, made from recycled materials, and those that support sharing platforms and the secondary market. On this day, educational actions, events, and social media campaigns take place worldwide, aiming to shift consumption attitudes.

The campaign targets various audience groups. We cannot shift the entire responsibility for change onto consumers. It is also the role of companies and their business models, which need to evolve to support more sustainable consumption patterns. That’s why we aim to reach both consumers, promoting more sustainable purchasing attitudes, and businesses, showing that a change in business models and the way of delivering value is necessary," says Piotr Nejman from the Circular Poland Foundation, representing the initiative in Poland.

With the necessity to reduce resource use and waste generation in mind, Circular Monday is an initiative that practically promotes sustainable solutions.

How to support circular monday?

The website provides a database of companies that support the initiative and promotional materials. The social media campaign revolves around the hashtag #circularmonday and has already garnered over 74 million reactions. Everyone can participate – both by promoting the idea of Circular Monday and by implementing its principles in their lives.

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source: press release from the Circular Poland Foundation

THE DEAD SEA – A SALTY PARADISE FOR TOURISTS. WHAT ELSE DOES IT HAVE TO OFFER?

Posted on 24 November 2024 by Marta Maj

Located on the border between Israel and Jordan, the Dead Sea is considered one of the most extraordinary places on Earth. Its exceptionally high salinity makes the water buoyant, offering a unique experience that attracts tourists from all corners of the globe. The Dead Sea is actually a landlocked lake situated in a tectonic valley. It lies on the borders of Israel, Jordan, and Palestine. Positioned approximately 400 meters below sea level, it is known as the lowest point on land. The Dead Sea stretches about 50 kilometers in length and is nearly 16 kilometers wide, with a maximum depth of around 300 meters. Its water boasts a high salt concentration, reaching 340-350 g/L. The basin experiences a dry climate, with evaporation equaling the inflow of water.

Categories: Issue 21/2024, News
Tags: Dead Sea, salt water, sea, sea salt

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The Dead Sea – beloved by tourists

Health tourism around the Dead Sea has been thriving for years. Crowds flock to experience the unique properties not only of its salty water but also of the mud from the lakebed. The high salinity allows people to float effortlessly on the surface – a rare treat unavailable at any other sea in Europe. Tourists often capture photos of their baths, appearing as if they're lying on an invisible mattress. Mud baths are also popular, as the mineral-rich water and mud make the Dead Sea renowned for its health benefits.

Mud baths are particularly recommended for individuals suffering from skin conditions like psoriasis or respiratory problems. Bathing in the mineral-rich water can also relieve rheumatic pain. The local climate, characterized by high oxygen levels and low allergens, makes it a popular destination for both leisure and therapeutic trips.

https://wodnesprawy.pl/en/salt-water-in-agriculture-an-innovative-approach-to-crop-irrigation/

Health benefits vs. environmental challenges

Despite the natural wonder of the Dead Sea, it faces serious challenges that threaten its future. The lake has been shrinking for decades. This desiccation is primarily due to the extensive use of the Jordan River, its main source of water. Additionally, factors like climate change, which increases evaporation rates, have further exacerbated the issue, leading to a water level drop of several meters annually. Currently, the Dead Sea loses 1 square meter of surface area every day.

Researchers and experts, including hydrologists, ecologists, and climatologists, are working on strategies to protect the Dead Sea. Improved water resource management, including the restoration of natural water sources, is paramount. It's reasonable to expect that the countries bordering the Dead Sea should prioritize its preservation – after all, the shores of this unique lake draw tourists from around the world. Time will tell if the decisions made today will be enough to save this exceptional natural reservoir.

NAMIB – THE OLDEST DESERT IN THE WORLD

Posted on 23 November 2024 by Iwona Szyprowska-Głodzik

Categories: Issue 21/2024, News
Tags: Africa, desert, Namib

The Namib Desert, located in southwestern Africa. Its name, derived from the Nama language, means "place where there is nothing". The Namib is considered the oldest desert in the world, existing for over 55 million years. It is also characterized by its extreme climate, making it one of the driest places on Earth. The lack of water not only shapes this landscape but also defines the way of life for organisms that have had to develop unique mechanisms to survive in such a challenging environment.

Where is the Namib Desert?

The Namib Desert stretches approximately 2,000 km along the Atlantic Ocean coast, covering areas of Namibia, Angola, and the Republic of South Africa. Its width ranges from 50 to 160 km, which translates to an impressive area of 160,000 km². This vast area is distinguished by a diversity of landscapes that combine monumental formations with harshness and emptiness, simultaneously requiring adaptability from every form of life.

Namib is a place full of contrasts. Particularly noteworthy are some of the world's highest dunes, reaching up to 300 m in height, such as those in the famous Sossusvlei valley. The intensely red color of the sand, which changes depending on the time of day, is the result of high iron content and millions of years of oxidation processes. The uniqueness of this landscape is complemented by Deadvlei – a valley of a dried-up river that once teemed with life, but today captivates with the ascetic beauty of dead acacia trees standing there for about 600 years.

Mists – a source of life in the desert

Although Namib is one of the driest regions in the world, water also plays a role here. The main source of moisture comes from mists flowing from the Atlantic Ocean, caused by the cold Benguela Current. The mists deposit on the surfaces of plants and bodies of animals, allowing them to collect and store precious water.

Temperatures in the desert show huge fluctuations. Along the coast, they are moderate, ranging from 9 to 20°C, while inland they can exceed 45°C during the day and drop below zero at night. The annual rainfall totals are very low, ranging from only 2 to 85 mm depending on the part of the desert. Nonetheless, the mists provide enough moisture to allow some organisms to function. Research on this phenomenon has inspired scientists to develop water collection technologies that can be used in other dry regions of the world.

Adaptation to life in xxtreme conditions

Although the Namib Desert may seem harsh and almost lifeless, it is home to many unique forms of life. As many as 180 species of plants and animals are endemic, meaning they do not occur anywhere else in the world.

One of the most distinctive examples is the Welwitschia mirabilis – a plant that can live for up to 2,000 years. Its long, ribbon-like leaves draw moisture from the mist, and its roots reach deep to draw underground water.

In the animal world, the fog beetle attracts attention with its unique method of collecting water. Water condenses on its carapace and then

flows directly into its mouth. Similar adaptive abilities are shown by mammals, such as oryxes, which can regulate their body temperature, minimizing water loss, and black-backed jackals, adapted to obtaining food in such difficult conditions.

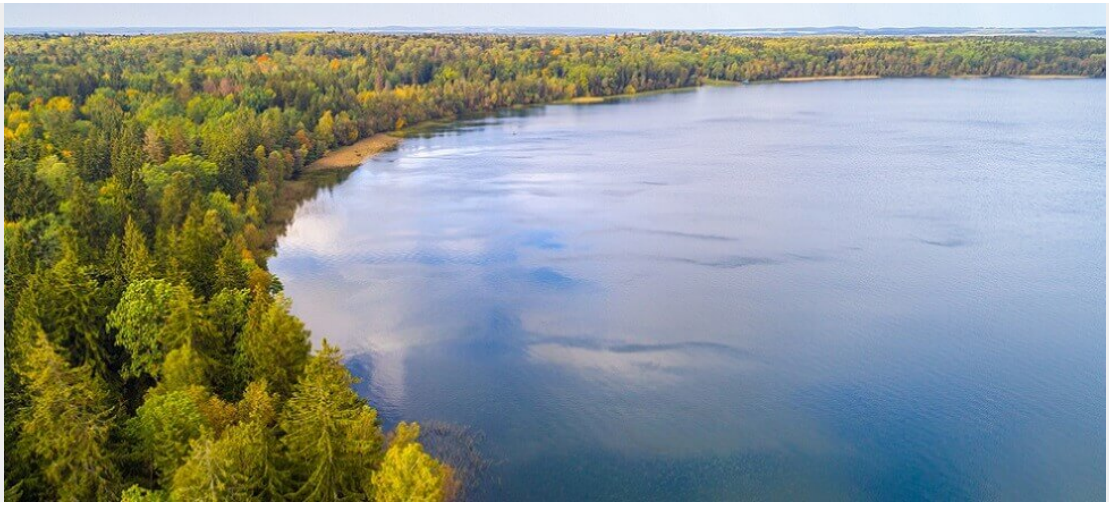
https://wodnesprawy.pl/en/flood-in-the-sahara-how-is-it-possible-in-afric/

Protection of the Namib Desert

In 2013, part of the Namib Desert, including the Namib-Naukluft National Park, was listed as a UNESCO World Heritage site. This decision highlights the immense importance of protecting this unique ecosystem. The Namib not only reveals interesting chapters in the geological history of our planet but also serves as an inspiration for scientists and technologists, motivating them to develop innovative solutions for surviving in extreme conditions.

ŚWITEŹ – LAKE FULL OF LEGENDS

Posted on 22 November 2024 by Iwona Szyprowska-Głodzik



In the heart of ancient Lithuania, amidst vast forests and picturesque meadows, lies Lake Świteź – a place that has intrigued with its extraordinary aura for centuries. Located near Nowogródek, it is one of those spots on the map that combines the richness of nature with a mysterious past. It is here that history intertwines with legend, creating a tale that inspires artists, researchers, and travelers. The lake gained immortal fame thanks to the ballad by Adam Mickiewicz, but its history goes much deeper, harboring countless stories passed down through generations.

Categories: Issue 21/2024, News
Tags: lake, legend

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Lake Świteź – a natural phenomenon

Lake Świteź, situated in Belarus on the border of the Nowogródek and Korelichi districts, is one of the karst jewels of this region. Formed by the collapse of earth into an underground void, it has a unique, funnel-shaped form close to a circle and lies at an altitude of 258 m above sea level. It is a small reservoir with an area of about 2.5 km^2 and a maximum depth of 15 m.

The lake is not fed by any major rivers and only the Sworotwa stream flows out of it. The flora of Lake Świteź is characterized by the presence of relict plants such as the lobelia dortmanna and the one-flowered wintergreen, which is the only known location in Belarus for the latter. In the waters of the lake, tench dominates, adapting to the low acidity of the water, which acts as a barrier for other fish species.

Google maps

Since 1970, the lake and its surrounding area have been protected as part of the Świteźian Landscape Reserve. Stanisław Lorentz, who in 1930 led to the recognition of the lake as a monument, contributed to the preservation of its unique nature and landscape. Today, the lake is a popular recreation spot, with amateur fishing allowed.

The legend of the sunken city

The greatest fame of Lake Świteź owes to its legend, immortalized by Adam Mickiewicz in the ballad Świteź. This extraordinary tale of a sunken city and its inhabitants is the essence of the romantic spirit, where reality interweaves with metaphysics. According to accounts, in the place of today's lake, there once was a prosperous city. Its residents led peaceful lives until enemies from Rus invaded the land.

According to legend, when the Russian troops besieged nearby Nowogródek, then the capital of Lithuania, Grand Duke Mendog asked for help from Tuhan, the ruler of Świteź. Although Tuhan faced a difficult choice, whether to rush to the aid or stay and defend his own city, he decided to help Mendog, leaving only women, children, and the elderly in Świteź. Soon after, the city was attacked by victorious Russian troops. According to the story, when the enemies captured the city, its residents, not wanting to surrender, turned to God for help. In response to their prayers, the earth opened up, swallowing the city and creating the lake in its place.

This dramatic story has become the basis for local beliefs, including about the lobelias, white flowers that appeared on the lake as a symbol of the residents' sacrifice. These plants, called car ziele by the locals, have become a symbol of a curse for anyone who tries to pick them, reflecting the continuity of spirit and courage of the former city.

According to other accounts, the residents of the sunken city still live beneath the surface of the lake. On quiet nights, one can hear their songs, and the moonlight sometimes brings out mysterious figures – the ghosts of the drowned.

Mickiewicz's ballad added a poetic glow to this legend, portraying the sunken inhabitants as defenders of the honor and purity of their land. Their tragic fate, combined with their extraordinary sacrifice, made the tale of Świteź one of the most beautiful myths of Polish romantic literature.

https://wodnesprawy.pl/en/atlantis-a-mystery-that-has-fascinated-the-world-for-centuries/

Mysterious rituals and unusual properties of lake Świteź

The lake, beyond its literary and natural fame, is also a place surrounded by an aura of spiritual rituals and mystical beliefs. According to local residents, nymphs called świtezianki inhabit the depths of the lake. The water of the lake, considered sacred, is reputed to have purifying properties – both for the body and the soul. Local traditions suggest that a bath in Świteź can bring relief to tired eyes and allow for spiritual rebirth.

A simple ritual of immersion in the lake, combined with meditation and the repetition of the spell: I want to see everything as it is. Let my thought be as pure and clear as the water of Świteź, has the power to free from illusions and purify the mind, enabling a better understanding of the surrounding reality. Whether such practices truly have supernatural power, or merely allow for a moment of reflection and relaxation – remains a question that every visitor to Świteź must decide for themselves.

NEW RESERVE TORFOWISKO JEZIERZBA

Posted on 21 November 2024 by Agata Pavlinec

As part of the program "100 reserves for the 100th anniversary of State Forests" in the Kuyavian-Pomeranian Voivodeship, a new reserve Torfowisko Jezierzba is being designed. Covering an area of nearly 37 hectares, it is located within the Woziwoda Forestry and is distinguished by unique natural values of supra-regional significance, including rare species of peat bogs, mosses, and vascular plants.

Categories: Issue 21/2024, News

Tags: nature reserve, peat bogs, reserve

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New reserve in the Tuchola Forests

Torfowisko Jezierzba is one of the twelve proposals submitted so far by the Regional Directorate for Environmental Protection in Bydgoszcz for social consultations within the initiative "100 reserves for the 100th anniversary of State Forests". It is worth reminding that the RDOŚ across the country have prepared projects to establish new environmental protection areas and invited citizens to submit their own comments and suggestions. In most regions, consultations take place in several rounds as more proposals are prepared.

The idea of creating the Torfowisko Jezierzba reserve is not new, however. A Polish-Norwegian research project carried out in 2021, Protection of Valuable Ecosystems of the Tuchola Forests, showed that the peat bog in the Tucholskie district has enormous natural potential and is a habitat for many endangered species and plant communities. As part of the project funded by the Environment, Energy and Climate Change Program, an inventory of natural resources and mapping of peat-forming vegetation were prepared, which served as the basis for formulating recommendations for the establishment of the new reserve.

The planned Torfowisko Jezierzba reserve has an area of 39.97 ha and a buffer zone extending over a further 67 ha. It is located within the boundaries of the Tuchola Landscape Park and the Natura 2000 area Tuchola Forests PLB220009, encompassing forests belonging to the Biała and Wilcze Doły Forest Districts.

Overview map of the Torfowisko Jezierzba reserve;

source: GDOŚ

Torfowisko Jezierzba – unique vegetation

The area designated for protection is a remnant of a former lake-peat bog complex, which was formed between post-glacial dunes. Unfortunately, intensive drainage conducted by the local population from the 19th century led to the desiccation of Lake Kloce. However, the marshes and so-called Baltic high bogs have remained in very good condition. The whole is surrounded by forests and boggy pine forests as well as meadows in the forest.

Torfowisko Jezierzba is highly diversified in cross-section—from juvenile peat bogs on the edges, through quagmires and bistort meadows, to the heart of the reserve, a peat bog with several species of peat bogs, including the very rare papillose sphagnum (Sphagnum papillosum), feathered sphagnum (Sphagnum subnitens), brown sphagnum (Sphagnum fuscum), and toothed sphagnum (Sphagnum denticulatum).

Another interesting group of rare and protected species includes bruntante mosses comprising, among others, pyriform campylopus (Campylopus pyriformis), slender haircap (Polytrichum strictum), boggy aulacomnium (Aulacomnium palustre), and tree-like climacium (Climacium dendroides). Also noteworthy are liverworts like floating odontoschisma (Odontoschisma fluitans) and Fuscocephaloziopsis macrostachya. Finally, the area of the planned Torfowisko Jezierzba reserve also boasts fascinating vascular plant species, including the carnivorous round-leaved sundew (Drosera rotundifolia), the rare in Poland swamp sedge (Carex limosa), and the bog violet (Viola epipsila), a unique relic of the ice age.

The establishment of the Torfowisko Jezierzba reserve aims to protect individual valuable species, but also four natural habitats of the Natura 2000 network. The initiative also fits into the concept of preserving and restoring wetland areas, which are a key element in combating climate change.

INVESTIGATION INTO THE CONSTRUCTION OF THE VISTULA SPIT CANAL WILL BE EXTENDED

Posted on 20 November 2024 by Agata Pavlinec

Categories: News, Issue 21/2024
Tags: Baltic, NIK, Vistula Spit

On November 18, the Regional Prosecutor's Office in Gdańsk announced the extension of the investigation concerning the implementation of the Vistula Spit canal construction project. The proceedings are being conducted at the request of the Supreme Audit Office (NIK), which in June submitted two notifications to the prosecutor's office regarding suspected crimes committed by the former Director of the Maritime Office and the former Minister of Maritime Economy.

Vistula Spit canal under the scrutiny of investigators

Let us recall that exactly a year ago, in November 2023, NIK published a report from an inspection conducted regarding the implementation of the Multiannual Program for the Construction of a Waterway Connecting the Vistula Lagoon with the Gulf of Gdańsk. According to the report, the project, with a total value of almost PLN 2 billion, turned out to be an example of mismanagement at the highest level and multiple cases of overstepping authority by state administration officials.

Critical analysis by NIK revealed that 160 out of 161 tasks of the project were completed with delays, which in some cases reached nearly six years. The project's budget was exceeded by PLN 157.7 million, and the costs of irregularities alone amounted to PLN 381,000.

As a result, NIK submitted two notifications to the prosecutor's office regarding the possibility of crimes committed during the implementation of the Vistula Spit canal project:

- by the former Director of the Maritime Office, who in 2019–2020 concluded execution contracts exceeding the program's budget by PLN 157.7 million;
- by the former Minister of Maritime Economy and Inland Navigation, who in 2016 failed to define the necessary financial and material scope of the investment and, in 2019–2020, did not inform the Council of Ministers about the increased value of the investment.

NIK accuses both officials of acting to the detriment of the public interest and proceeding contrary to applicable legal regulations.

The investigation will last until 2025

The investigation is being conducted by the Regional Prosecutor's Office in Gdańsk, responsible for the region where the negligence and potential crimes occurred. After reviewing the extensive NIK notifications, the Prosecutor decided that more time would be needed to analyze the evidence. In particular, the acquisition of supplementary documents from other ministries involved in the project and the questioning of witnesses are planned. Additionally, the appointment of an expert to assess the economic aspects of the irregularities is being considered.

By the decision of the Gdańsk Prosecutor, the investigation will be extended until April 17, 2025. So far, no charges have been brought against anyone for committing a crime, but the Gdańsk-based *Gazeta Wyborcza* suggested that the former Minister of Maritime Economy and Inland Navigation might lose parliamentary immunity.

POST-FLOOD SUPPORT FOR AGRICULTURAL HOLDINGS

Posted on 19 November 2024 by Agata Pavlinec

Categories: Issue 21/2024, News
Tags: flood, Support for farmers

On November 15th, the President of the Agency for Restructuring and Modernization of Agriculture (ARiMR) announced the call for applications for support for farms affected by the flood that hit southwestern Poland in September. Farmers will be able to apply for funding to restore the agricultural production potential—up to 80% of eligible costs.

General rules for granting aid

The funds for this support come from the Rural Development Program for 2014-2020. By decision of the European Commission, the implementation of the program's various activities has been extended to 2024. The current call concerns the sub-action "Support for investments in restoring agricultural land and restoring agricultural production potential destroyed as a result of natural disasters, adverse climatic events, and catastrophes."

Eligibility for support

Support is targeted at farmers who have suffered damage amounting to at least 30% of the average annual plant or animal production from the three years preceding the flood or three of the five years preceding the flood, excluding the highest and lowest production figures. Importantly, the extent of the damage must be assessed by a special commission appointed by the provincial governor. The territorial scope of the grant funding is limited to areas where a state of natural disaster was declared.

What investments can be made?

The support program includes investments in farm components that were destroyed or damaged solely by the September flood. In particular, funding of up to 80% of eligible costs will be granted for:

- Construction, reconstruction, or renovation of buildings (excluding buildings that require mandatory insurance);
- Purchase of equipment;
- Demolition and disposal of harmful materials related to demolition;
- Purchase of agricultural production machinery and equipment for storage, drying, and preparation for sale, including, for instance, polytunnels;
- Restoration of orchards or perennial plantations;
- Purchase of farm animals for basic herds.

Farmers who have previously received support under the RDP must remember that the maximum allowed aid for one farm in the years

2014-2020 is 300,000 PLN. Additionally, if a farm component was insured, the funding will be reduced by the amount of compensation granted. A 50% reduction in aid also applies in cases where a farmer did not enter into a mandatory insurance contract for the indicated crop types.

Detailed conditions for providing assistance

The specific conditions for providing aid are defined in the Regulation of the Minister of Agriculture and Rural Development dated March 1, 2019 (Journal of Laws from 2022, item 280, as amended).

How to apply for support for flood-affected farms?

Farmers can submit applications for aid from November 22 to December 30, 2024. Application forms are available on the ARiMR website along with a list of required attachments and instructions for filling them out. Applications can be submitted in the following forms:

- In paper at the Regional Branch or County Office of ARiMR;
- By registered mail;
- Electronically to the specified email address or through the ePUAP submission box.

It is important to note that the order of granting aid is dependent on the order in which applications are received by ARiMR. However, applicants may request the payment of an advance of up to 50% of the requested aid during the application process, which can accelerate the implementation of investments before the upcoming season.

WHY IS THE BALTIC SEA WASHING DEAD SEALS ASHORE?

Posted on 18 November 2024 by Iwona Szyprowska-Głodzik

Categories: Issue 21/2024, News
Tags: Baltic, seals

In recent weeks, dozens of dead gray seals—one of the most iconic and protected species of the Baltic Sea—have been found on the shores of Rügen and other Baltic beaches. The mass death has raised concerns among local residents and environmental organizations, which are striving to uncover the cause of this tragic event. Is it the result of human activity, climate change, or natural processes within the ecosystem? Recent studies are beginning to reveal the unsettling details of this case.

Could the seals have drowned?

Groundbreaking findings in the case of the mass death of gray seals have been provided by studies conducted by the German Maritime Museum in Stralsund and the University of Veterinary Medicine Hannover (TiHo). Experts performed autopsies on eleven dead seals found on the shores of Rügen, revealing that drowning is the most likely cause of death.

Although drowning incidents among marine mammals may seem unusual, the research suggests that these animals could have fallen victim to bycatch, meaning accidental entrapment in fishing nets. Another possibility being investigated is deliberate baiting of seals. The telltale signs supporting this hypothesis include hematomas around the head, neck, and flippers; broken vibrissae; abrasions on the head and flippers; and distinctly bloodshot, bulging eyes. Furthermore, histological examinations found food remnants in the lungs, indicating that the animals might have been feeding when they became entangled in nets, ultimately drowning due to their inability to surface for air.

Denkinger, one of the researchers involved in the investigation, points out that the absence of direct evidence, such as seals being found in nets, makes it challenging to definitively confirm bycatch as the cause of death. Nevertheless, the location and timing of these incidents suggest a link to fishing traps in the Thiessow area, which were subject to detailed investigation. While inspections of these traps have so far yielded no conclusive evidence, the increasing number of dead seals in the region hints at a more complex issue.

> *Sea Shepherd erstattet Anzeige*
> *Obduktionsergebnisse des Meeresmuseums Stralsund weisen auf einen Ertränkungstod hin. Die Organe von 3 untersuchten Robben hätten Verletzungen aufgewiesen, die typisch für Tiere seien, die sich unter Wasser verfangen haben.https://t.co/RJTMeYKIEU*
>
> *— Robby (@Robby68142735) November 15, 2024*

Dozens of dead seals near Rügen

Since October, 44 dead gray seals have been found on German beaches near Rügen—a significant blow to the local population of this species, estimated at around 200 individuals. This means the losses account for 20% of the regional population. Most of the dead animals were discovered in the towns of Haken bei Thiessow, Lobbe, and Zicker on the southeastern coast of the island. The state of decomposition of the bodies indicates that the seals died over an extended period, spanning several days. This tragedy raises serious concerns about the causes behind such a high number of deaths in a short timeframe.

Initial hypotheses – infectious diseases and human impact

Initially, it was hypothesized that the mass death of seals might have been caused by infectious diseases, such as avian flu, or other environmental stressors. Potential causes considered included anthropogenic pressures, such as chemical poisoning or the effects of construction work related to offshore wind farm installations in the Baltic Sea.

However, the Ministry of the Environment dismissed these speculations. According to their reports, autopsy results do not indicate infectious diseases or direct human impacts, such as chemical poisoning or environmental contamination. The causes of the seals' deaths remain unexplained, fueling concerns and raising further questions about the mechanisms responsible for this tragedy.

IGUAZÚ FALLS – THE POWER OF NATURE ON THE BORDER OF ARGENTINA AND BRAZIL

Posted on 17 November 2024 by Patrycja Draguć

Categories: Issue 21/2024, News
Tags: Iguazú, waterfall

Iguazú Falls, known in Spanish as *Cataratas del Iguazú* and in Portuguese as *Cataratas do Iguaçu*, is a majestic waterfall system located on the border of Argentina and Brazil. Situated on the river of the same name, Iguazú, the falls impress not only with their size but also with the spectacular surroundings of lush jungle. This extraordinary natural wonder, recognized as one of the New Seven Wonders of Nature, is listed as a UNESCO World Heritage site.

Where are iguazú falls? this place deserves a longer visit

Iguazú Falls lie within two national parks: the Argentine Iguazú National Park and the Brazilian Iguaçu National Park. The area encompasses over 275 cascades stretching across a distance of 2.7 kilometers. The most impressive of these is *Garganta del Diablo* (Devil's Throat), where water plunges from a height of 82 meters, making it taller than Niagara Falls. This site evokes incredible emotions, renowned for its breathtaking power and depth—the roar of falling water can be heard from approximately 20 kilometers away.

The Iguazú Falls were formed around 100 million years ago when magma eruptions created unique lava structures, and the Iguazú River began carving through the terrain, creating the waterfalls. The water flow varies with the seasons: the falls are most spectacular during the rainy season when water levels are immense. However, there have been exceptionally dry years, such as in 1978, when the falls were almost completely dry. But the impressive size of Iguazú Falls is just one of their many fascinating aspects.

Did you know?

One of the captivating features of the falls is their surroundings. The Argentine side offers visitors the chance to get very close to individual cascades, while the Brazilian side provides panoramic views, allowing one to take in the entire waterfall system at once. Interestingly, the name Iguazú comes from the Guarani language and means "big water," perfectly capturing the essence of this place where water seems to dominate and overwhelm everything in sight.

Iguazú Falls are undoubtedly a great natural masterpiece that astonishes all who visit. But there’s more! They have also become a cultural icon. Scenes from the 1986 film *The Mission* were filmed here. Moreover, the falls are part of a remarkable rainforest ecosystem that protects numerous species, including many endangered ones. This makes it a crucial area for South America’s biodiversity.

Seasonal water level changes in the Iguazú region

The ideal time to visit the falls is between March and June or August and October. During these months, water levels are stable, allowing visitors to fully enjoy the views, and temperatures are milder compared to the peak summer heat. During the rainy season, which occurs in January and February, the falls are at their most spectacular due to higher water flow, but heavy rains can limit visibility and access to certain attractions.

Iguazú Falls are considered among the most beautiful in the world. They amaze not only with their scale and power but also with the unique, pristine atmosphere of their surroundings, which form part of some of the most important nature reserves in South America. Iguazú captivates with its grandeur while delighting visitors with a spectacle of colors and sounds, providing undeniable evidence of nature's power.

THE LARGEST CORAL IN THE WORLD DISCOVERED

Posted on 16 November 2024 by Iwona Szyprowska-Głodzik

In the depths of the waters surrounding the Solomon Islands, a massive coral colony that had remained unnoticed for centuries has been discovered. This finding has captivated scientists and environmentalists, opening new opportunities for studying coral reef ecosystems. The impressive size of the colony and its extraordinary resilience to environmental changes prompt reflection on its survival mechanisms and the state of contemporary oceans.

Categories: Issue 21/2024, News
Tags: coral, coral reef, corals

In the depths of the waters surrounding the Solomon Islands, a massive coral colony that had remained unnoticed for centuries has been discovered. This finding has captivated scientists and environmentalists, opening new opportunities for studying coral reef ecosystems. The impressive size of the colony and its extraordinary resilience to environmental changes prompt reflection on its survival mechanisms and the state of contemporary oceans.

Gigantic size and remarkable longevity

The coral colony, belonging to the species *Pavona clavus*, known as the leafy coral, measures 34 meters in width and 32 meters in length. This discovery not only astonishes with its scale but also provides researchers with valuable data on coral adaptations to changing environments.

The coral was found at a depth of just 10 meters, suggesting that stable conditions in the region, such as moderate temperatures, low pollution levels, and minimal human impact, allowed it to thrive for centuries. While its exact age cannot be determined to the year, researchers estimate it to be between 300 and 500 years old.

Complex structure of a unique coral

The colossal *Pavona clavus* colony consists of densely intertwined coral polyps—tiny, individual organisms that together form one large structure. Each polyp is encased in a calcareous skeleton, and the entire colony grows in a complex, branched manner, resembling an underwater leafy landscape.

photo: Philippe Bourjon, CC BY-SA 4.0, via Wikimedia Commons

The coral stands out with its distinctive coloration. Shades of brown dominate, but bright spots of yellow, blue, and red are visible on its surface. This coloration results from the presence of symbiotic algae and varying mineral structures in different parts of the colony. Additionally, the coral's surface is delicately corrugated, a typical feature of this species, which also increases its biological surface area.

Unlike coral reefs, which consist of networks of multiple coral colonies, this structure is a single, autonomous colony. This means it has developed continuously over hundreds of years, without interruptions or competition for space. This unique growth form indicates favorable environmental conditions that enabled the colony to achieve such extraordinary dimensions. Its remarkable structure supports a variety of marine species, offering them shelter and food.

The path to discovery

The discovery was the result of collaboration between the National Geographic Pristine Seas team, the government of the Solomon Islands, the Ministry of Education and Human Resources Development (MEHRD), the Ocean12 consortium, and marine institutes from Australia, the United States, and local Solomon Islands organizations. The expedition aimed to identify coral reefs requiring protection and assess their condition.

During field research, the team stumbled upon the coral colony, whose size astonished even the most experienced researchers. Using underwater measurements and cartographic technologies, scientists precisely estimated the coral's dimensions. Divers manually measured the colony using tape measures to determine its diameter and height. In addition, 3D imaging technology was employed to accurately map the coral's structure and size, ensuring exceptional precision.

By combining these methods, researchers were able not only to measure the coral but also to thoroughly analyze its condition and structure, providing crucial data for further studies on coral reefs.

"Just when we think there's nothing left to discover on Earth, we find a giant coral made up of nearly a billion tiny polyps, pulsating with life and color," said Enric Sala, National Geographic Explorer in Residence and founder of Pristine Seas. "This is a significant scientific discovery, akin to finding the tallest tree in the world. But there is cause for concern. Despite its remote location, this coral is not safe from global warming and other human threats."

The largest coral in the world – protection and future research

Despite the exceptional health of the *Pavona clavus* colony, scientists warn that climate change poses a serious threat. Ocean acidification, caused by rising atmospheric carbon dioxide levels, negatively affects corals' ability to build their calcareous skeletons. Coral bleaching, a result of rising water temperatures, further weakens their survival capacity.

The discovery of the *Pavona clavus* colony provides scientists with a unique opportunity to delve deeper into the biology and ecology of corals. Detailed genetic analyses and studies of adaptive mechanisms are planned, which could provide valuable insights in the fight to save other endangered coral reefs.

CONFIGURATIONS OF PARTIES IN PROCEEDINGS REGARDING CHANGES IN WATER CONDITIONS – ARTICLE 234 OF THE WATER LAW ACT

Posted on 15 November 2024 by Piotr Tarkowski

Article 234 of the Water Law Act governs the rules concerning changes in water conditions on land, outlining the rights and obligations of landowners regarding the protection of neighboring areas from the harmful effects of such changes. According to the provisions, a landowner may not alter the flow of rainwater or meltwater in a manner that could harm adjacent properties. In cases where these rules are violated, administrative proceedings may involve a broad range of parties, including both landowners causing harm and their affected neighbors.

Categories: Issue 21/2024, News
Tags: law, water

Article 234 of the Water Law Act governs the rules concerning changes in water conditions on land, outlining the rights and obligations of landowners regarding the protection of neighboring areas from the harmful effects of such changes. According to the provisions, a landowner may not alter the flow of rainwater or meltwater in a manner that could harm adjacent properties. In cases where these rules are violated, administrative proceedings may involve a broad range of parties, including both landowners causing harm and their affected neighbors.

Parties to proceedings in cases of harmful changes in water flow

Article 234 of the Water Law Act states:

1. A landowner, unless otherwise specified by the Act, may not:
    - Change the direction and intensity of the flow of rainwater or meltwater present on their land, or the direction of water flow from springs, to the detriment of neighboring lands;
    - Discharge water or introduce wastewater onto neighboring lands.
2. The landowner is obligated to remove obstacles and changes in water flow that have arisen on their land due to accidents or third-party actions, which harm neighboring lands.
3. If changes in water conditions caused by the landowner negatively affect neighboring lands, the mayor, village head, or city president, acting ex officio or upon request, may order the landowner to restore the previous state or construct facilities to prevent harm, setting a deadline for these actions through an administrative decision.

From the literal interpretation of the quoted provision, it is clear that the number of parties in proceedings concerning harmful changes in water conditions on land affecting neighboring lands can vary. Below, I will identify and discuss these configurations.

Parties directly referenced in article 234 of the Water Law Act

It should be noted that the provision explicitly states that an individual landowner cannot introduce changes to water conditions that harm not just a single neighboring property, but neighboring lands in general. Thus, the basic configuration of parties in proceedings regarding harmful changes in water conditions is as follows: on one side, the landowner responsible for changes causing harm, and on the other side, the harmed party or parties—owners of the affected land.

This provides two potential scenarios:

1. Two parties in the proceedings – The landowner responsible for harm and the owner of the land or lands affected by harmful changes.

2. Multiple parties in the proceedings – On one side, the landowner responsible for harm, and on the other side, the owners of all the lands affected by harmful changes.

These scenarios are not merely theoretical. They are reflected in case law, where court rulings confirm such possibilities without disputing their scope. For example:

- The first configuration is illustrated in the judgment of the Provincial Administrative Court in Gliwice on May 9, 2024 (case no. II SA/Gl 145/24).
- The second configuration can be found in the judgment of the Provincial Administrative Court in Lublin on August 23, 2023 (case no. II SA/Lu 333/23).

Two additional possible configurations of parties

In addition to the above configurations, two further scenarios are conceivable:

3. Multiple parties in the proceedings – On one side, multiple landowners responsible for harm, and on the other, a single landowner or multiple landowners of the affected lands.
4. Multiple parties in the proceedings – On one side, multiple landowners responsible for harm, and on the other, multiple landowners of the affected lands.

Examples of these configurations include:

- The third scenario is reflected in the judgment of the Provincial Administrative Court in Krakow on April 24, 2024 (case no. II SA/Kr 40/24).
- The fourth scenario is illustrated in the judgment of the Provincial Administrative Court in Gliwice on September 23, 2024 (case no. II SA/Gl 1054/24).

https://wodnesprawy.pl/en/types-of-harmful-impacts-on-adjacent-land-under/

The role of the application in determining the scope of parties

It should be emphasized that proceedings concerning changes in water conditions on land affecting neighboring lands are typically initiated upon request. Such an application defines the scope of the parties to the proceedings, as it must specify the properties where harmful changes in water conditions have occurred and the lands affected by these changes. Consequently, the administrative body handling the proceedings

is bound by the scope defined in the application. Any modifications require the applicant to revise their request.

In cases initiated ex officio, the administrative body has the authority to manage the scope of the proceedings, which it may modify based on factual findings during the process. Although ex officio proceedings are rare, an example can be found in the judgment of the Provincial Administrative Court in Lublin on August 23, 2023 (case no. II SA/Lu 333/23). In this case, the village head initiated proceedings ex officio concerning disruptions to water conditions in an area west of a national road, affecting multiple properties.

PATRIOTISM AND ENVIRONMENTAL RESPONSIBILITY

Posted on 14 November 2024 by Agnieszka Hobot

I am writing this article on November 11, Independence Day, a holiday that reminds us of the strength of spirit and steadfastness of our nation. However, today I am not just reflecting on the defense of borders. I ask myself whether concern for the homeland should also include our relationship with nature. Doesn't being a patriot mean being responsible for the natural resources that are part of what we will leave behind?

Categories: Issue 21/2024, Issue topic, Onet
Tags: ecology, environment, nature, nature conservation, water

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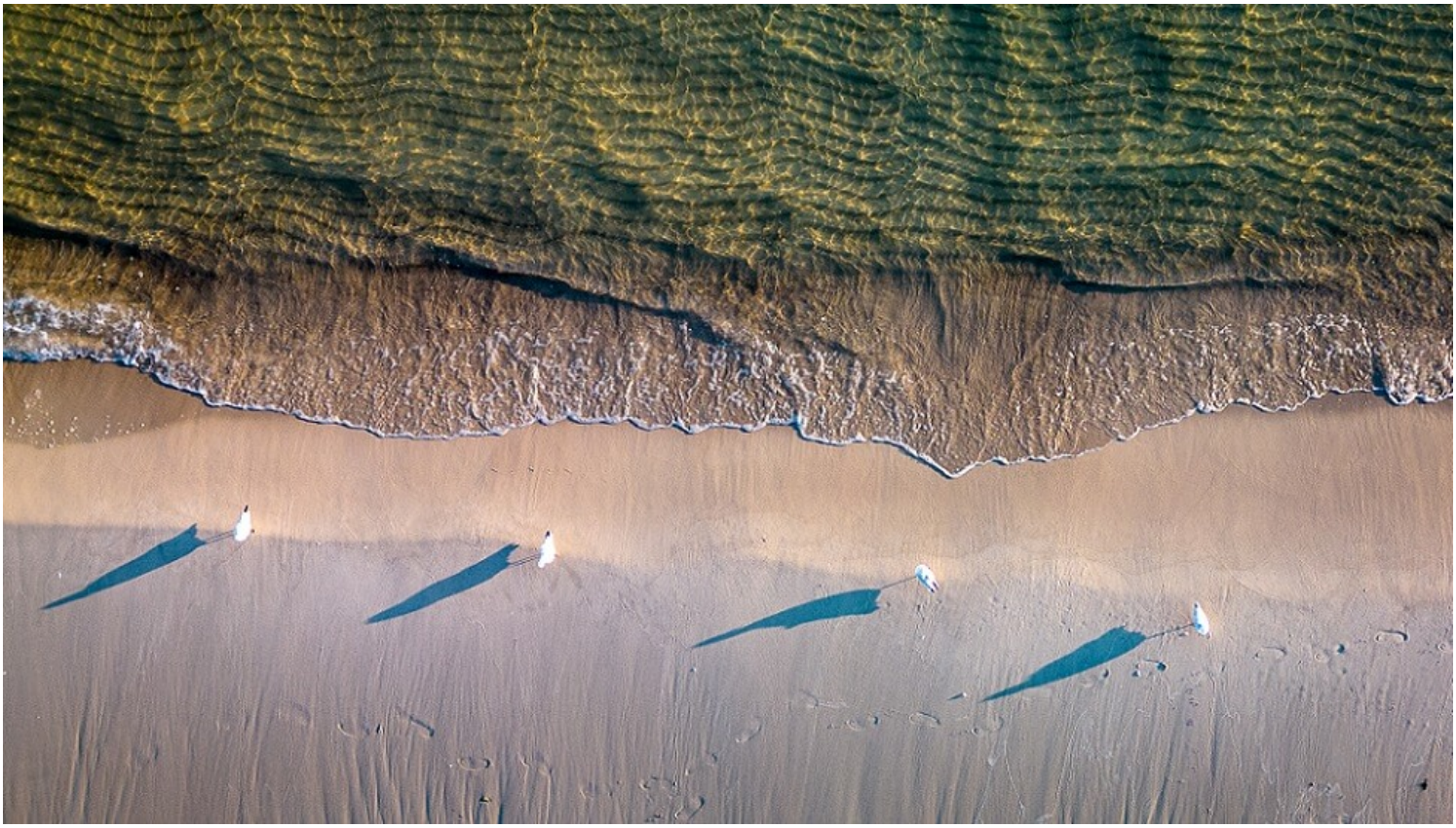
In the background of the international *battles* over the green planet, the vested interests - both of individuals and entire countries - fighting for their own vision of the future, so different in different parts of the world, are becoming increasingly clear. Recently, the media has been dominated by a fierce debate about what Donald Trump's ascension to the office of President of the United States will bring. On par with political predictions, social inequalities are resounding - the challenges we face can no longer be ignored.



pic. Dominik Litwinski

The war for a green future - who wins and who loses?

Every day we hear about more climate summits, agreements and treaties to bring solutions to global environmental problems. Currently, the eyes of the world are on COP29, taking place in Baku - an event that once again ignites hopes for a common strategy to save the planet. But how often are vested interests behind these declarations? Great promises often blur under the pressure of politics and economic calculations. Developed countries, seeking to reduce emissions, move their polluting productions to poorer regions of the world, only moving the problem further *away* from their own borders.

At COP29, these tensions seem clearer than ever. Already the first days of the climate summit reveal deep divergences: according to experts, the global North is to blame for the global South's $5 trillion a year and climate commitments from COP28 have not been met. *This year has been a masterful example of humanity's destructive actions* , the UN secretary-general stressed, warning that the effects of the global climate crisis are beginning to grow dangerously.

The battle for a green future is being waged on every continent, but visions of that future vary drastically. For some, economic survival is key, for others, climate protection remains a priority, and there are those who see it as a profit opportunity. Meetings and negotiations drag on endlessly, and the question that remains unanswered is: is it possible to develop a common global plan when visions of the future are so different?

The climate summits reveal a paradox-filled picture of a world that still does not seem to understand that fighting for the environment is not a choice, but a necessity - and that the ultimate price may be higher than any country is willing to pay.

Billionaires and the climate crisis

Recent years have highlighted inequalities in access to and conservation of natural resources. In a world where billionaires travel in private jets and generate a disproportionately large carbon footprint, ordinary people hear about the need to reduce consumption and pay environmental costs.

We've reached the point where we're not just talking about the impact of the consumption of the richest on climate change in a general way - we're also starting to count it. The British organization Oxfam revealed shocking data in its report. Between 1990 and 2019, the consumption emissions of the world's richest have reduced agricultural yields by the equivalent of enough calories to feed 14.5 million people for three decades. At the same time, the carbon footprint from just four years of the billionaires' lives is enough to cause the deaths of 1.5 million people from climate change by 2120.

The financial elite therefore has a special responsibility. Not only in the form of investing in pro-environmental technologies, but also in setting an example of curbing their own destructive actions. Is change for the better possible if the same elites who have the power of influence are often the least willing to make sacrifices? The environment is a common good, regardless of one's bank balance, but it is the privileged who can most effectively manage it - or destroy it.

pic. Alexander Skweres

Donald Trump and his vision of the world - going back in time?

Donald Trump' s return to the White House has caused deep concern among environmentalists and experts around the world. It's déjà vu for those who remember his first term - a time when the United States withdrew from the Paris Agreement and environmental regulations were significantly weakened in the name of economic interest. Now, as the incoming president announces his next actions, the question is whether a retreat to past practices is the answer to future climate challenges - and how much that return may cost us all.

Trump is known for his apparent dislike of climate policy, which he sees as unnecessary ballast for the US economy. Environmental Protection Agency (EPA) officials quoted by *The Guardian* express grave concerns that his administration will restore pressure to expand the fossil fuel industry and lower environmental standards. His previous actions have included weakening air and water quality regulations, among other things. Such decisions, as the world faces a climate crisis, carry increasingly dire consequences. Does it make sense to return to the past when the planet is crying out for innovation and adaptation?

Trump is not only shifting the U.S. climate compass, but also giving permission to other countries to do the same. In such an arrangement, the risk of a global dilution of responsibility for protecting the planet grows. The question that remains unanswered is: how long will we wait for global leadership that points the way forward instead of going backwards? Will we have time before climate change irreversibly transforms the world as we know it?

A pebble for your own garden. Independence Day lesson

Meanwhile, Independence Day reminds me of sovereignty. Today's environmental threats show that independence in today's world has many dimensions. Can a truly independent nation be one that loses access to clean air and water? Our independence should include not only political boundaries, but also concern for the environment that gives us the ability to survive. How we treat our place on Earth is a sign of responsibility and true freedom. Perhaps the patriotism of tomorrow will mean fighting not only for territorial borders, but also for green spaces, clean rivers and air.

pic. Artur Kwiek

Is it too late to reverse the negative effects of human actions against the environment? Fighting for the country that is our home requires solidarity, courage and political will. Change must come from each of us, but even so, the decisions that decision-makers make are crucial. Water, which is particularly close to my heart, knows no borders or needs a passport, and climate change affects everyone. If we continue to choose short-term benefits over the long-term security of our country, we will suffer consequences that no amount of wealth and influence can mitigate.

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pic. main: Anna Adamska

CANDIDATE'S PLANS FOR ENVIRONMENT COMMISSIONER?

Posted on 14 November 2024 by Monika Zabrzeńska-Chaterera

On November 5, 2024, at 6:30 p.m., the hearing of the candidate for the new commissioner for the environment, water scarcity resilience and a competitive closed-loop economy - Jessica Roswall of Sweden - began. The procedure stipulates that the Conference of Presidents is to conduct a final evaluation and announce the closing of the hearings of the commissioner candidates on November 21, 2024, after which the evaluation lists will be published. The election of the full College of Commissioners is scheduled for November 25-28, 2024. They will be indicated by members of the European Parliament - formal approval will then take place. In practice, Jessica Roswall's candidacy has already been approved by the coordinators of the political groups, and thus the Swede has fulfilled the condition for election as a commissioner. The new European Commission, including the commissioner for the environment, should start work in early December 2024. What are the plans and priorities of the new commissioner? About this in the following part of the article.

Categories: From the European Commission, Issue 21/2024, Onet
Tags: environment, KE, water

The hearing of the candidate for the new Commissioner for the Environment, Water Scarcity Resilience and a Competitive Closed Circuit Economy, Jessica Roswall of Sweden, began at 6:30 pm on November 5, 2024.

The procedure stipulates that the Conference of Presidents is to conduct a final evaluation and announce the closing of hearings for commissioner candidates on November 21, 2024, after which the evaluation lists will be published. The election of the full College of Commissioners is scheduled for November 25-28, 2024. Members of the European Parliament will nominate them - formal approval will then follow.

In practice, Jessica Roswall's candidacy has already been approved by the coordinators of the political groups, and thus the Swedish woman has fulfilled the condition for election as commissioner. The new European Commission, including the commissioner for the environment, should start work in early December 2024. What are the plans and priorities of the new commissioner? About this in the following part of the article.

Priorities of the new Commissioner for the Environment. environments

There is no more important task than delivering clear results that protect nature and the climate, create tangible benefits for citizens, and demonstrate real economic opportunities for our industry," Jessica Roswall reported at the hearing.

The candidate for the new environment commissioner on November 5 be. presented her priorities, highlighting issues such as water management, support for sustainable agricultural practices and protection of biodiversity. During the hearing, she pledged to work toward the goal of protecting the environment and biodiversity while maintaining support for the economy and agriculture. She also referred to her experience during the Swedish presidency, when she made decisions on environmental legislation, i.e. Fit for 55, to demonstrate her commitment to environmental action.

During the hearing, Jessica Roswall pledged full commitment to all aspects of the European Green Deal policy. She pointed out the need to maintain high environmental standards, to meet *zero pollution* targets, and to take advantage of the opportunities offered by the closed-loop economy.

Jessika Roswall also pointed out the need to enforce the application of current regulations so that they have the ability to meet their goals and produce results and benefits. She pointed out the need for simplification that will not lead to deregulation, but will allow the implementation of regulations. She also declared the implementation of the European Union's international commitments.

During the hearing, the future commissioner raised questions about the importance of financial support. In this area, she pointed out the role of working with international partners to raise funds, including through credits for nature. These credits would measure environmental parameters and reward those who improve the environment. She also announced the monitoring of pilot projects to prevent abuse. Jessica Roswall stressed the need to regain public trust and reconcile economic and environmental goals by supporting the economy and reducing bureaucracy.

Water resources management

The future commissioner identified water management as a key challenge, especially in the context of frequent flooding and drought. During the hearing, she pointed out that through the Water Resilience Initiative, a source-to-sea approach will be adopted and various challenges in our regions and sectors will be analyzed. She promised to make access to clean water for all citizens part of the equitable transformation

agenda.She stressed that financing measures, especially in water management, is essential to avoid the high costs of neglect in the future.

She also mentioned that farmers are increasingly experiencing problems with water shortages, environmental degradation or the effects of climate change. Therefore, in her opinion, due to the need to protect the earth, food security or the social situation of farmers, it is necessary to work closely with this social group.

Agriculture

The Commissioner-designate highlighted the difficulties faced by farmers, expressing her willingness to promote and support sustainable practices and ensure them a fair income. During the discussion, she pointed out that support for the countryside is crucial to the prosperity and food security of the entire EU. She also declared her willingness to work with the Agriculture Commissioner, among others, to shape the vision for agriculture, including in efforts to reduce emissions.

During the discussion, Roswall expressed her willingness to closely collaborate and develop technologies to support sustainable agriculture in order to develop agricultural innovations that will reduce the environmental impact of agriculture while protecting family farms. Jessica Roswall stressed that she recognizes the importance and opportunities for agriculture and other sectors in the bioeconomy. She also stressed that farmers are key partners in protecting biodiversity, and that healthy ecosystems have an economic value that is difficult to value. In the context of the tool to be nature credits, she stressed that this is a challenge in which she sees potential for sustainable rural development.

Biodiversity

Jessica Roswall recognizes the importance of protecting natural resources. She stressed that the protection of biodiversity and the implementation of the Regulation on the Restoration of Natural Resources are intended to increase the resilience of the European Union (EU) and fulfill international obligations, but without adequate funding they will be ineffective. Therefore, the next EU budget perspective is an opportunity to increase the efficiency of spending. The Environment Commissioner-designate, in response to questions, pledged to implement the provisions of the deforestation regulation. In addition, she expressed approval of the decision for an additional 12-month transition period.

Other priority areas

Competitive economy and green transformation go hand in hand. This is a unique opportunity for Europe. The closed-loop economy is a priority and a key part of the Clean Industry Agreement. Too often it is cheaper to import new materials than to use recycled ones," the candidate for the new Environment Commissioner told the hearing.

Jessica Roswall announced that, as commissioner, she will focus on implementation and enforcement of existing regulations. She stressed the importance of doing so in order to achieve goals and generate benefits for citizens, farmers or businesses. During the discussion, she stressed that if there is a need for new regulations, assessing their impact on small and medium-sized businesses will be a priority. Simplification of regulations, according to the commissioner-designate, should not lead to deregulation, but facilitate the implementation of rules to maintain a high level of protection for both human health and the environment. Jessica Roswall hopes that her legal experience will make it easier for her to get all states to comply with existing laws.

During the debate, the environmental commissioner candidate indicated that she would fight for funding for environmental priorities, so she intends to explore borrowing for nature and work with the European Investment Bank and international partners. She stressed that she will

strive for the EU to lead the way, but expects commitment and initiatives from individual member states as well. Jessica Roswall pledged to work for results-oriented solutions.

Photo. main: Henrik Smångs / Wikimedia

AID FOR FLOOD-AFFECTED FARMERS – REGULATIONS UPDATED

Posted on 14 November 2024 by Monika Zabrzeńska-Chaterera

Categories: From the European Commission, In this issue, Issue 21/2024
Tags: agriculture, flood, help

On November 7, 2024, the Minister of Agriculture and Rural Development issued a regulation from October 31, 2024, amending the provisions on the detailed conditions and procedures for granting and disbursing financial assistance for operations aimed at restoring agricultural production capacity under the sub-measure "Investment in restoring agricultural land and production potential damaged by natural disasters, adverse climatic events, and catastrophes" as part of the Rural Development Program for 2014–2020 (Journal of Laws, item 1630).

The regulation introduced the possibility of supporting investments destroyed by the flood that occurred in September 2024 in southwestern Poland. This aid does not apply to buildings that require mandatory insurance. The regulation came into force the day after its announcement.

Aid for farmers affected by the September 2024 flood

The regulation published on November 7, 2024, provides the possibility of financial support for farmers affected by the flood in September 2024. The goal is to rebuild farms damaged by the catastrophe of September 2024 (excluding buildings that require mandatory insurance). This support will be launched under sub-measure 5.2 of the Rural Development Program for 2014–2020, with a budget of 22 million euros.

Key changes introduced by the regulation

The regulation, announced on November 7, 2024, introduced several key changes relevant to farmers affected by the recent flood. These include:

- The aid is directed exclusively to farmers in areas where a state of natural disaster has been declared due to the September 2024 flood in the southwestern part of the Republic of Poland.
- The deadline for submitting payment requests has been extended to August 31, 2025.
- Requirements for estimating production levels were specified, separately for livestock production and crops affected by the disaster.
- For agricultural production, damages must amount to at least 30% of the average annual production.
- Clarification was made regarding the submission of payment requests.
- The operation is to be carried out in a single stage.
- The Agency for Restructuring and Modernization of Agriculture is to process the payment request within two months of its submission and, upon approval, promptly disburse the funds.

Application process for aid to farmers affected by the flood

The application announcement is planned for November 15, 2024. Affected farmers will be able to apply for funds from November 22, 2024, to December 31, 2024. The aid intensity will be 80% of eligible costs, with a maximum support amount of PLN 300,000 per farm.

Eligible costs include:

- construction, reconstruction, or renovation of buildings;
- purchase of new machinery, equipment, polytunnels, and other equipment for agricultural production, storage, drying, warehousing, preparing agricultural products for sale, particularly equipment for cultivation, maintenance, protection, fertilization, and harvesting of crops; equipment for preparing, storing, cleaning, sorting, grading, and packaging agricultural products; machinery or equipment for feed preparation or storage; machinery or equipment for watering and feeding livestock; equipment for collecting or storing milk;
- restoration of:
    - hop plantations, orchards, or berry plantations with fruit-bearing species effective for over 5 years;
    - agricultural production potential in farms by establishing hop plantations, orchards, or berry plantations with fruit-bearing species effective for over 5 years;
- purchase of livestock forming the basic herd as defined by the regulations on the organization of breeding and reproduction of livestock;
- purchase of computer equipment and software as well as patents and licenses supporting agricultural activities;
- purchase, installation, or construction of technical infrastructure elements that directly impact the conditions for conducting agricultural activities.

FISHING OPPORTUNITIES FOR 2025 IN THE ATLANTIC, KATTEGAT AND SKAGERRAK STRAITS

Posted on 14 November 2024 by Karol Kucharski

The European Commission has published a proposal to set catch limits or total allowable catches (TACs) for ten fish stocks in EU waters in the Atlantic Ocean, Kattegat and Skagerrak for 2025. The proposal is based on scientific advice and covers fish stocks managed exclusively by the EU in these sea basins.

Categories: From the European Commission, Issue 21/2024, Onet
Tags: Atlantic Ocean, fish, fishing, limit

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Fishing opportunities vs. sustainable fisheries

Fishing opportunities, or total allowable catches (TACs), are set for most commercial fish stocks in Europe in accordance with the objectives of the Common Fisheries Policy (CFP) to balance the sustainability of stocks with social and economic considerations. The goal is to keep the stock in good condition or help it recover, while providing EU fishermen with a basis for economic activity. Under the CFP, EU member states are legally obligated to manage stocks at a sustainable level.

Sustainable fisheries are playing an increasingly important role in EU policies. In 2024. 81 percent of the TAC was set at the Maximum Sustainable Yield (MSY) level, ensuring a healthy future for fishermen's stocks and reliance on them, while in 2009 the figure was only 14 percent.

How does the EC develop the TAC proposal?

Each year, the European Commission asks the International Council for the Exploration of the Sea (ICES) for scientific advice on each fish stock, and then develops a total allowable catch (TAC) proposal based on that advice. ICES provides two types of advice: maximum sustainable yield (MSY) assessment advice and precautionary approach advice. These depend on the data available to scientists.

With more information, ICES can conduct an MSY assessment, while for stocks lacking complete data, advice will be given based on the precautionary approach. The European Commission then analyzes the advice received and prepares a proposal, which is discussed and adopted by the Council of the European Union, where EU member state fisheries ministers meet.

Fishing opportunities for other bodies of water, including the Baltic Sea, are similarly defined, as we wrote about in a previous article: Fishing situation in the Baltic Sea for 2025.

Fishing opportunities for individual fish species

The number of TACs proposed for 2025 is lower compared to previous years due to the introduction of multi-year plans last year. For some stocks, TACs for 2025 were set by the Council at the end of 2023. The European Commission is proposing increased catch limits for five stocks: monkfish, megrim and horse mackerel in the Atlantic waters of the Iberian Peninsula, lobster in the southern Bay of Biscay and the Cantabrian Sea, and sole in the Bay of Biscay.

For hake in Atlantic Iberian waters, the European Commission is proposing to maintain the 2024 TAC at 17,445 tons - which is between the MSY point value (15,105 tons) and the upper limit of the ICES MSY range (20,404 tons). Hake is the most limiting species, as others are often caught incidentally along with it. With this proposal, the European Commission seeks to strike a balance between protecting hake in the long term and allowing fishermen to harvest it.

For plaice in the Kattegat, the European Commission is proposing to maintain the 2024 TAC, which is below the lower limit of the ICES MSY range. Plaice and cod are caught incidentally in the lobster fishery. In light of the advice for zero cod catches, the limits for lobster and plaice

should remain low to avoid increasing pressure on cod bycatch.

For sole in the Skagerrak-Kattegat and the western Baltic Sea, given the low biomass of the stock, the Commission proposes to suspend the directed fishery, and maintain the current TAC for the lobster directed fishery. ICES forecasts that this bycatch TAC will keep the stock's biomass stable, although it will not achieve MSY.

Based on a precautionary approach, ICES recommends zero catches of roundnose grenadier in the Skagerrak-Kattegat in 2025 and 2026, and the Commission suggests setting a low TAC for it for those years in fisheries targeting northern shrimp at the level of recent landings.

Given the critical state of the European eel population, the Commission is proposing to maintain existing measures to protect the stock. These include a mandatory six-month fishing closure and a ban on all recreational eel fishing in EU marine and brackish waters of the Northeast Atlantic.

Fishing opportunities - further stage of work

On December 9 and 10, 2024, the European Council will discuss the European Commission's proposal and set fishing opportunities for 2025 and, in some cases, for 2026. The regulation should enter into force on January 1, 2025.

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pic. main: Jordan Allen Walters / Unsplash

CLIMATE ACTION PROGRESS REPORT 2024.

Posted on 14 November 2024 by Karol Kucharski

The European Commission has released the 2024 EU Climate Action Progress Report, which shows that in 2023, the EU's net greenhouse gas emissions fell by 8.3 percent compared to the previous year. The report highlights the EU's leading role in the transition to a clean economy. According to the latest information, the EU currently accounts for about 6 percent of global emissions.

Categories: From the European Commission, Issue 21/2024, Onet

Tags: CO2 emissions, greenhouse gas emissions, KE, klimat, report

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Is the EU on track to meet its commitment to reduce emissions?

According to the prepared report, the EU's net greenhouse gas emissions fell by 8.3 percent, the largest annual decline in decades (with the exception of 2020, when emissions fell by 9.8 percent as a result of the COVID-19 pandemic). Net greenhouse gas emissions are now 37 percent lower than in 1990, while GDP has grown by 68 percent over the same period, showing that emissions are independent of economic growth.

The information presented in the report clearly indicates that the EU is on track to meet its commitment to reduce emissions by at least 55 percent. By 2030. We have written about the needs for meeting the 2030 climate goals envisioned in a previous article: How to achieve the 2030 climate goals? Up to $6.8 trillion is needed.

Report - key climate actions taken

- In 2023. there has been a record drop in emissions from energy and industrial installations covered by the EU ETS. The drop was 16.5 percent. Emissions from the ETS sector are now about 47.6 percent below 2005 levels, meaning the EU is on track to meet its 2030 target of a 62 percent reduction.

- Under the EU ETS, emissions from electricity generation and heating decreased by 24 percent compared to 2022, driven by the development of renewable energy sources, particularly wind and solar power, and a shift away from coal combustion. Emissions from aviation increased by 9.5 percent, in line with the trend observed since the end of the COVID-19 pandemic.

- In 2023. The EU ETS has generated revenues of 43.6 billion euros for investment in climate action. Of this, €7.4 billion went to innovation and modernization funds, with the remaining funds going directly to member states.

- In 2023, emissions from buildings, agriculture, domestic transportation, small industry and the waste sector (covered by the Effort Sharing Regulation) fell by about 2 percent. The largest contributor to this was the construction sector, where emissions fell by about 5.5 percent. Agriculture reduced its harmful activities by 2 percent, and transportation by less than 1 percent.

- The EU's natural carbon sink increased by 8.5 percent in 2023, reversing the downward trend observed over the past decade in the land use, land use change and forestry (LULUCF) sector.

What climate-related risks does the report identify?

While the report contains much optimism about the EU's emission reductions, it should be noted that last year also saw many disasters, fatalities and material losses related to climate change, and global emissions have not yet reached their highest projected levels. In order for the EU to meet its 2030 targets and move closer to achieving the 2040 target and carbon neutrality by 2050, further action is needed.

The prepared report shows that member states are slowly adapting to climate change and building resilience, but should continue their efforts in this direction. In 2023. Europe has experienced the largest forest fires on record, unusually intense rainfall and heat waves, devastating floods and a steady rise in temperatures. Both the European Commission's Communication on Climate Risk Management and the European Climate Risk Assessment emphasize that climate change vulnerability should be taken into account when setting policy priorities at all levels of governance and in all sectoral policies.

Climate action progress report and its importance

The Climate Action Progress Report accompanies the annual State of the Energy Union report. It outlines progress in meeting emission reduction targets, as required by the Energy Management Regulation. The report also outlines key achievements and recent developments in the fight against climate change. It includes actual (historical) and projected emissions for each member state, as well as information on EU policies and measures, climate change financing and adaptation.

COP29: WHERE TO GET MONEY TO FIGHT CLIMATE CHANGE?

Posted on 14 November 2024 by Agata Pavlinec

Let's abandon the thesis that climate financing is a matter of philanthropy," urged Simon Stiell, UN climate chief, at the inauguration of the COP29 summit in Baku, the capital of Azerbaijan. The conference, which will last until November 22, is expected to set new financial targets for international cooperation to combat the negative effects of climate change. As the hottest year on record, 2024 has witnessed a number of disasters that demonstrate the seriousness of the situation.

Categories: Business and economics, In this issue, Issue 21/2024, Onet
Tags: climate change, climate protection, COP29

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Urgent need for action

Recall that at the COP15 summit in Copenhagen in 2019, developed countries pledged to mobilize $100 billion a year for climate action in developing countries. This commitment was extended to 2025 at subsequent conferences, and now it's time for an update.

In his speech, Simon Stiell highlighted the role of the United Nations Framework Convention on Climate Change (UNFCCC), advancing the thesis that without it, humanity would already be heading for a five-degree increase in global temperature compared to the pre-industrial era. At the same time, the UN representative reminded that the climate crisis affects each and every one of us, as it translates into higher energy and food prices, a decline in national competitiveness and global instability, which often entails loss of life.

Simon Stiello's speech also included impressive numbers - by 2024, investment in green energy and infrastructure will reach $2 trillion, double the investment in fossil fuels. This, however, is still not enough to stop the 1.5°C temperature rise. Change must accelerate, and the benefits should be felt by citizens around the world.

pic. UNclimatechange / flicker

New common quantitative target (NCQG)

The priority of the COP29 summit is to set a new common quantitative target for climate change financing. The issue is not only the contribution amounts themselves, but above all their allocation among the various stakeholders and specific targets, relating to adaptation measures and financial instruments.

Work on the NCQG has been underway for several months and was summarized in a working document published a month before the start of COP29. It contains general guidelines, including the timeframe for the new goal - 2035. The first financial estimates of the new global commitment closed in the range of $1-1.3 trillion per year, or ten times the existing commitments.

The NCQG is intended to address the current needs of developing countries, including climate investments in countries embroiled in armed conflict. Specific goals will address such key aspects as health, water and sanitation, hygiene and food security in the face of climate change.

Pay or...

Since the beginning of COP29, the dominant theme repeated by successive speakers has been the need for financial commitment in opposition to generous voluntarism. Simon Stiell pointed out that already today the cost of the effects of climate change in some countries reaches the equivalent of 5 percent of GDP, essentially fueling inflation. UN Secretary-General António Guterres, in his speech, recalled the recently published Oxfam report on. generating more carbon emissions in an hour than the average person does in a lifetime. *The rich are the cause of the problems, the poor pay the biggest price*, Guterres added.

The UN secretary recalled that by 2030 the financial gap between adaptation needs and available finances could be $359 billion a year, and the missing funds will translate into loss of life, loss of fertility and stunted economic development.

We have to pay or humanity will pay," Guterres said, calling for tearing down the walls surrounding the topic of climate change financing. According to him, public contributions must increase, and in addition, innovative sources of capital must be involved. New financing targets should also stimulate the lending capacity of large international development banks.

COP29 stirs emotions

Calls for increased budgets for climate action are not only coming from high-profile politicians. Back in September this year, the international network of environmental NGOs Climate Action Network (CAN) officially backed activists demanding that the countries of the global North, i.e. developed, stable democracies, pay the countries of the global South $5 trillion a year in climate debt. In their view, it is the developed North that is responsible for 75 percent of greenhouse gas emissions, and should therefore support developing countries in adapting to climate change, also paying for the damage caused during natural disasters.

CAN's statement came in at $192 trillion, which the North will owe the South by 2050, assuming global warming can be halted at +1.5°C relative to the pre-industrial era.

A more modest claim was made by CARE, a global confederation dedicated to fighting for a just world without gender inequality. In a document published in connection with the COP29 summit, it called for annual support of $1 trillion between 2025 and 2030, a sum derived from the UNFCCC's second report detailing the financial needs for meeting climate goals. Referring to the $5 trillion sum proposed by CAN, CARE representatives say it is not supported by solid data and evidence.

Climate loss and damage fund is ready

Regardless of what will be agreed in Baku on new financial commitments to developing countries, the Climate Loss and Damage Fund, agreed in December 2023, has officially opened. Once the relevant documents are signed, the first contributions will flow into the fund - representatives of the Swedish government have already announced a contribution of $19 million. The total of contributions pledged so far reaches $720 million.

The fund will support immediate financial assistance to countries affected by natural disasters related to climate change, with funds used to rebuild homes, resettle and save lives. The first support will be provided as early as 2025. The World Bank was involved in preparing this

important initiative, which is considered a model example of global solidarity on climate issues. All these efforts are aimed at overhauling the international financial architecture, which was openly discussed at the United Nations Future Summit in September. António Guterres admitted that the current system is inadequate and inefficient, with the world's poorest countries spending more on debt repayment than on investments in health, education and infrastructure. If participants manage to reach a consensus, COP29 has the potential to be an important step toward a more supportive and equitable global future.

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pic. main: UNclimatechange / flicker

NOT SIN CITY, BUT SOLAR CITY? GREEN TRANSFORMATION OF LAS VEGAS

Posted on 14 November 2024 by Agata Pavlinec

The city, which is famous for its glitz, colorful neon lights and partying until dawn, has dynamically embarked on a path of sustainable development, surprising the world with a positive example. Las Vegas has been painstakingly implementing corrective measures related to clean energy and more efficient water management for more than a dozen years. The results of millions of dollars of investment are already visible, but the city government is not resting on its laurels and announces further changes.

Categories: Business and economics, Issue 21/2024, Onet
Tags: clean energy, Las Vegas, sustainability, water management

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Solar City, or the energy transformation of Las Vegas

In 2009. The Obama administration passed the American Recovery and Reinvestment Act, which was primarily intended to spur job creation in the face of the economic crisis. Its $787 billion investment package included, among other things, investments in renewable energy sources, advanced batteries and green buildings. In Las Vegas, the city government seized a major opportunity and invested $75 million in sustainability projects.

In a city that experiences an average of 3825 hours of sunshine per year, solar photovoltaics (PV) were the obvious choice. The pace of the transformation was dictated by a regulation adopted by the state of Nevada in 2019.(Renewable Portfolio Standard), which set an ambitious goal of sourcing by 2030. 50 percent of energy from renewable sources and a completely carbon-free energy sector by 2050.

Hotels and casinos began investing in solar energy, taking advantage of a 50 percent tax credit for the next 10 years. As a result, by 2023, small and large solar PV installations were already generating 26 percent of the total energy used in Nevada, and Las Vegas became the second city in the United States with the highest PV capacity per capita. In total, the gambling capital produces 443 megawatts of solar energy, which translates into 669 watts per person.

Not only the sun...

Paradoxically, until 2017, the main source of renewable energy in Nevada was geothermal energy. It still accounts for ¼ of renewable energy and 10% of total energy production. In 2009. a giant power plant that draws heat from deep within the earth was opened, and in 2015 a solar module was added to further heat geothermal fluids, increasing the efficiency of the hybrid power plant.

The third major renewable energy source for Las Vegas is a hydroelectric plant located at the Hoover Dam. It's a phenomenon of sorts that a city located in the desert benefits from the energy potential of water, which totals as much as 2,080 megawatts and provides electricity to Nevada, Arizona and California. Unfortunately, the plant, which was built in the 1930s, is now threatened by the effects of climate change - in 2023, the amount of energy produced for Nevada this way dropped by as much as 22 percent due to drought. This is one of the reasons for the state's energy portfolio's refocus on solar power.

Wind energy is so far used the least. In 2012. the only windmill farm with a capacity of 150 megawatts has opened. The development of this branch of energy is limited by the fact that most of the mountain ranges with wind potential are state-owned and construction requires approval from the federal government.

pic. sepavone / depositphotos

Water in the desert

A major challenge for Las Vegas authorities is to ensure that the metropolis of 3 million residents, which is visited annually by some 40 million tourists, has sufficient potable and usable water. Situated in the Mojave Desert, the city draws 90 percent of its water resources from the Colorado River, which had already reached a critical minimum in 2002. As alternative sources are in short supply, Las Vegas has begun to implement an intensive water conservation program.

Restrictions introduced included limiting the volume of swimming pools, banning the use of evaporative cooling, hefty fines for water spills, a limit on the frequency of car washing, and a ban on installing fountains and decorative ponds larger than 0.9$^{m2.}$ A campaign to replace faucets in buildings with water-efficient ones was carried out, and the famous Bellagio fountains were obliged to reuse water. In addition, the state authorities managed to remove 18.5 million$^{m2\ of}$ waterfront turf, increasing the allocation of Colorado River water for Nevada by 10 percent. The results were surprising - although southern Nevada's population has increased by 750,000 over two decades, water use has fallen by 31 percent in that time.

Recycling of water has also proven to be a very important measure, which has already reached 85 percent in the buildings. Nevada returns treated water to Lake Mead, above Hoover Dam, from where it is redistributed to residents of three states. The problem, however, remains the use of water for irrigation, where evaporation losses are huge and recovery is very difficult. For this reason, projects are being implemented in Las Vegas to replace traditional lawns with desert vegetation.

Unfortunately, the future is not overly optimistic. Water levels in the Colorado River, which feeds Lake Mead, depend heavily on the snowpack in the Rocky Mountains. Its scarcity, combined with increased evaporation due to rising temperatures, could threaten the water security of Las Vegas' population. Not surprisingly, starting in 2019, the public-private Las Vegas Global Economic Alliance (LVGEA) is leading an ambitious plan to link water use to economic development through special investment assessment tools. There is also growing talk of building seawater desalination plants, although this is a solution with limited potential due to the high price of the technology and the fact that Nevada is landlocked.

Waste management

On the road to sustainability, an ambitious waste management plan has also been introduced in the state of Nevada. Adopted in 2022, it expands and complements the earlier 2017 strategy, introducing an important concept: landfill should be a last resort. In particular, this principle applies to products that are difficult to recycle and should be reused or composted in a responsible manner. The new plan promotes a closed loop as an alternative to the linear life cycle of products - from manufacture to landfill.

In 2021. The level of waste recycling in the state of Nevada was only 24 percent. However, the state authorities are not giving up and are conducting an extensive education campaign in schools and rural areas. At the same time, there are plans to invest in waste processing infrastructure and develop a market for recycled materials. In Las Vegas itself, the fleet of waste collection vehicles and the operation of collection points have been improved.

Challenges facing Las Vegas

Las Vegas is a prime example of a city that started on a losing streak and, on top of that, is subject to tremendous commercial pressure. Nonetheless, it turned out that even private business, with the right public motivation, is eager to get involved in the energy transition and water conservation process.

However, the city of lights and fun still faces many challenges. Among the most important is reducing road transportation, which is one of the most serious sources of greenhouse gas emissions. The city government announces that in 2050 all residents will have guaranteed access to public transportation, and 75 percent of the population will have a bus stop within 800 meters. There are also plans to adapt individual thoroughfares for pedestrian and bicycle traffic. The entire bus fleet is to be replaced over time with hydrogen-powered vehicles - the city has secured a $3.8 million government grant for this purpose. In early 2024. In the state of Nevada, there were also 560 charging sites for electric cars from more than 2,000 ports.

Another challenge is air conditioning, without which it is hard to survive in the desert climate, and which involves enormous energy consumption. It will take many more smart moves to turn Sin City into a truly green city. However, the direction and intensity of the local authorities' efforts are impressive.

ORCHARDING AND WATER CONSERVATION

Posted on 14 November 2024 by Adam Kapler

Autumn is a time of piling up work in the orchard. It is necessary not only to harvest fruit, but also to take cuttings for grafting noble varieties and for rooting for shoot cuttings. Watch over the condition of cellars and drying rooms. Spray and shape trees and shrubs. Rejuvenate old but promising specimens and slowly protect them from winter. Grub out the weakest, no longer yielding specimens, and plant something new in their place. Fallen leaves and fungus-infested branches will not bury or burn on their own. Sometimes it is necessary to protect the fruit with nets, "pop" from a bang cannon or call a falconer. What do orcharding and our waters have in common? As it turns out, quite a lot!

Categories: Feedback, Issue 21/2024, Onet
Tags: horticulture, protection, water, winter

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Orcharding and water status

Orcharding, including berry farming, threatens Europe' s freshwater and wetland ecosystems in several ways:

1. is using more and more freshwater for agricultural irrigation, including non-renewable and conditionally renewable groundwater;
2. leads to pollution of rivers and flowing lakes and then the seas with fertilizer and pesticide residues;
3. in hot and dry climates leads to salinization of irrationally irrigated soils;
4. consumes a lot of natural peat (extracted from high and transitional bogs) for blueberry plantations and for establishing new orchards (40 to 75 thousand liters of peat per 1 hectare of blueberries);
5. In places, it disrupts the biogeochemical cycling of calcium, binding $^{Ca2+}$ ions in wood and fruit, resulting in too few cations of this biogen entering lakes and rivers;
6. with industrial cultivation generates an additional pool of greenhouse gases (escaping into the atmosphere) and microplastics (running off into waterways over time);
7. in a black fallow regime aggravates soil erosion, leading to turbid waters .

In order that the wolf be full and the sheep be whole

Fortunately, we do not have to choose between running an orchard and protecting our waters and wetlands. A number of ways have been developed to remove, or at least significantly reduce, the above threats. We need to thoroughly reduce our use of water, as well as artificial and natural fertilizers, especially peats and muck. The paths to more resource-efficient orcharding are many. They are:

1. Appropriate selection of species and varieties to local conditions: soil type, relief and microclimate;
2. Rational preparation of the site for the new plantation;
3. Replacing high peat with other fertilizers that are more climate- and biodiversity-friendly (e.g.: homemade composts, innovative fertilizers made from garbage, sewage and the remains of invasive species);
4. Reducing the cultivation and consumption of blueberry (highbush) in favor of mineral-yielding plants, including its lesser-known cousins, shown below .

Proper preparation is 3/4 of the success!

Optimal selection of fruit plants and preparation of the site are three quarters of success. The vast majority of them prefer fresh, moderately fertile soils. This applies both to the well-known apple and plum trees, walnut and hazelnut, as well as to collector curiosities - from minikiwi to acebia to Virginia hurma. On light and sandy soils, you can grow cherry and sweet cherry, scarlet thorn (goi berry), and, of lesser-known species, sea buckthorn, silverleaf cherimoya, umbellifer and multifloral olive.

Edible chokecherry, certain mulberries and quince trees are also quite dry-bearing. On the banks of rivers - in riparian habitats - you can experiment with growing pecan and other pecan trees, grafted onto pecan trees. The most moisture-loving of our orchard plants are black currant and coral calla. The former remains a characteristic species of currant alder forests, while the latter grows wild in riparian and low oak-hornbeam forests. Of the lesser-known exotics, the Virginia black cherry, especially grafted onto the common black cherry, has an almost equally great need for moisture. Slightly acidic, but fertile and deep soils are suitable for urodlin (peacock) .

Preparing the site for a new plantation or resting the soil after cutting down an old orchard can be done with climate and biodiversity-friendly methods. It is worth taking care of crop rotation with a high proportion of broad beans and brassicas .

Instead of highbush blueberries

What to replace highbush blueberry with? After all, Polish women and men have come to love it more strongly than other superfoods! For several decades now, it has been displacing its native cousins from our tables: cherries picked in the forests and goldenberries from the wetlands. As of July 2023. By August 2024, the number of purchasers of these non-dirty hands and keyboards of blueberries had increased by 17 percent in Poland. Ophthalmologists recommend it for eye fatigue caused by too much smartphone scrolling. No wonder, then, that blueberry plantations have been displacing currant and gooseberry crops for at least 30 years.

They are arriving faster than orchards of sea buckthorn, miniquince or kamchatka berry. The *Vaccinium* genus includes a number of other species with similar flavor, but very different soil preferences. Several of them could be planted in Poland on mineral or humus soils, so without consuming huge amounts of natural high peat. It is worth experimenting with the cultivation of, among others, lowbush blueberry (narrow-leafed) *Vaccinium angustifolium*, chinkabush (velvetleafed) *V. myrtilloides* and stinkberry (mapleberry) *V. praestans*. Their family - the heathers - includes a number of further genera with edible berries or fleshy pouches, potentially tolerating our climate well, such as the blueberry *Gaylussacia baccata* and the salal golteria (old madder) *Gaulteria shallon*. There is plenty to choose from when looking for less "peat-eating" substitutes for highbush blueberry .

Scarlet thorn, bearing goi berries, is planted in large numbers in our country, but on the slopes of railroad tracks and between highways, not in orchards. Akebias have their lovers, but as ornamental vines (even honey-bearing ones, although no one has studied their forage yield, and even if they have, they haven't published the results...), not fruit plants. Perhaps it would be worthwhile for them to establish themselves in our orchards as well?

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

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2. Kapler, A. 2021. The biology, ecology, and cultivation potential of lesser-known polyphenol-rich plants. ss. 143-160. w: Kalemba-Drożdż M., Grzywacz-Kisielewska A., Cierniak A. (red.) Surowce polifenolowe. Zastosowania i perspektywy. Krakowska Akademia im. Frycza-Modrzewskiego, Kraków, s. 198.

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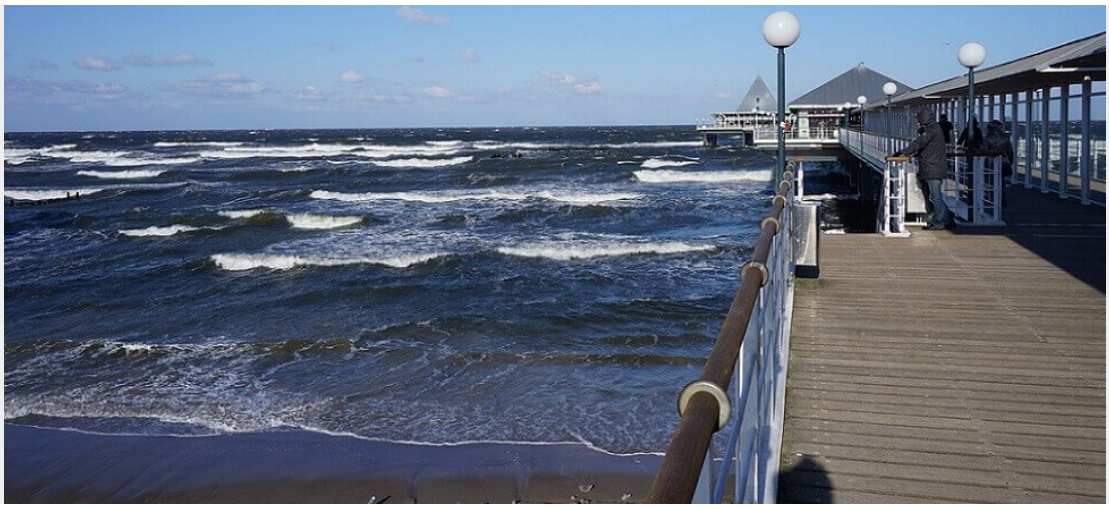
WALKING THE SHORE, SAILING THE SEA. ABOUT WOLIN AND THE SISTER ISLAND OF USEDOM

Posted on 14 November 2024 by Leszek Naziemiec



I moved to the Baltic Sea from Silesia two and a half years ago, primarily for my love of the sea, but also for the unique nature of Wolin Island. I love walking along its shores, mainly along the beach from Dziwnow to Swinoujscie and back. I also decided to explore the island of Usedom and then Rügen. The sister islands of Wolin and Usedom are flanked to the south by the waters of the Pomeranian Bay and both are cut off from the mainland by straits where the water comes from the Oder River.

Categories: Feedback, Issue 21/2024, Onet
Tags: Baltic, beaches, sea

I moved to the Baltic Sea from Silesia two and a half years ago, primarily for my love of the sea, but also for the unique nature of Wolin Island. I love walking along its shores, mainly along the beach from Dziwnow to Swinoujscie and back. I also decided to explore the island of Usedom and then Rügen. The sister islands of Wolin and Usedom are flanked to the south by the waters of the Pomeranian Bay and both are cut off from the mainland by straits where the water comes from the Oder River.

We will find similarities in the landscape of the two islands, but we will also be struck by differences. Wolin is more undulating. The highest cliff, Gosan, rises to 93.4 meters above sea level, while the highest mountain, Grzywacz, is 116 meters above sea level. The larger and flatter island of Usedom boasts the Streckelberg cliff at 58 meters above sea level, adjacent to the village of Koserow. The highest elevation is Golm Hill (69 m above sea level), which has a cemetery for World War II victims. It is an important memorial of Mecklenburg-Vorpommern.

Numerous branches of the Pomeranian Bay penetrate deep into the mainland of Usedom Island. Sightseeing usually brings us to a sleepy German village, with old but renovated thatched cottages and at least some of the residents engaged in fishing. Along the way, we pass other farming villages, cultivated fields and grazing cows. If we want to enjoy the views from the highest cliff, we will probably also visit Koserow and walk along the beautiful wooden pier, which may be a symbol of the Germans' approach to the development of coastal villages.

The new wooden construction harmonizes with the modest buildings hidden among the dunes. No one is trying to violate the space with tall, concrete apartment buildings. A similar policy is being pursued in the three towns closest to the Polish border: Ahlbeck, Heringsdorf and Bansin. They retain the character given to them since the first half of the 19th century. On the Polish side, Swinoujscie and Miedzyzdroje had similar Art Nouveau buildings. What happened later in the former can be understood. The progressive urbanization of the port city forced far-reaching reconstruction.

However, it is difficult to pass indifferently to the changes that have occurred and continue to occur in Miedzyzdroje. Until relatively recently (1993), one could stroll along the wooden pier and through the streets with stylish, historic buildings, which are still present in Ahlbeck. Unfortunately, in Poland there is acquiescence to the erection of apartment buildings in any space ripped out of nature. New Miedzyzdroje is dominated by two developments: a scaled-down City Hall building, the so-called Belvedere, and an apartment building on the beach, next to the Wolin National Park itself.

Even weighing the words, it is difficult to avoid the term devastation, seeing what has happened in this resort! I managed to reach the statements of local officials on the subject: *Well, sometimes decisions were made by our predecessors*. Such words can be heard, but in general the direction of change is accepted both in the magistrate's office and among residents.

I had the pleasure of attending a meeting with Prof. Jacek Tylkowski, Head of the Environmental Monitoring Station in Biala Gora, near Miedzyzdroje. I asked about investments on the beaches and dunes of Miedzyzdroje, but also of Miedzywodzie and Dziwnow. The professor replied that it is important to remember that one larger storm can wreak havoc, shifting the cliff by several meters. It should also be added that it's not just a matter of a high wave, but also that during a storm the water level rises, so the wave pushes in from a higher level. Officials make decisions on an ad hoc basis, looking at budget revenues, and leave the problems to those who will manage later. Just who will pay compensation?

Another issue electrifying local public opinion is the planned construction of a container port in Swinoujscie, which is associated with further urbanization of the island and the possibility of a potential increase in pollution of the surrounding waters, e.g. as a result of an incoming ship crash. Such concerns are expressed by the current mayor of Swinoujscie, Joanna Agatowska, as well as by German local government officials from bordering Polish spas. What may be good for the Polish economy will not necessarily be so for local residents. I know similar situations from Upper Silesia all too well!

Sailing the sea

I, meanwhile, look at the sea from Grodno, Wiselka and Kolczewo. Here, for the time being, urbanization has not arrived, and it only takes these dozen kilometers for the water to become clearer, and the only sound left is the sound of the sea. Maybe you should try to swim from Heringsdorf to the Kikut lighthouse in Wisełka, hidden in the forest? Then I would walk home through the forest. The route by water would be less than 30 km, the walk would take an hour. The crossing would become *a swim home*.

If one wanted to cross the entire Pomeranian Bay, one would have to start from Cape Arkona on Rügen and land in Jaroslawiec. This is, however... 200 km! Swimmers may find the winkel, as the Germans say, the part of the bay cut in between the two countries, where the Swina River enters the Baltic Sea, attractive. From the pier in Heringsdorf you can see Międzyzdroje and Gosan - the bright rocks on the horizon resemble the cliffs of southern England.

I train throughout the summer, swimming along the shore from Swietouścia towards Wiselka. Usually 2 to 5 km, sometimes longer stretches. In stormy weather I move to Lake Recze, which is located in Kolczewo. I am ready for the swim test on September 1. I follow the weather apps to hit a slight tailwind or flare. Unfortunately, as if out of spite, the winds pick up and reach up to 28 knots, which causes a big swell in the bay.

Note that a wave coming from the northwest or east will bounce off the shore and return, causing interference that interferes with swimming. If the wind is blowing from the south, with a cliff shore, the waves are not perceptible to a swimmer sailing close to the surf line. The winds pass over the top. I finally decide to attempt the swim on September 12, with not the best weather. I'm afraid that in the second half of the month the water temperature will start to drop and the winds will increase, and I won't have the opportunity to try my hand.

At 6 a.m. I board the yacht Falkor in Swinoujscie. I am accompanied by Captain Jacek Jasinski, my wife Sylwia, Pawel Stasiewicz and Martyna Jakubska, acting as lifeguard. We sail to the pier in Heringsdorf. At 7:17 I jump into the water and swim up to the very pier where I want to launch. The water in the initial stretch is unprecedentedly clear.

There are jellyfish swimming around, which line up on different floors. I see one a meter below me, another two meters below, and a third even deeper. Underwater cosmos. We initially took a course for White Mountain, but the southwest wind and current push me north, making me move very slowly. The current is created by the not-so-clean water flowing out of the Swina River. For the first two hours I cover only two nautical miles. The tide pushes my right arm off the track with each stroke, and morale drops a bit.

So we decide to turn to Miedzyzdroje, where I will land. The skipper doesn't have that much time to sail on. He thought I would be faster. The whole route, following the curve, is only 21 km, but realistically I probably covered more, because I swam 8 hours and 48 minutes. The water temperature was 19°C throughout, the air was 8°C at the start, then 14°C, and 17°C at the finish. I swam in just swim trunks, cap and goggles, without touching the boat, non-stop. I was not cold. The conditions were not very good, but still the best, looking back two weeks. I swam through the fairway and anchorages on the way, but everything went smoothly. We asked one fishing boat to change course slightly because of my attempt.

From afar I could also see the gas port and the long concrete breakwater, beyond which the water quality began to improve somewhat. In Miedzyzdroje, the water became more turbid. I fed mainly on bananas thrown into the water and apple juice from a bidon on a string. Landing on the beach by the pier in Miedzyzdroje, I still had the strength to continue the crossing, but the late hour made it impossible to continue the adventure. On the shore I was greeted by the local swimming club Children of the Baltic and tourists. In the end, I am satisfied, because it is unclear whether such an attempt will be possible when the work on the planned container port in Swinoujscie begins. I'm glad that we managed to have a *home swim* at the end of the summer!

https://wodnesprawy.pl/przewodnik-plywacki-po-wyspie-wolin-najwieksza-pols/

In the sea hope

Wolin Island and Swinoujscie on Usedom are changing rapidly, and we are facing challenges only recently recognized. Former Minister Marek Gróbarczyk had a plan to turn Wolin Island into a second Miami. But doesn't this mean development of the construction industry? Will powerful hurricanes haunt our region in the future, as they have in Florida? I asked Prof. Jacek Tylkowski the question about the future of the coast and the Baltic on this occasion. Earlier I also listened to oceanographer Prof. Marcin Węsławski. Both specialists are reassuring. The rising water level of the world ocean can increase life-giving inflows of oxygenated water, and new species of flora and fauna do not threaten too much the Baltic ecosystems, which are very poor and leave niches for newcomers. And the truth is that nature itself will correct people's long-range plans.

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pic. main: scooter56 / pixabay

(CYBER)WATER HEALTH SECURITY

Posted on 14 November 2024 by Ewa Wysowska

For a (non-)IT professional or (non-)pentester, the approach to cyber-security in the context of water health security seems to be a pretty much abstract concept. While there are reports from time to time in the media about attempted attacks (or successful attacks) on water supply systems, a closer look at the subject from the point of view of an environmental engineer has always seemed to me to be beyond competence. And here comes the first question - is cyber security in water utilities (and not only) exclusive to IT/automation/monitoring/control departments, etc.? Nothing could be further from the truth.

Categories: Feedback, In this issue, Issue 21/2024, Onet
Tags: health, security, water

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The critical and important role of the water and sewer industry in cybersecurity

Currently, we are seeing a feverish preparation of the water industry (as one of the key sectors - but more on that below) for the requirements of the new EU directive on cyber security, and a veritable rash of solutions to adapt to the new requirements.

How to approach it?

Directive (EU) 2022/2555 of the European Parliament and of the Council of December 14, 2022 on measures for a high common level of cyber-security within the Union (the so-called NIS 2 Directive) entered into force last January and replaced Regulation (EU) No. 910/2014 and Directive (EU) 2018/1972 and Directive (EU) 2016/1148. The document primarily aims to harmonize across the Community the requirements and level of security in cyberspace, control of the indicated risks and cooperation in this regard.

Exactly on October 17, 2024, the deadline for transposing EU regulations into national law passed. The draft amendment to the Law on the National Cyber Security System (NSC) and Certain Other Laws (hereafter referred to as the draft) is currently undergoing an intensive process of adoption. The document (dated October 3, 2024) is already after consultations and, according to assumptions, is expected to be adopted later this year by the Council of Ministers and finally enacted at the beginning of 2025. It should be mentioned that the current law on the National Cyber Security System has been in force since August 2018.

What to use to implement safety rules?

A set of important guidelines for maintaining cybersecurity, for both public and private entities, is the National Cyber Security Standards (NSC). The study contains recommended solutions for maintaining the security of networks and information systems. The indicated guidelines have been prepared based on the US National Institute of Science and Technology (NIST) standards and appropriately referenced to the realities of national law (as of the date of preparation), and apply to entities of the national cyber security system, including key service operators.

The aforementioned *guide* fulfills the state's commitment to develop and implement National Cyber Security Standards, stemming from the Cyber Security Strategy 2019-2024. The guidelines provide valuable suggestions and guidance, including on selecting solutions, planning for emergencies, and managing cloud accesses. The NSC cites confidentiality, integrity and availability as the main attributes of cyber security. These standards are subject to successive reviews and updates. At this point, it is worth mentioning that on October 28, 2024, a draft of Poland's Digitization Strategy for the next 10 years was presented by the Ministry of Digitization. One of its priorities is cybersecurity in the broadest sense, including with the use of AI. The document has been sent for public consultation, where comments can be submitted until December 10, 2024.

In relating cyber security requirements to the water sector, which makes extensive use of industrial networks (e.g., SCADA-type software), equipment controllers, etc., it is useful to use the international series of standardsIEC 62443, which specifies requirements for threat

prevention for both users and solution providers and integrators. Minimum standards for information security are indicated by the ISO/IEC 27001 standard.

In this article we will focus on the challenges that water utilities will face after the implementation of the NIS 2 Directive into national law, that is, after the implementation of the update to the NSC Law. The document presented here introduces many changes and will very much affect the operations of the water supply sector.

For starters, it implements a self-identification mechanism by key or important entities. According to the draft law, a key entity is *a natural person, a legal person or an unincorporated organizational unit indicated in Annex 1 to the Law, which exceeds the requirements for a medium-sized enterprise set forth in Art. 2 paragraph. 1 of Annex I to Commission Regulation (EU) No. 651/2014 of June 17, 2014 declaring certain types of aid compatible with the internal market in application of Article 107 and 108 of the Treaty (Official Journal of the EU L 187 of 26.06.2014, p. 1), hereinafter referred to as Regulation 651/2014/EU.*

Therefore, in order to identify themselves in the appropriate group of entities, it is necessary to consider the indicated premises. Water supply companies qualify under the heading: Drinking water supply and distribution, i.e., entities that supply water for human consumption, including water supply and sewerage companies, as referred to in Article 2(4) of the Act of June 7, 2001 on collective water supply and collective sewage disposal (Journal of Laws of 2024, item 757), excluding entities for which the supply of water for human consumption is a non-essential part of the overall business.

The second item in the classification is Collective Sewage Disposal - entities that discharge or treat sewage, including water and sewerage companies, as referred to in Article 2(4) of the Law of June 7, 2001 on Collective Water Supply and Collective Sewage Disposal, excluding entities for which the discharge or treatment of sewage is a non-essential part of the overall business.

If an enterprise classifies itself into the above-mentioned groups of entities, it meets the first condition for inclusion in the National Cyber Security System (KSC) as a key entity. The next depends on the size of the enterprise. If a water and sewage enterprise meets the status of a medium-sized entrepreneur - it is recognized as a key entity. On the other hand, if it has the status of a large entrepreneur - it is recognized as a key entity . The scheme of considerations is shown in Figure 1.

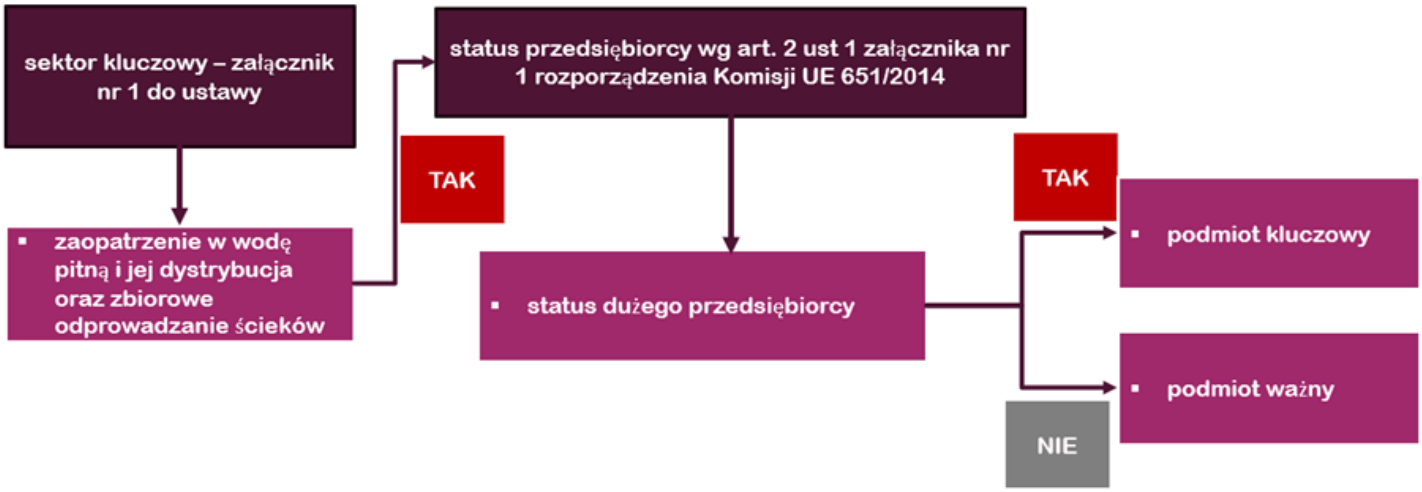

Fig. 1. Schemat postępowania przy samokwalifikacji jako podmiot kluczowy lub ważny dla przedsiębiorstw wod-kan

Key entity, important entity - responsibilities

In practice, qualification for the group of key or important entities actually differs little. In principle, the obligations arising from inclusion in

the National Cyber Security System (NSC) for both types of entities are very similar. Only in the case of important entities are surveillance measures imposed only after a breach is detected (ex post). In addition, key entities will be subject to information security system audits.

The main obligation imposed by the bill on designated KSC units is to implement an information security management system (SBI). It requires, in addition to drafting, updating, archiving and, above all, applying documentation of continuous efforts to secure and monitor undesirable incidents, also their elimination and preventive response. KSC entities will be required to systematically estimate the risk of an incident, implement risk estimation and information system security policies, action plans to ensure the confidentiality, integrity, availability and authenticity of information and contingency plans, as well as cryptography policies and procedures, including encryption. So much for the theory.

On the technical side, KSC entities will be required to implement a continuous monitoring system (Security Operations Center - SOC), or "Cyber Command Center." And here the financial and organizational question arises - who is to be responsible for this? Is a separate cyber security organizational unit, or an external unit professionally dedicated to cyber security? Both solutions have their advantages and disadvantages and probably as many supporters as opponents.

However, the choice requires a detailed analysis of security, organizational structure (including appropriately qualified human resources) and financial resources. Taking into account security issues, it is necessary to pay attention to the fact of possible sharing of IT/OT infrastructure with the entity externally, thus letting it into the entity's own resources and systems to monitor and secure them remotely. This implies the need for appropriate contractual regulations and the implementation of prevention.

Another requirement imposed on KSC entities, and involving a real cost, is the obligation to conduct a security audit of the information system used to provide services by key entities, and submit the report to the relevant supervisory authority. Significantly, the KSC supervisory authority may also order an audit.

The head of the entity responsible for cyber security

According to the wording of the draft law on the KSC, as in the case of the regulations on the protection of personal data (RODO), the head of the key entity or major entity is responsible for fulfilling the obligations related to it. When the function is performed by a multi-member body and no responsible person has been designated, all members of the body are responsible.

What mobilizes most - possible penalties

What if an entity fails to meet its obligations or significantly violates them? According to the wording of the bill, heavy penalties will apply. Here it should be noted that, according to the assumptions, they may apply to the entity, but also to the head of the entity personally as responsible for cyber security.

How do digital security requirements relate to the security of the quality and quantity of water directed to consumers?

Water supply companies are obliged to comply with very strict requirements related to the quality of water directed to consumers. Regulations impose detailed obligations on the sector to monitor, treat and maintain water quality in the water supply network. In the era of digitalization, AI and the automation and computerization of water supply systems, it is impossible to limit water quality security solely to

protecting infrastructure and monitoring physical parameters. There is a close connection between the cybersecurity of processes and the services provided - so vital to the health and lives of residents. Water supply systems are increasingly no longer *just a pipe buried in the ground*, but are widely developed systems full of automation, regulation, OT network connections and control. They are thus becoming potential targets for cyber-attacks that could threaten the health security of water.

In addition, as with the requirement to inform consumers about the quality of water supplied to them, key and important players will likely be required to provide the service user with access to knowledge to understand cyber threats and types of security.

Tick tock - October 17, 2024 behind us

Given that October 17, 2024 was the deadline for the implementation of EU regulations into national law and work is still ongoing - there is little time left to adapt to the new requirements. According to the announcements, the amendment to the KSC Law is expected to come into force within 1 month from the date of its promulgation (vacatio legis).Entities will have 6 months to comply with the new obligations and implement a safety management system, and 3 months to register in the list of entities covered by the KSC.

The challenges posed by new regulations and the requirements of the environment, regardless of the classification of the entity, will result in the need for financial outlays for the implementation of new solutions, as well as organizational (hiring of specialists) and training (training of staff) changes. And here, unfortunately, everything depends on the funds available to the entity.

A key issue in the implementation of cyber security in an entity is cooperation between IT departments, separate cyber security units, management and other organizational units of the entity - from the management level to the employee who is in no way associated with cyber security issues. Without proper awareness, backed by knowledge and, above all, interaction, it is impossible to implement and effectively manage a cyber security system to ensure adequate protection.

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

1. Draft Law on Amendments to the Law on the National Cyber Security System and Certain Other Laws dated 03/10/2024. https://mc.bip.gov.pl/projekty-aktow-prawnych-mc/902927_projekt-ustawy-o-zmianie-ustawy-o-krajowym-systemie-cyberbezpieczenstwa-oraz-niektorych-innych-ustaw.html

2. Directive (EU) 2022/2555 of the European Parliament and of the Council of 14 December 2022 on measures for a high common level of cyber-security in the territory of the Union

3. National Cyber Security Standards (NSC) https://www.gov.pl/web/baza-wiedzy/narodowe-standardy-cyber.

4. National Institute of Science and Technology (NIST) https://www.nist.gov/

5. Draft Digitalization Strategy of Poland https://www.gov.pl/web/cyfryzacja/strategia-cyfryzacji-polski-do-2035-roku

THE WORLD'S LARGEST CROCODILES. HOW HAVE THEY SURVIVED SINCE THE TIME OF THE DINOSAURS?

Posted on 14 November 2024 by Iwona Szyprowska-Głodzik

Crocodiles, some of the oldest creatures on Earth, remember the days when dinosaurs ruled the world. These powerful reptiles, living relics of prehistory, have adapted to a wide variety of environments - from swampy rivers to coastal saltwater. Over millions of years of their evolution, some species reached gigantic sizes, and although today's crocodiles are smaller than their prehistoric ancestors, they still impress with their size and strength, occupying the top of the food chain in their ecosystems. How crocodiles have faced millions of years of evolution Crocodiles, one of the oldest vertebrate lineages, have survived numerous episodes of climate change and adapted to a wide variety of environmental conditions, allowing them to evolve for more than 200 million years. During warmer periods abundant with food, prehistoric crocodiles reached impressive sizes - some could measure as much as 12 meters. Over time, in response to changing environmental conditions and the limited availability of food resources, evolution steered them toward a more compact size. Their remarkable adaptability has allowed them to inhabit a wide variety of ecosystems, from brackish coastlines to freshwater rivers and swamps. An example is the roseate crocodile (Crocodylus porosus), which has developed the ability to travel hundreds of kilometers across the open sea, enabling it to occupy new areas. Climate change has affected not only the size of crocodiles, but also their behavior and hunting strategy. In response to rising temperatures, modern crocodiles have modified their seasons of activity and food acquisition to survive in changing ecosystems. What's more, scientists have noted that ambient temperature affects the sex ratio among young crocodiles - warmer conditions can result in a preponderance of one sex in the new generation. Such mechanisms are crucial to the survival of these reptiles, which, despite their smaller size than their prehistoric ancestors, still dominate their environments as powerful predators. Here are the largest modern crocodile species that still command respect.

Categories: From the world, Issue 21/2024, Onet
Tags: crocodiles, dinosaur, evolution

Crocodiles, some of the oldest creatures on Earth, remember the days when dinosaurs ruled the world. These powerful reptiles, living relics of prehistory, have adapted to a wide variety of environments - from swampy rivers to coastal saltwater. Over millions of years of their evolution, some species reached gigantic sizes, and although today's crocodiles are smaller than their prehistoric ancestors, they still impress with their size and strength, occupying the top of the food chain in their ecosystems.

How crocodiles faced millions of years of evolution

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Climate change has affected not only the size of crocodiles, but also their behavior and hunting strategy. In response to rising temperatures, modern crocodiles have modified their activity seasons and food acquisition to survive in changing ecosystems. What's more, scientists have noted that ambient temperature affects the sex ratio among young crocodiles - warmer conditions can result in a preponderance of one sex in the new generation. Such mechanisms are crucial to the survival of these reptiles, which, despite their smaller size than their prehistoric ancestors, still dominate their environments as powerful predators. Here are the largest modern crocodile species that still command respect.

The rosary crocodile - the largest living crocodile

The roseate crocodile, also known as the marine or Australian crocodile (*Crocodylus porosus*), is the largest living representative of its species, reaching impressive sizes. Adult males typically grow up to 5-6 meters, with record specimens measuring up to 7 meters and weighing more than 1 ton. Females are smaller, reaching 2.5-3 m. The body of the roseate crocodile is covered with thick, scaly skin, the hue of which varies from dark green to brownish-gray, which perfectly camouflages it in muddy waters and among lush coastal vegetation.

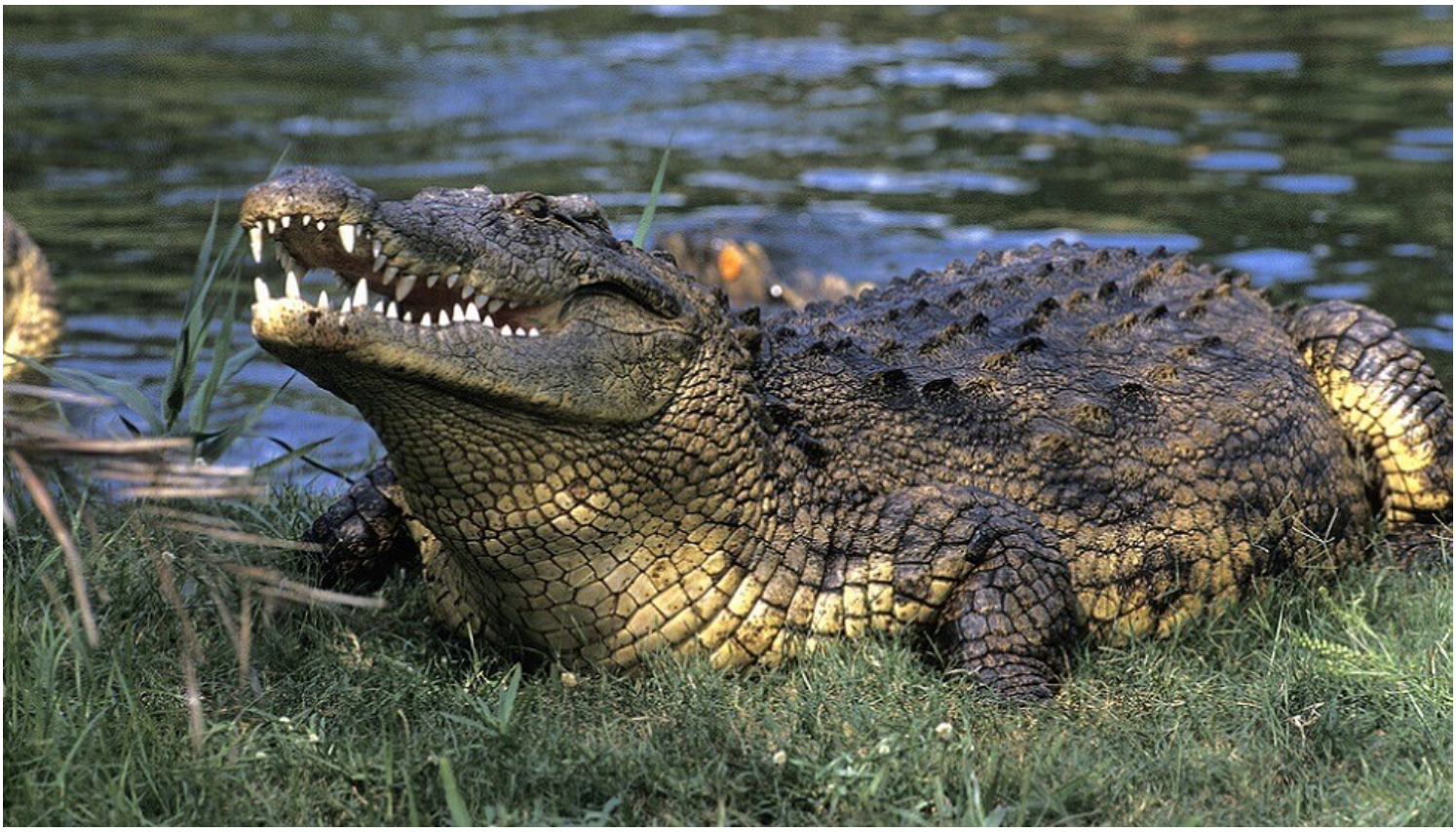
The rosary crocodile's natural habitat is the coast of Australia and the rivers and estuaries of New Guinea, Indonesia and Southeast Asia. It can adapt to both fresh and brackish waters, allowing it to travel hundreds of kilometers across the open sea. Thanks to its unique adaptability, the roseate crocodile hunts a wide range of prey - from fish to birds to mammals such as wild boar and cattle. Its method for obtaining food is to silently swim up to its prey, attack instantly and crush it with its jaws, which generate pressure in excess of 1.7 tons.

Nile crocodile - Africa's largest predator

Nile crocodile (*Crocodylus niloticus*), an icon of the African backwoods, is one of the continent's most dangerous predators. Adult males can reach 5-6 meters in length and weigh up to 900 kg, while females are smaller and usually measure 3-3.5 meters. Its olive-brown, scaly skin with dark spots helps it blend in with the environment of muddy rivers and marshes, where it spends most of its life.

Nile crocodiles inhabit the rivers, lakes and wetlands of Africa, including the Nile, Congo and Zambezi valleys, as well as Africa's Great Lakes. They are sometimes found in brackish waters, such as estuaries. They live semi-aquatic lives, often basking in the sun, but it is in the water that their most important hunting takes place. The diet of the Nile crocodile is diverse - it hunts fish, birds, reptiles, as well as larger

mammals such as buffalo and antelope. The exceptional strength of its jaws allows it to easily overpower and strangle even the largest prey. The Nile crocodile is also a key predator in the ecosystem, regulating the numbers of other species and preventing its prey from over-reproducing, which supports the biological health of Africa's rivers and wetlands.



pic. slowmotiongli / depositphotos

American crocodile - the tropical giant of the Americas

The American crocodile (*Crocodylus acutus*) is one of the largest crocodiles of the Americas, typically measuring 3-4 m, although there are known cases of individuals reaching 5 m in length and weighing over 450 kg. Females are smaller, usually reaching 2.5-3 m. Its slender body and light gray or brown coloration with dark spots allows it to hide well in coastal waters.

This species of crocodile prefers coastal environments - rivers, estuaries and lagoons, as well as the brackish water of the Central American and Caribbean coasts. Thanks to its adaptation to brackish waters, the American crocodile can migrate considerable distances along the coasts. It hunts a variety of animals - from insects and small fish in its youth, to birds and mammals in adulthood. The American crocodile is quieter than the roseate and Nile crocodiles, but an encounter with it can be dangerous. Its population has been gradually increasing in recent years thanks to reintroduction programs.

pic. mecan / depositphotos

The orinoco crocodile - a rare and endangered predator of the Amazon

The orinoco crocodile (*Crocodylus intermedius*), which inhabits the Orinoco River basin in Colombia and Venezuela, is one of the world's most endangered crocodiles. Males reach 5-6 meters in length, and females typically 2.5 to 3.6 meters. The body of this crocodile is slender, with an olive-gray coloration that camouflages it perfectly in the coastal waters of the Amazon.

The orinoco crocodile chooses quiet rivers, lakes and swamps, hunting mainly fish, although adults also attack birds, turtles and mammals. Interest in its high-quality skin has made it critically endangered. Many conservation programs are trying to restore its population through breeding and reintroduction to prevent the species from becoming extinct.

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Black caiman - the largest of the alligators

Black caiman (*Melanosuchus niger*) is the largest representative of alligators, living in the Amazon basin. Adult specimens reach 5-6 meters in length and can weigh up to 0.5 tons. Its dark, almost black coloration provides it with excellent camouflage in shady waters and on muddy riverbanks.

The black caiman hunts a variety of animals - in its youth for insects and crustaceans, and as an adult for fish, birds, capybara and even young deer. Ambushes are its specialty - it approaches silently to instantly attack its prey and drag it underwater. Although black caimans were commonly killed for their skin in the past, today they are protected and their population is slowly recovering thanks to conservation efforts.

pic. riverriver / depositphotos

The role of crocodiles in the ecosystem and the need to protect them

As one of the largest and oldest predators, crocodiles play a key role in their ecosystems. Their presence at the top of the food chain helps control populations of smaller animals, which supports biological balance. They also play a role in distributing nutrients that support vegetation and provide resources to other organisms in the aquatic environment.

With increasing threats such as poaching, habitat destruction and climate change, crocodile conservation is becoming more urgent. Monitoring programs, captive breeding and reintroduction are essential to ensure their survival. Preserving crocodiles is a concern not only for their future, but also for the sustainability of the ecosystems of which they are an integral part.

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pic. main: David Clode / Unsplash

PREHISTORIC WATER CREATURES THAT CAN BE CONSIDERED MONSTERS

Posted on 14 November 2024 by Justyna Błach-Sachnik

For millions of years, the oceans have been a battleground for giant predators, which, with their size and strength, struck fear into the hearts of sea creatures. Those were times when creatures of extraordinary size and killer instincts reigned among the waves and depths - from the mighty Megalodons to the ruthless Mosasaurs and Tylosaurs. Each of these creatures possessed unique hunting skills, perfectly adapted to their living environment. These beasts, which could inspire legends, hunted with ruthless efficiency, maintaining their power over the oceanic ecosystem. Although these colossi are long extinct, they continue to fascinate researchers and natural history enthusiasts alike. Thanks to modern paleontological discoveries, every fossilized trace brings us closer to the world of ancient sea dwellers whose size, strength and way of life were unique.

Categories: From the world, Issue 21/2024, Onet
Tags: evolution, ocean, predators

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1. megalodon - king of the oceans millions of years ago

Megalodon, or *Carcharocles megalodon*, is one of the most fascinating yet terrifying creatures ever to inhabit the ocean. Its history dates back to the Miocene and Pliocene, from about 16 to 3.6 million years ago, and its size and strength still evoke awe today. Traces in the form of huge teeth found in various corners of the world are proof that Megalodon was a true monarch of the seas, and its hunting abilities continue to generate much excitement, both among scientists and lovers of marine legends.

A giant in the ocean, or the largest prehistoric aquatic creature

Megalodon was undoubtedly the largest shark ever to exist on Earth. It reached as much as 18 meters in length, the equivalent of several buses lined up behind one another. By comparison, the largest modern whale shark*(Rhincodon typus*) can grow up to about 12 m, making this aquatic creature a true giant of its time. Megalodon's body weight could be around 60 t, making it capable of hunting really large marine animals.

Powerful jaws and unique teeth made hunting easier

Giant jaws, consisting of numerous rows of jaws, are pointed out as a special feature of Megalodon. Replacing each other throughout its life, its teeth were among the largest ever to exist among fish, reaching up to 18 cm in length. Very hard, they were an ideal adaptation for grinding the flesh of large marine mammals such as dragonflies and seals.

Megalodon was a predator of extraordinary efficiency. It hunted the largest marine animals of its time, including whales, large fish, and smaller sharks. According to researchers, it may have used a variety of hunting techniques, such as surprise attacks and fleeing with its prey from the hunting site.

Megalodon in pop culture

There is no doubt that the Megalodon has become one of the most famous sea beasts in history. The films *Sharknado* or *Meg* brought it to movie and TV screens, where it gained status as a true monster of the ocean.

While modern technology does not allow us to discover whether the Megalodon could still survive today, there is no doubt that its huge jaws and teeth remain one of the symbols of prehistory in oceanic waters.

2. liopleurodon, as an infernal predator from the past

Liopleurodon is one of the largest sea lizards from the Jurassic period, about 150 million years ago, with a reputation as a true king of the oceans. It could reach a length of 25 meters, and its powerful maw was full of razor-sharp teeth. It hunted whales, fish and marine reptiles. Although it was not as huge as the Megalodon, its speed and agility in the water made it just as dangerous.

Liopleurodon's body structure and clever hunting techniques

Its elongated body with a strongly built head was perfectly adapted to life in the water. Liopleurodon had short but strong limbs that acted as flippers, and powerful jaws with numerous sharp teeth.

Liopleurodon hunted a variety of marine animals. Interestingly, it was not only his physical aptitude that made him an effective hunter, but also his cunning. He attacked by surprise, but was also able to swim after his prey for so long until it fell from exhaustion. He was fast and strong, so he could effectively hunt large animals, including other marine reptiles such as the smaller pliosaurs, as well as fish from the ammonite family.

3. Tylosaurus - a stalker from the ocean

Tylosaurus is one of the most impressive prehistoric predators that ruled the oceans in the Late Cretaceous, some 80 million years ago. It grew to an impressive 14 meters in length, making it one of the largest marine predators of its era. It had a streamlined shape, so it moved quickly in the water, and strong limbs that acted as rudders.

Surprising hunts

As a predator, Tylosaurus possessed a unique ability to hunt a variety of animals. Its elongated maw was full of sharp, curved teeth, and it also surprised its prey by unexpectedly changing its direction of movement.

Thanks to this clever hunting technique, Tylosaurus was able to react instantly to changing circumstances and use its sense of sight and smell to locate potential prey.

4. mosasaurus - shadow of marine dominance

Mosasaurus is one of the most famous and impressive prehistoric marine reptiles that lived in the Late Cretaceous, about 66 million years ago. Its length, which could reach up to 17 meters, made it one of the largest predators of its time. Although often compared to modern crocodiles, it was related to snakes and lizards. Mosasaurus was a reptile with a long, streamlined body, adapted to life in water and with strong limbs in the form of flippers.

Structure and hunting abilities of Mosasaurus

Its impressive maw was full of sharply pointed teeth, ideally suited for grabbing and holding fish, crustaceans and other sea creatures. This predator had the ability to open and close its maw quickly, allowing it to capture prey efficiently. It appears to have been one of the most

versatile predators of its time, capable of hunting both fish and smaller marine reptiles such as ammonites, as well as various organisms living on the ocean floor.

Despite the fact that Mosasaurus lived at a time when huge land dinosaurs ruled the Earth, it was one of the highest links in the food chain in the oceans. Its hunting abilities and incredible size made it a truly formidable predator. Not surprisingly, Mosasaurus is the inspiration of many legends and myths about sea monsters.

Mosasaurus, with its strong jaws, large eyes and efficient fins, was not only faster and more maneuverable than other marine predators, but also more versatile than them.

Extinction of the largest prehistoric aquatic creatures

The extinction of large prehistoric marine predators such as Megalodon, Liopleurodon, Tylosaurus and Mosasaurus had various causes that reflect changes in the ocean environment. Megalodon disappeared about 3.6 million years ago, and its extinction may be the result of climate change, changing water temperatures, a decline in the number of large marine mammals that provided its food base, and competition. Liopleurodon's extinction, on the other hand, occurred about 100 million years ago, but the legend of this marine predator has persisted through scientific research and popular stories.

Tylosaurus and Mosasaurus disappeared during a mass extinction event at the end of the Cretaceous, some 66 million years ago, when catastrophic changes in climate and environment, triggered by an asteroid impact on the Chicxulub crater and intense volcanic activity, led to global changes. Declining oxygen levels in the oceans, acidification of the waters and cooling of the atmosphere destroyed many marine ecosystems, which affected the availability of food for these giant predators. Tylosaurus, like other mosasaurs, was unable to adapt to the new conditions, leading to its extinction.

All of these extinctions are part of a larger phenomenon that has changed life in the oceans, paving the way for new groups of marine animals such as dolphins, sharks and cetaceans.

Prehistoric water creatures inspire fear, yet curiosity?

Prehistoric aquatic creatures inspire fear not only among researchers, but also in pop culture, where they continue to appear as inspiration for sea monster myths. These amazing animals that once dominated the oceanic depths have left behind traces that we can study and admire today. Although many of *the monsters* are no longer in our waters, their legendary power still fascinates and reminds us how strange and untamed the world of millions of years ago could be. If you enjoyed this article and want to read about other unusual deep-sea creatures, please visit our website. Learn interesting facts about menacing-looking predators, but also about gentle, almost fairy-tale-like creatures.

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pic. main: generated AI

CYANOBACTERIA - COMMON MICROORGANISMS THAT CAN BE DANGEROUS

Posted on 14 November 2024 by Michał Adamski

Cyanobacteria (cyanobacteria) are ancient prokaryotic organisms (having no cell nucleus). Traces of their presence have even been discovered in Precambrian sediments dating back 3.5 billion years. Cyanobacteria cells are photoautotrophic, meaning that they produce organic compounds through photosynthesis. Photosynthesis, of which oxygen is a byproduct - so-called oxygenic photosynthesis - is believed to have first appeared precisely in cyanobacteria, which is why these organisms are classified as pioneers supplying the Earth's atmosphere with this gas. To date, about 2,000 species of cyanobacteria have been described, however, given their cosmopolitan lifestyle, new ones are still being discovered.

Categories: Science, Issue 21/2024
Tags: blooms, cyanobacteria, cyanobacteria

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Cyanobacteria - brief characteristics

Cyanobacteria are organisms that were originally aquatic, but now occupy other ecological niches, but are still most commonly associated with water. Their activity is recorded in both fresh and salt water, solid and flowing. On land, they are found in soil environments, on tree bark and other plant tissues (such as leaves). There are species whose cells can float in the air (aerophytic), while others, such as the genus *Nostoc,* enter into symbiosis with vascular plants (e.g., ferns or sago) and provide their partner with nitrogenous compounds, which they convert to a plant-available form (ammonium ion) using molecular atmospheric nitrogen.

The ability to fix atmospheric nitrogen is a feature possessed not only by symbiotic cyanobacteria. Some free-living ones are also able to do this, using an enzymatic nitrogenase complex contained in special cells (heterocytes) where anaerobic conditions prevail. This is an extremely interesting metabolic arrangement - in part of the cyanobacterial cells, oxygen is released through photosynthesis, and next door, in heterocytes, nitrogenase works in the absence of oxygen. Cyanobacteria have a diverse structure - there are spherical forms, which are shaped like a sphere (e.g. *Microcystis* sp.) and filamentous forms (e.g. *Anabena sp.*). For the most part, they take on a characteristic blue-gray coloration, resulting from the presence of the pigment phycocyanin.

Positive and negative effects of cyanobacteria

In recent years, cyanobacteria have increasingly been the focus of research groups around the world. The reason is, among other things, their ability to produce compounds that can find applications in medicine, pharmacy or cosmetology. Unfortunately, their presence can also pose a serious problem in natural ecosystems, as their excessive growth - the so-called bloom - carries a number of negative consequences. Reports of cyanobacterial blooms in recent decades have been appearing regularly and with continuously increasing frequency. This is due to the continuous discharge of municipal, industrial, as well as agricultural pollutants into waters (e.g., surface runoff of fertilizers), the presence of which in reservoirs results in the occurrence of high concentrations of biogenic elements (mainly nitrogen, carbon and phosphorus) - the so-called eutrophication.

Water containing a large amount of biogenic elements, provides an excellent medium for the growth of cyanobacteria, which in extreme cases can dominate other microorganisms in the water body, covering it with a green sheepskin of their cells. This contributes to a greater turbidity of the water, which ultimately reduces the access to light necessary for aquatic plants and causes their death.

Although cyanobacteria themselves produce oxygen, their cells also consume it, and as a result of the putrefactive processes that develop during a bloom, so-called anoxia, a condition in which the oxygen content of a body of water is insufficient, quickly develops. A frequent consequence of this phenomenon is the death of animals such as crustaceans, mollusks and fish. Not insignificant in the appearance of cyanobacterial blooms are also climatic changes, which cause conditions conducive to the excessive growth of these microorganisms in places where previously blooms were rare.

Toxicity of cyanobacteria

Cyanobacteria blooms can disrupt ecological relationships in a water body by producing and releasing toxic secondary metabolites of cyanobacteria - so-called cyanotoxins (cyanobacterial toxins) - into the water. These compounds are one of the most dangerous groups of poisons synthesized in nature. The toxicity of some is comparable to the most dangerous snake venoms or botulinum toxin. It is customary to divide cyanobacterial toxins into four groups, based on the consequences of their effects in vertebrate organisms. The earliest known are those that cause liver cell dysfunction, or hepatotoxins (e.g., microcystin and nodularin).

Their action involves a number of processes, including inhibition of enzymes involved in phosphoric acid metabolism (phosphatases), disruption of lipid metabolism and the integrity of the cell cytoplasm. As a consequence, lipidosis, impaired functioning of bile ducts, bleeding occur in liver cells, which in extreme cases can lead to death. The second group of cyanotoxins are neurotoxins, which act in the central and peripheral nervous system (e.g. anatoxin-a, anatoxin-a(S), beta-N-methylamino-L-alanine). These compounds disrupt acetylcholine-dependent receptors (anaotoxin-a) or inhibit acetylcholinesterase . The result is a disruption of nerve impulse propagation, which is particularly dangerous in neuromuscular systems because it leads to permanent muscle contraction and so-called functional paralysis. If the receptors operating in the respiratory muscles are paralyzed, death by asphyxiation quickly follows.

The results of some studies suggest that neurodegenerative diseases such as ALS-PDC (amyotrophic lateral sclerosis-parkinsonism-dementia complex), which resemble Parkinson's disease and amyotrophic lateral sclerosis in some symptoms, may develop due to the effects of certain cyanobacterial neurotoxins (beta-N-methylamino-L-alanine). The third group of cyanobacterial toxins are compounds that exhibit general cytotoxic properties and impair a number of processes in the cells of various organs. The best known cytotoxin is cylindrospermopsin (CYN). It is a very potent inhibitor of protein biosynthesis, which also aberrates antioxidant systems and consequently leads to oxidative stress. CYN has been shown to inhibit cell proliferation, often exhibiting genotoxicity. It also has carcinogenic properties and interferes with fertilization and maintenance of pregnancy. The last group of cyanotoxins consists of dermatotoxins (e.g., lipopolysaccharides, lyngbyatoxins), which cause irritation of the skin and mucous membranes.

Cyanotoxins lethal only sometimes

The danger of cyanobacterial toxins should not be marginalized, and when a bloom occurs, the water body in question should be immediately excluded from recreational or commercial use. To date, a number of cases of cyanotoxin poisoning have been described, some with very dramatic outcomes In 1978, 148 people, mostly children, were hospitalized in the Palm Island area (Queensland, Australia) after consuming water from a spring covered with a cyanobacterial bloom and contaminated with CYN. In 1996. At the Brazilian dialysis center in Caruaru, dozens of patients have died as a result of treatments carried out with microcystin-contaminated water. Most often, however, cyanotoxin poisoning does not have a radical course - its symptoms resemble the flu. For this reason, it is relatively difficult to link, for example, malaise, diarrhea or vomiting in people vacationing by the water with cyanobacterial activity.

An additional danger is generally the high chemical stability of cyanotoxins (e.g., CYN does not decompose at the boiling point of water), as well as the demonstrated toxicity of their decomposition products. The reasons for the synthesis of toxins by cyanobacteria have not been fully elucidated. The most commonly postulated hypothesis is that cyanotoxins are compounds, enabling them to interact with other microorganisms and gain an advantage in the ecosystem, such as through allelopathy.

Michal Adamski - PhD in biological sciences, assistant professor at the W. Szafer Institute of Botany of the Polish Academy of Sciences. Leader of a team working on compounds synthesized by cyanobacteria and algae. Co-author of dozens of scientific publications. He is currently pursuing a research grant under the Science for Society II program entitled: Can algae be a valuable component of the human diet? (NdS-II/SP/0234/2024/01).

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

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WHERE DOES SO MUCH WATER COME FROM? - A STUDY OF THE MOST ABUNDANT CATCHMENT AREA IN POLAND

Posted on 14 November 2024 by Adam Nawrocki

In Poland, the average water abundance expressed in unit discharge (g) (outflow/catchment area) is ~5.5 l/s/km2. High water resources in southern Poland, in mountainous areas (Carpathians, Sudetes), are genetically related to the so-called orographic precipitation. The highest resources are found in the Tatra Mountains and result from the circulation of water in karst systems and its abundant outflow from extremely productive springs, usually called vents.

Categories: Science, Issue 21/2024

In Poland, the average water abundance expressed in unit discharge (g) (outflow/catchment area) is ~5.5 $^{l/s/km^2}$. High water resources in southern Poland, in mountainous areas (Carpathians, Sudetes), are genetically related to the so-called orographic precipitation. The highest resources are found in the Tatra Mountains and result from the circulation of water in karst systems and its abundant outflow from extremely productive springs, usually called vents.

The most well-known Wywierzysko are: Olczyskie Wywierzysko (Olczyska Valley), Lodowe Źródło (Koscieliska Valley), Chochołowskie Wywierzysko (Chochołowska Valley) and Goryczkowe Wywierzysko, Wywierzyska Bystrej Dolne and Bystrej Górne (Bystrej Valley). All of them have an average outflow of ~100 l/s. Analysis of maps and publications indicates that unit outflow in the Tatras during lows is highly variable and usually spatially related to valleys (Fig. 1).

For example, the specific outflow from the catchment area of the Bystrej stream ranges from 20-25 $^{l/s/km^2}$, and there are as many as three wywierzyska: Bystrej Górne and Bystrej Dolne, as well as Goryczkowe Wywierzysko. There are also catchments where the unit outflow, despite the presence of an wywierzyska, is 8-10 $^{l/s/km^2}$ (Kościeliska Valley). It is worth noting that in the Tatra Mountains there is a catchment area of Olczyska and the "U Lisów" stream, where the unit outflow during lows is very high (q> 25 $^{l/s/km^2}$). The study focused on the catchment area of the "U Lisów" stream, since the thematic maps show a very high outflow, despite the absence of a vent.

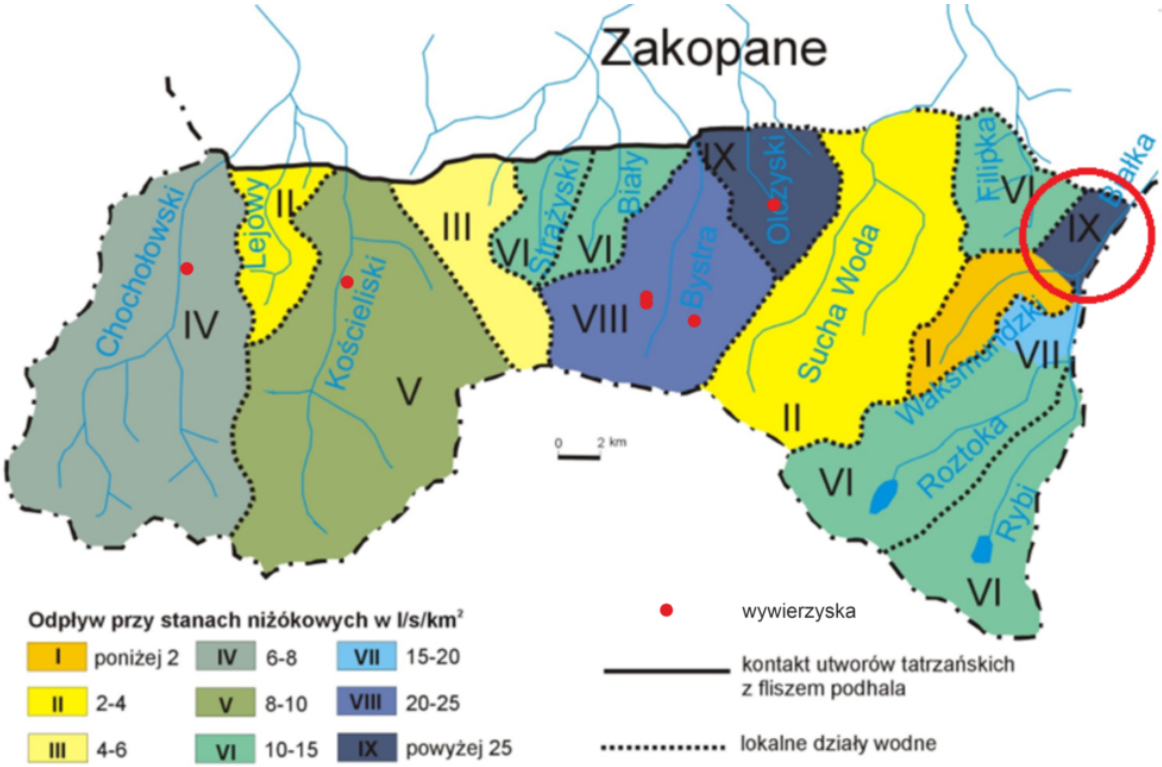

Fig. 1. Odpływ jednostkowy (podziemny) północnych stoków Tatr
(compiled from: Malecka, 1996, Hydrogeological characteristics of the Tatra Mountains in light of monitoring studies)

The stream "U Lisów" - characteristics

It begs the question: how is it possible to have such abundant water in the absence of a vent?

The catchment area of the "U Lisów" stream is located in the Carpathian Mountains, in the Tatra Mountains, within the Tatra National Park.

It extends from the vicinity of the hamlet of Lysa Polana to Palenica Białczańska. The studied catchment area (2.31 ^{km2}) is mainly composed of carbonate rocks, i.e. limestone and dolomite, where on the northwestern side the rocks extend above the surface (Goły Wierch).

On the southeast side, the sedimentary rocks are covered by Holocene Quaternary formations, which consist of boulders, sands and moraine clays (Figure 2). Due to the geological structure of the area (carbonates and alluvium), water can move between catchments by groundwater drainage.

Fig. 2. Głazy węglanowe

The higher parts of the basin are located in a northwesterly direction, with the highest peak of the ridge at 1,430 meters above sea level, while the lowest point in the basin is at 950 meters above sea level, at the mouth of the stream to the Białka River (Fig. 3).

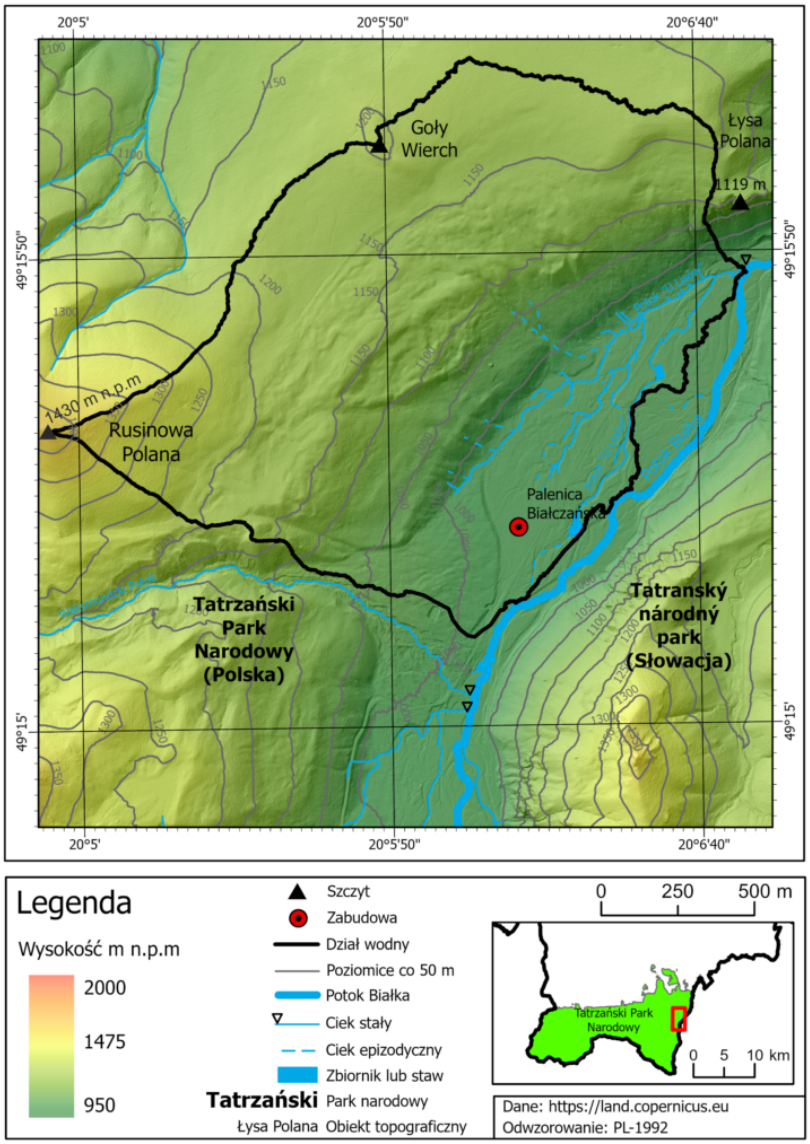

Fig. 3. Rzeźba zlewni potoku „U Lisów”

The catchment area of the "U Lisów" stream is located in the area of influence of the temperate transitional climate of the high mountain variety in the moderately cool and cool floors. These floors are dominated by air temperatures in the range of 2°C to 4°C and average annual precipitation of 1200 mm to 1400 mm.

Research Methodology

In order to learn about the genesis of waters in the catchment, the area was surveyed using the hydrological-chemical mapping method. The method involves locating water objects (outflows and watercourses) in the catchment and determining physical-chemical parameters, i.e.: water temperature and specific electrolytic conductivity referenced to 25°C , which allows field estimation of water mineralization. The higher the conductivity, the higher the mineralization, i.e. the sum of dissolved ions in the water. The above parameters at 128 sites (outflows, watercourses) were measured with a WTW Multi 350i conductivity meter (Fig. 4). Water velocity was measured with an electromagnetic mill at the mouth of the stream to the Białka River, and the flow rate was calculated using the indirect point method.

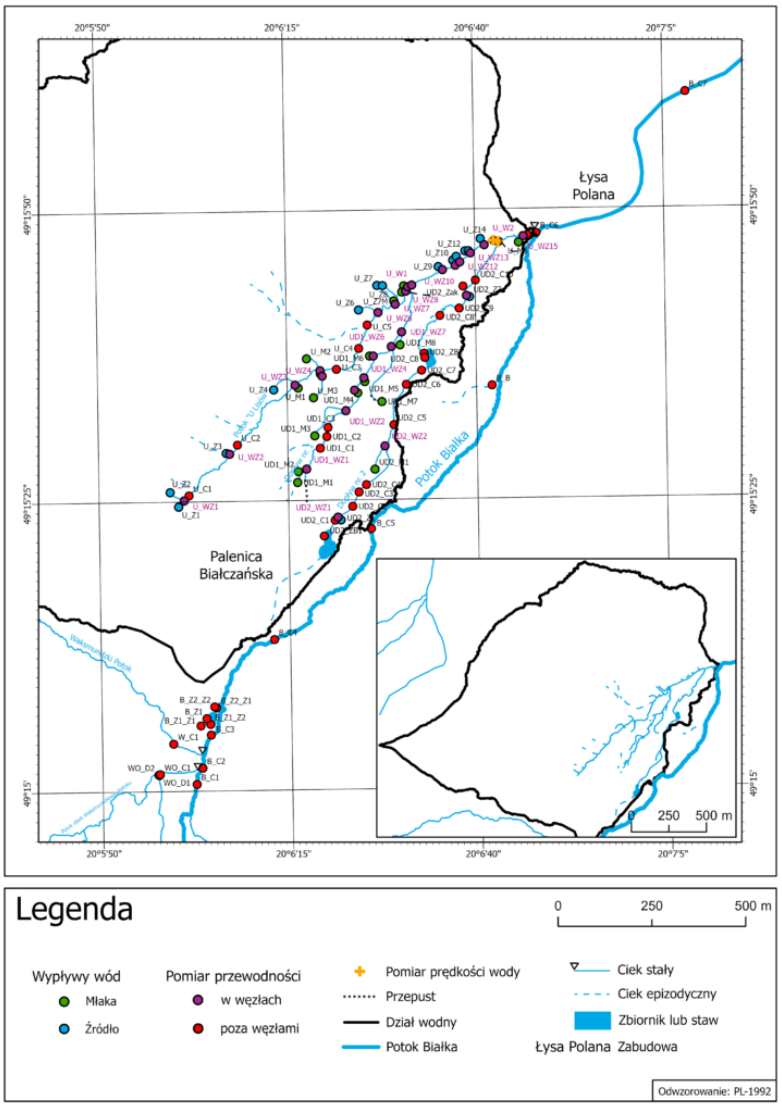

Fig. 4. Punkty pomiarowe w zlewni

The chamber work consisted of calculating the hydrographic parameters of the catchment (crenological index and density of watercourses) and analyzing the distribution of physical and chemical features of groundwater and surface water. The catchment parameters concerned the symmetry of the catchment, the analysis was carried out between the left bank side and the right bank side, where the main watercourse is the westernmost one, called the "U Lisów" stream (Fig. 5).

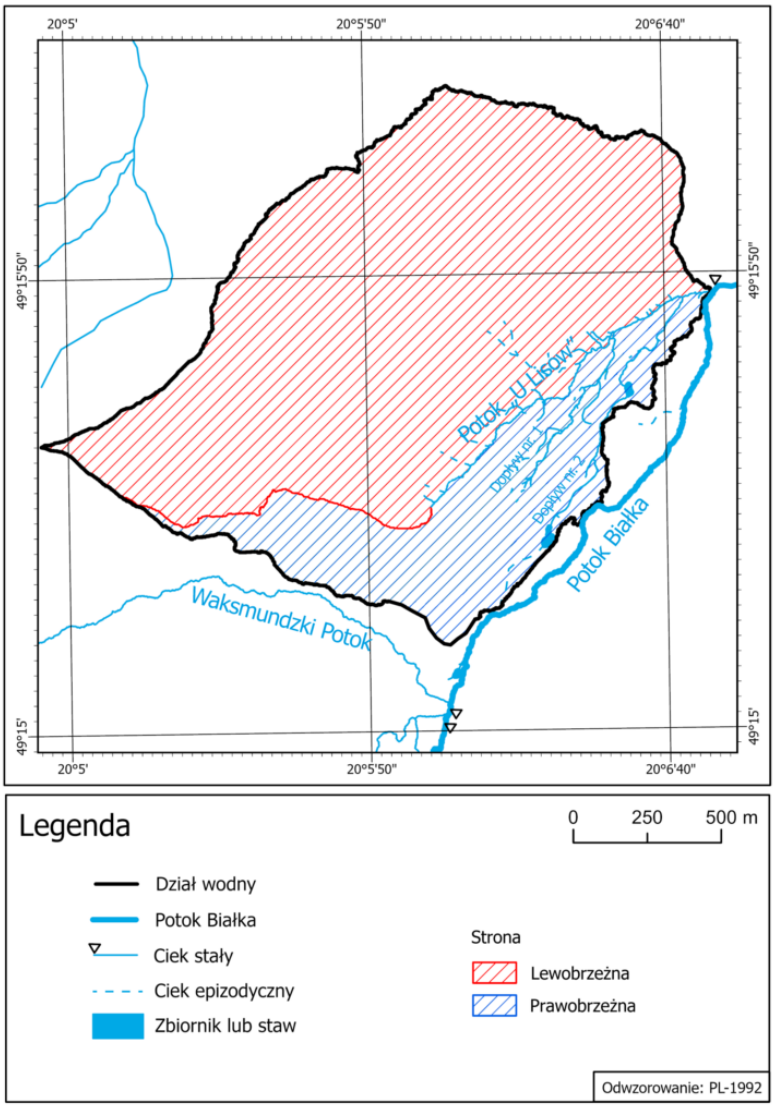

Fig. 5. Zlewnia potoku „U Lisów”

Summary of research results

Measurements of water flow made in winter are particularly important in assessing the abundance of groundwater, since the watercourses are practically fed by it. During the low season, the water flow in the estuary section of the "U Lisow" stream was 81.1 l/s, and the unit outflow - q=38.7 $^{l/s/km2}$. Such a high unit outflow testifies to the high abundance of the catchment area. In comparison, at the same time in Bialka at Lysa Polana, the IMGW site recorded an operational flow (NZQ = 1.49$^{m3/s}$), which corresponds to a unit outflow of 23.45 l/s/km2^{from} a catchment area of 63.54 ^{km2}. The result testifies to the fact that the resources of the small stream catchment are almost twice as large as those of the Białka River catchment.

The catchment area of the "U Lisów" stream - 2.31 ^{km2} - is asymmetrical. On the left bank side it has an area of 1.78 ^{km2}, and on the right bank - 0.58 ^{km2}. In the catchment area of the "U Lisów" stream, 32 outflows have been identified, with most of the sources located on the left-bank side, and the threshers on the right-bank side. The number of left-bank outflows is similar to the number of outflows on the right-bank side, however, the crenological index ($^{outflow/km2}$) is almost three times lower on the left-bank side than on the right-bank side. The length of all left-bank tributaries (0.5 km) is five times less than that of right-bank tributaries (2.5 km) (Fig. 6). The density of left-bank tributaries is several times less than that of right-bank tributaries.

Fig. 6. Widok na potok „U Lisów”

In the catchment area of the "U Lisow" stream, the physical-chemical characteristics of the waters vary. The average conductivity of groundwater is 124.4 µS/cm, for left-bank waters is higher than right-bank waters (145.4 µS/cm and 96.9 µS/cm, respectively). Groundwater with higher conductivity (158.9 - 247.0 µS/cm) is found in left-bank springs (Figure 7). Groundwater with low conductivity (48.3 - 88.3 µS/cm) mostly represents outflows from the threshers, which are located in the source section of tributary No. 1. The average conductivity of surface water in the basin is 115.0 µS/cm.

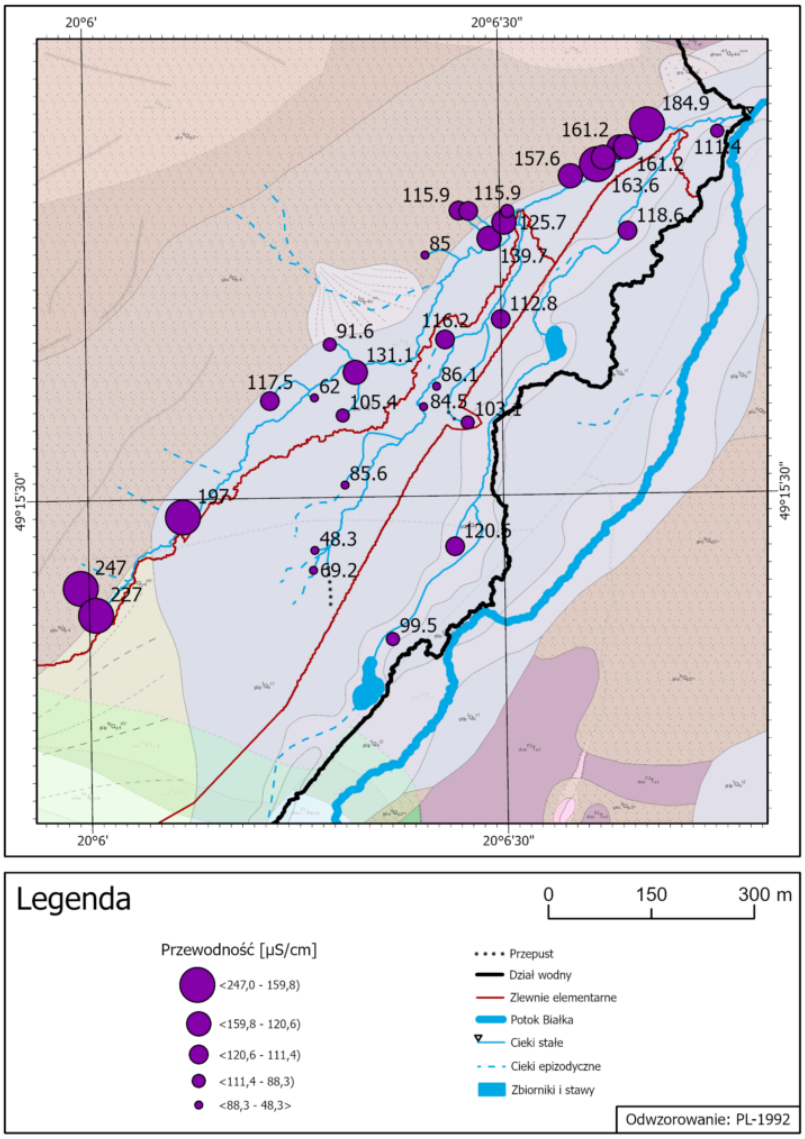

Fig. 7. Przewodność wód podziemnych w zlewni

Waters with higher conductivity (126.2 - 247.0 µS/cm) are found in the main stream "U Lisów" (Fig. 8). Waters with lower conductivity are found in the right-bank watercourses. Waters with very low conductivity (23.5 - 75.2 µS/cm) are most common in tributary No. 1, starting from the main outflow, as well as in the watercourses of neighboring catchments: the Waksmundzki Brook and the Białka Brook.

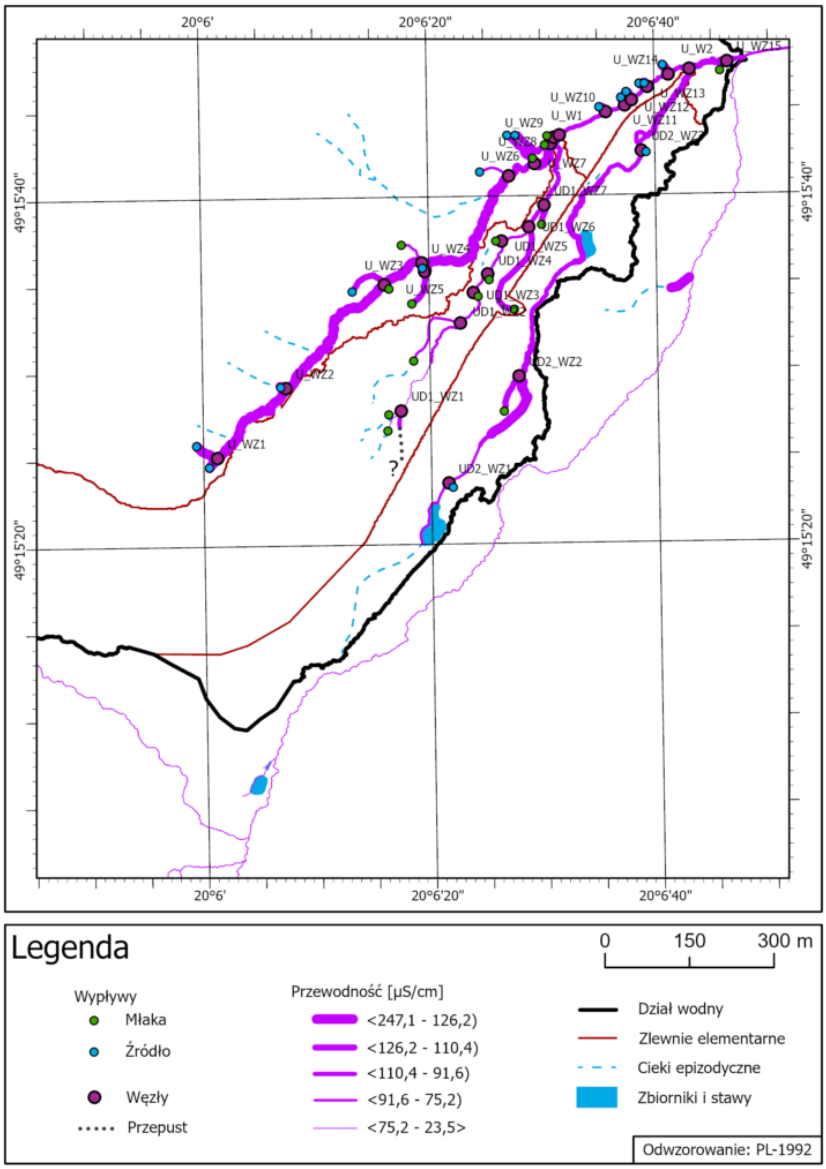

Fig. 8. Przewodność wód powierzchniowych w zlewni na tle sąsiednich potoków

Conclusions from research and observations

Based on the study, it was shown that the water resources of the catchment area of the "U Lisów" stream during winter lows are the highest in the Polish Tatra Mountains, and this is not genetically related to the presence of an efficient overhang, but to numerous groundwater outflows and water drainage along smaller watercourses.

The complex geological structure results in groundwater of different genesis. Left-bank springs are associated with the drainage of water in carbonate rocks from the northwestern part of the catchment, while right-bank mudflats are the result of filtering water in river alluvia. This is evidenced by the increased mineralization of the waters in the springs and the decreased mineralization of the waters from the hamlets, as well as the temperature of the waters, which was higher in the left-bank springs.

Highly mineralized waters in the basin are found in the "U Lisów" stream and its left-bank springs (Fig. 9). This is probably due to the long-term circulation of water in the carbonate massif. Water enters through ponors, both in the catchment of the "U Lisów" stream and in the neighboring catchment of Zloty Potok (Area 1). The least mineralized waters in the catchment are found at the beginning of tributary No. 1. The neighboring Waksmundzki Potok has similar low mineralization.

This leads to the assumption that water from Waksmundzki Stream infiltrates through the fluvioglacial cone into the catchment area of the "U Lisów" stream (Area 2). Low-mineralized water is also found in the initial section of tributary No. 2 and similarly mineralized water is found in Białka. Hence the suggestion that water from the Białka stream infiltrates from alluvial formations into the catchment area of the "U Lisów" stream (Area 3).

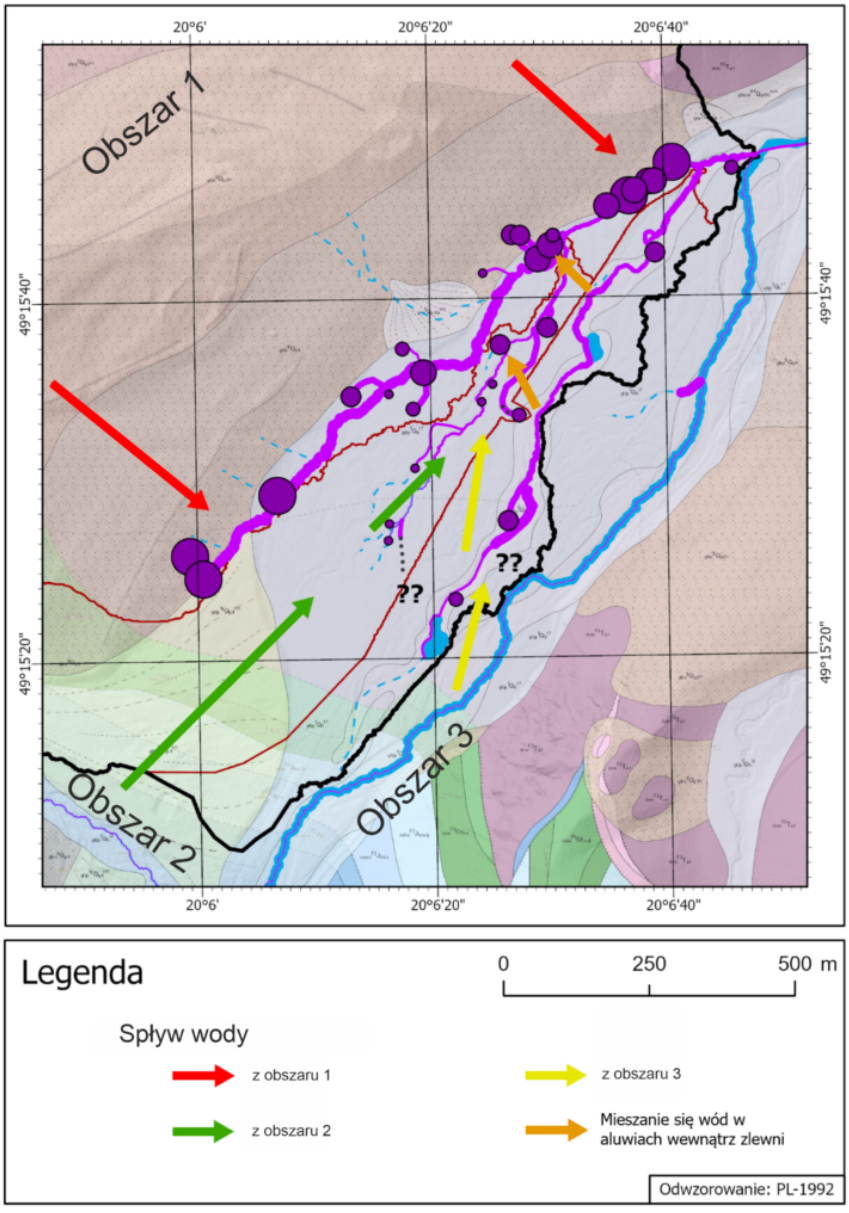

Fig. 9. Prawdopodobna geneza wód zlewni potoku „U Lisów" na tle wyników badań i budowy geologicznej

Based on this, it is possible to identify the three most important alluvial areas of water, which supply water to this small catchment, resulting in a catchment with the highest hydration in Poland (expressed in unit outflow).

AQUATIC PUBLICATION REVIEW (29)

Posted on 14 November 2024 by Agnieszka Kolada

In the study of the hydrosphere and the environmental components associated with it, the topic of the effects of climate change is impossible to escape. Whether one likes it or not, the facts are that our world is changing at a rate never before recorded, which is a cause for many questions and intriguing hypotheses. Because climate change affects everything - it favors biological invasions, can remodel the soil seed bank in the Atlantic Forest, change the severity, extent and frequency of drought in the western US states, and double the rate of global ocean level rise. It also causes coral reefs to fade, which can be saved by inoculating the water with probiotic microorganisms. The question is whether they are safe for non-target organisms. Another bane of our waters is chemical pollution. Studies on the effects of exposure of striped danio to polystyrene microplastics indicate a link between exposure to these plastics and the development of polycystic ovary syndrome. Be careful what you drink!

Categories: Science, Issue 21/2024
Tags: climate change, literature review, review

In the study of the hydrosphere and the environmental components associated with it, the topic of the effects of climate change is impossible to escape. Whether one likes it or not, the facts are that our world is changing at a rate never before recorded, which is a cause for many questions and intriguing hypotheses. Because climate change affects everything - it favors biological invasions, can remodel the soil seed bank in the Atlantic Forest, change the severity, extent and frequency of drought in the western US states, and double the rate of global ocean level rise. It also causes coral reefs to fade, which can be saved by inoculating the water with probiotic microorganisms. The question is whether they are safe for non-target organisms.

Another bane of our waters is chemical pollution. Studies on the effects of exposure of striped danio to polystyrene microplastics indicate a link between exposure to these plastics and the development of polycystic ovary syndrome. Be careful what you drink!

1. Effects of temperature and N:P ratio on the invasion success of the cyanobacterium *Raphidiopsis raciborskii*

Meriggi C., Johnson R.K., Laugen A.T., Drakare S., (2024) Effects of temperature and N:P ratio on the invasion success of the cyanobacterium *Raphidiopsis raciborskii*. Aquatic Invasions 19(3): 275-286.

Recently, there have been more and more reports of environmental problems associated with invasive plankton organisms. If not our "favorite" golden alga, then the tropical freshwater *cyanobacteria Raphidiopsis raciborskii*. The latter species was first recorded in Central Europe about two decades ago, and is now relatively widespread and continues to expand its geographic range. Because it forms blooms and produces toxins, an increase in its population can negatively affect local biodiversity and ecosystem services, although its behavior in the waters of different geographic regions is not recognized.

A team of Scandinavian scientists conducted a laboratory experiment to study the competitiveness of *R. raciborskii* in interaction with other phytoplankton taxa typically found in Scandinavian lakes (diatoms, green algae and cyanobacteria). The experimental setup included three temperature conditions (17°C; 22°C; 26°C) and three variants of nutrient conditions (N:P ratio 8:1; 16:1; 32:1).

In none of the environmental variants tested did *R. raciborskii* become the dominant species, but in all of them it was able to proliferate and maintain biomass, even in relatively cool water (17°C). Temperature proved to be an important factor shaping the taxonomic composition of the phytoplankton community of the Scandinavian lakes, with *Raphidiopsis raciborskii* proving more competitive than *Planktothrix agardhii* at low temperatures, but less so than *Microcystis aeruginosa*. The results of the study demonstrate that *R. raciborskii* can survive at relatively high latitudes and establish itself in ecosystems such as Scandinavian lakes.

2. water restriction alters seed bank traits and ecology in Atlantic Forest seasonal forests under climate change

Borges Diaz P., Horn Kunz S., Macedo Pezzopane J. E. *et al*, 2024. Water restriction alters seed bank traits and ecology in Atlantic Forest seasonal forests under climate change. *Global Change Biology*.

The *Soil Seed Bank*(SSB) is one of the key mechanisms for ensuring the sustainability of forest ecosystems. Knowledge of how projected climate change will affect this essential component of the ecology is still very limited. A team from several research centers in Brazil conducted a study to assess the germination potential, ecological attributes and selected functional characteristics of SSB in a seasonal *Atlantic Forest (Atlantic Forest,* port. *Mata Atlântica*) under different climate scenarios (current and future RCP8.5) and under different levels of irrigation (unconstrained and constrained water availability as assessed by the WHC, or *water-holding capacity* index).

After 5 months of SSB incubation under controlled conditions, the number of exclusive (exclusive) species ranged from 24 in the current

scenario without water restrictions, 22 in the current scenario with water restrictions, 16 in the future scenario without restrictions, to only 6 in the future scenario with water restrictions. All assessed ecological attributes and functional traits (such as leaf area, biomass production, density, richness or taxonomic diversity) were significantly reduced in the future projection, especially in the scenario with water restriction.

The results indicate that water scarcity, especially in future warmer scenarios, could significantly reduce seed viability and forest regeneration capacity. The effects of climate change shown in the study could alter the overall structure of seasonal forests in the future, and result in a loss of SSB regeneration potential due to reduced seed viability and increased mortality of juvenile individuals.

3. anthropogenic warming has ushered in an era of temperature-dominated droughts in the western United States

Zhuang Y., Fu R., Lisonbee J. *et al.* (2024).Anthropogenic warming has ushered in an era of temperature-dominated droughts in the western United States. *Sci. Adv.* 10, eadn9389 (2024).

As we are on the effects of climate change, of course, there can be no missing the thread of drought, which is increasingly affecting many areas of the globe, including the United States. Historically, meteorological drought in the western states has been caused mainly by rainfall deficits. However, an analysis of National Oceanic and Atmospheric Administration (NOAA) precipitation data from 1948 to 2022, conducted by U.S. scientists at the University of California and NOAA, shows that since about 2000, rising surface temperatures and the resulting increased evaporation (evapotranspiration) have contributed more to the severity (62 percent) and extent (66 percent) of the drought in the western U.S. than the precipitation deficit. The increase is particularly noticeable in Southern California, Nevada and the Four Corners region (the four-state quadrangle of Utah, Colorado, New Mexico and Arizona).

Based on an analysis of field observations and climate model simulations, the authors conclude that the main reason for the increased severity and extent of drought in the study area is an increase in evapotranspiration, mostly caused by anthropogenic warming. An example of such a change in factors is the unprecedented drought in the western United States between 2020 and 2022, for which evaporation was responsible for 61 percent, compared to 39 percent explained by a precipitation deficit.

Climate model simulations predict that in the fossil fuel-based development scenario (SSP5-8.5), droughts such as this one will occur not with the current frequency of once every thousand-plus years, but once every 60 years by the mid-21st century and once every six years by the end of the 21st century. We wish the people of the Western U.S. much satisfaction with the development of the fossil fuel economy.

4. the rate of global sea level rise doubled during the past three decades

Hamlington B.D., Bellas-Manley A., Willis J.K. *et al.* The rate of global sea level rise doubled during the past three decades. *Commun Earth Environ* 5, 601 (2024).

As we have written in the past - when it dries up some, it floods others. The rise in global mean sea level is one of the clearest indicators of climate change. And according to satellite data, global sea levels are rising twice as fast as they were three decades ago. Between 1993 (when such measurements began) and the end of 2023, as Benjamin Hamlington of NASA's Jet Propulsion Laboratory in Pasadena, California, and his colleagues showed, global mean sea level rose by 111 mm, and the rate of that rise increased from about 2.1 mm/year to about 4.5 mm/year.

Climate change is accelerating two processes that shape the amount of water in the seas and oceans: melting ice and increasing water volume due to heat absorption from greenhouse gas emissions (thermal expansion). Scientists predict that if this trajectory continues over the next

three decades, sea levels will rise by an additional 169 mm worldwide.

5. not only for corals: exploring the uptake of beneficial microorganisms for corals by sponges

Ribeiro B., N. Garritano A., Raimundo I. *et al.* (2024). Not only for corals: exploring the uptake of beneficial microorganisms for corals by sponges. *npj Biofilms Microbiomes* 10, 125.

The phenomenon of coral fading due to destabilization of symbiosis with photosymbionts as a result of climate warming is well known and fairly well studied. One way to support corals against anthropogenic stressors is to rebuild their microbiome using so-called *beneficial microorganisms for* corals (BMC). An interesting issue is the interaction of BMCs and non-target organisms, such as sponges.

The researchers set out to investigate whether sponges belonging to the model species, *Stylissa carteri* and *Callyspongia crassa*, incorporate probiotic bacteria used as BMCs into their biome, and whether such inoculations can affect host health. Based on a four-week experiment conducted in three variants (no BMC inoculation, inoculation once and inoculation three times a week), the authors found that in the case of *S. carteri*, probiotic strains naturally populated the microbiome in low numbers, and that after BMC inoculation, the abundance of two of them (BMC-Cobetia and BMC-Pseudoalteromonas) increased. In contrast, there was no natural presence of BMC-associated bacteria in the microbiome of *C. crassa*, nor was it proven that this sponge could acquire these microorganisms after inoculation. The sponges were visually healthy and continued to filter water efficiently at the end of the experiment.

The results indicate that the application of BMC to nearby corals can alter the structure of the microbiome of neighboring sponges, potentially affecting them, but these effects do not impair their vital functions. These studies support the view that inoculation of corals with probiotics has potentially very limited or negligible negative effects on the fitness of non-target organisms, which is an important criterion for the safe use of probiotics under field conditions.

6. Evaluating the potential of daily intake of polystyrene microplastics via drinking water in inducing PCOS and its ovarian fibrosis progression using female zebrafish

Adhikari M., Biswas Ch., Mazumdar P. *et al*, (2024). Evaluating the potential of daily intake of polystyrene microplastics via drinking water in inducing PCOS and its ovarian fibrosis progression using female zebrafish. NanoImpact, 34.

It is not particularly revealing to say that consuming water contaminated with microplastics will not do us any good. Polystyrene microplastics are widely known to be endocrine and reproductive disrupting chemicals. Despite numerous reports on the reproductive and endocrine toxicity of these particles, the literature on the daily intake of polystyrene microplastics in drinking water, which promote polycystic ovary syndrome (PCOS) and lead to ovarian fibrosis, is quite sparse.

Researchers led by Prof. K. Pramanick of Presidency University in Kolkata exposed female striped danios to polystyrene microplastics in drinking water for three weeks and compared selected reproductive traits with a control group kept in clean water. In fish exposed to microplastic, the level of testosterone, naturally produced there in small amounts, increased significantly in the ovaries. In microplastic-induced PCOS, excess testosterone in the ovaries interferes with the growth and development of follicles, impeding ovulation or egg release.

The exposed fish also showed a decrease in levels of folliculotropic hormone, which plays a role in sexual and reproductive development, while body weight increased due to fat deposition in the intestines and ovaries. These features are characteristic of PCOS, including in humans. Polystyrene microplastics have played a key role in the induction of PCOS in fish, but the results in the striped danios can be extrapolated to females, which may help develop treatments.