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EcoManAqua

Ecology and Management of aquatic ecosystems in Central, East and Southeast Europe



**KOPAČKI
RIT**
Park prirode
Nature Park

International Summer School „Floodplain Ecology“

Osijek, 7 -11 July, 2025

International Summer School „Floodplain Ecology“ was held in Osijek from 7-11 of July, 2025. Participants were from University of J. J. Strossmayer in Osijek, Department of Biology; University of Natural Resources and Life Sciences, Vienna, Department of Water, Atmosphere and Environment, IHG; University of Ljubljana, Faculty of Arts; University of Belgrade, Institute for Multidisciplinary Research, and University of Tirana, Faculty of Natural Sciences. During their stay, the students attended several lectures given by professors on floodplain ecology, floodplain management, and ecological and hydrological characteristics of floodplains.

Participants took part in fieldwork activities in Kopački Nature Park, such as bird and herpetofauna monitoring, and the collection of phytoplankton, zooplankton and macrozoobenthos samples. After that, they analyzed the collected samples in the laboratories at the Department of Biology. The Tikveš Castle Complex in Kopački Rit Nature Park and the Vučedol Culture Museum were also visited, where participants had an opportunity to gain insight into the history of these areas.

Activity Schedule

Monday (July 7, 2025)

UNIOS, Department of Biology

9.00 -12-00 - Opening remarks - prof. Tanja Žuna Pfeiffer (UNIOS); Introduction to floodplain ecology – prof. Melita.Mihaljević /UNIOS); Ecology of fish fauna in floodplains - prof. Gorčin Cvijanović /Serbia/;

12.00 -15.00 - Official registration and lunch time;

15.00 -17.00 - Work with historical sources: an introduction for students of life sciences: examples from the environmental history of fresh water environments – prof. Žiga Zwitter (Slovenia)



Lectures at Department of Biology



Lectures at the NP Kopački rit Visitor Center

Tuesday (July 8, 2025)

8.00 - 12.00 - Kopački rit Nature Park - NPKR Visitor Center: - lectures: Floodplain ecology and management - general - prof. Thomas Hein (BOKU); Management of Nature Park Kopački rit - dr. Vlatko Rožac (NPKR);

12.00 - 13.00 – NPKR Lake Sakadaš: Methods and sampling of freshwater biocenoses – phytoplankton, zooplankton, periphyton, benthic fauna – prof. Dubravka Špoljarić Maronić (UNIOS); doc. Anita Galir Balkić (UNIOS), doc. Barbara Vlaičević (UNIOS), dr. Olena Bilous (BOKU)

13.00 – 15.00 - Kopačevo: Lunch time (NPKR)

15.00 – 17.00 - NPKR Tikveš Museum – official presentation NPKR; Lectures: Ecological values and biodiversity of ornitofauna and herpetofauna – introduction – prof. Olga Jovanović Glavaš (UNIOS).



Visit to the NPKR Lake Sakadaš – methods and sampling of freshwater biocenoses



Official presentation at the NPKR Tikveš Museum

Wednesday (July 9, 2025)

8.00 – 12.00 – field classes - Kopački rit Nature Park - Ornitofauna and herpetofauna – monitoring and ecology – prof. Olga Jovanović Glavaš (UNIOS) – NPKR official guidance support

12.00 – 13.00 - Boat tour – NPKR

13.00 – 15.00 - Lunch time

16.00 – 20.00 - field visit - Danube - Vukovar – Vučedol Culture Museum and Archaeological Site



NPKR monitoring and ecology of ornitofauna and herpetofauna



Kopački rit Nature Park boat tour



Field visit to the Vukovar – Vučedol Culture Museum and Archaeological Site

Thursday (July 10, 2025)

UNIOS, Department of Biology

9.00 – 13.00 – Species-rich meadow agroecosystems in floodplains and beyond: learning from history for a sustainable future – prof. Ž. Zwitter (Slovenia); Algae in water monitoring – prof. Olena Bilous (BOKU) Management of floodplains - prof. T. Hein (BOKU);

13.00 – 15.00 – Lunch time (Student campus)

15.00 – 20.00 – Laboratory analyses of biocenoses - all teachers



Prof. Žiga Zwitter lectures and laboratory analyses with doc. Anita Galir

Friday (July 11, 2025)

UNIOS, Department of Biology

9.00 – 13.00 – Panel discussion and conclusions- all teachers;

Evaluation - student reports about the findings and discuss, interesting results and how this might be affected by changes in management or due to climate change (warming and changing discharge) – leading - prof. M. Mihaljević



International Summer School “Floodplain Ecology” participants in front of the Department of Biology, University of J.J. Strossmayer in Osijek



1. Wetlands vs. Floodplains

Throughout the week, we examined the ecological and hydrological characteristics that distinguish floodplains from wetlands. Floodplains are naturally flooded zones with seasonal variability, while wetlands—such as **Kopački Rit**, one of the largest protected floodplain areas in the middle Danube basin—function as ecological buffers.

Key insights learnt included:

- Wetlands play a crucial role in **water purification, flood control, and carbon storage**.
- Kopački Rit exemplifies the balance between **natural flooding processes** and human governance.
- They offer vital **ecosystem services** including nutrient cycling, biodiversity support, and aesthetic value.
- Differentiating wetlands and floodplains informs sustainable planning and restoration.
- Fieldwork reinforced how hydrological fluctuations directly affect species richness and land use decisions.

2. Threats to Wetland Health

We explored both anthropogenic and climate-related stressors threatening wetland sustainability.



- Channelization and hydrological alteration disrupt floodplain connectivity.
- Overharvesting, agrochemical runoff, and land encroachment degrade biodiversity.
- The rise of invasive species challenges native ecological balance.
- Unregulated tourism and construction further fragment critical habitats.
- These discussions underscored the urgency of **local stakeholder collaboration** and **integrated water management frameworks**.

3. Kopački Rit Wetlands & EU Governance

Kopački Rit is a model conservation site aligned with EU Directives: Water Framework, Floods, Habitats, etc.



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- The site showcases how EU integration shapes local decision-making.
- It demonstrates how **policy harmonization** can support restoration.
- Protection status enforces **land-use controls and ecological monitoring**.
- Constructed wetlands can complement natural systems in delivering water quality goals.

4. Fish Fauna & Invasive Species Management

We learned about fish community dynamics within floodplain systems, with a focus on both native species and invasive pressures. Our lessons included the following:



- Field sampling methods such as sonar, electro fishing, netting, etc.
- Techniques such as **physical removal (e.g. netting and trapping)** can be used to manage **alien species** while interventions are still being attempted to see how mosquito populations can be managed using biological means
- Community involvement is essential for early detection and prevention.
- **Sturgeon conservation** received special attention via EU-supported initiatives.
- Kopački Rit revealed how fisheries and wetland conservation must align.

5. Major Projects & Regional Initiatives

Several ongoing regional projects illustrated large-scale cooperation in wetland restoration and ecological monitoring: Explored Projects:



- **MONSTEUR**: Monitoring ecological indicators and fostering cross-border data sharing.
- **LIFE-Boat 4 Sturgeon**: Rehabilitation of endangered sturgeon through habitat improvement.
- **Danube4All** (EU Lighthouse): Engaged in 7 working packages including: *River restoration, Stakeholder mapping, Climate modeling, Policy education, Local empowerment, etc.*
- **Danube Lifelines**: A strategic framework to create a resilient network of protected floodplains along the Danube. These efforts reflect the value of transnational collaboration to meet long-term sustainability targets.

6. River History & Climate Data

Lectures on hydrological records highlighted the role of climatology and historical data in water management:



- **Historical flow data** reveals patterns of droughts, floods, and ecological shifts.
- River records guide floodplain restoration plans and risk mitigation strategies.
- Wetland **climatology directly influences species distributions and sediment cycles**.
- Understanding past land use improves resilience planning for grasslands, farming etc.
- We saw how cultural history influenced river conservation must be informed by **long-term discharge records**.

7. Biodiversity Monitoring: Birds, Amphibians & Aquatic Life

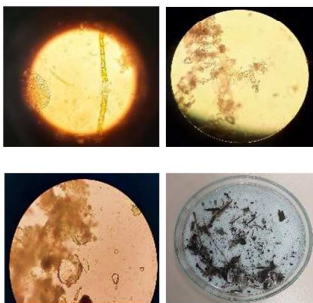
Daily field excursions gave us practical training in biological monitoring techniques. Fieldwork activities:



- **Bird and herpetofauna monitoring** with visual surveys and live traps.
- Followed **sampling protocols** by recording weather, time, and location during data collection in the floodplains.
- Gained insight into **biotic indices** and their application in water quality assessment.
- A great diversity of birds such as grey herons and white-tailed eagles were observed.
- Took some water samples to the lab for filtering & examinations under compound light microscopes

8. Algae & Water Quality Assessment

Thursday's lab work focused on plankton analysis, as tools for ecological diagnosis. Insights gained included:



- Sampled and examined **phytoplankton, zooplankton, and macrozoobenthos**. We observed which ones were dominant and inferences.
- **Algae act as primary producers**, supporting aquatic food webs.
- **Red algae blooms** were used to show nutrient imbalance and aesthetic degradation. Cyanobacteria were surprisingly not found to be dominant.
- Explored algae's role in **oxygen cycling and contaminant filtration**.
- Applied **standard water chemistry protocols** in field-to-lab workflows.
- Identified **Chironomidae** as a dominant indicator group for ecosystem health.
- Learned how **species composition can reflect ecological stability or stress**.

9. Cultural & Historical Context – Vučedol Visit

We visited the **Vučedol Culture Museum** in Vukovar—a powerful addition to our ecological understanding.



- Discovered how **pre-Medieval Danube communities** may have predated Mesopotamian civilization in complexity.
- Learned how they used **astronomy and metallurgy** to organize settlements.
- Historical land use was tied to sustainable river management.
- Cultural perspectives added layers to our understanding of **river stewardship**.
- Reinforced the idea that effective governance and human development includes **respect for historical context and indigenous knowledge**.

Kopački rit is an inner delta wetland with distinct morphological features as well as rich history.

Student impressions

This feedback reflects my impressions as a lecturer at the 2025 Summer School in Floodplain Ecology. The event was a truly enriching academic experience, combining high-quality science, fieldwork, and international exchange. I was impressed by the excellent organisation, the strong focus on practical learning, and the welcoming atmosphere at the University of Osijek's Department of Biology. The school, supported by the CEEPUS Ecological programme, offered a unique opportunity to engage with floodplain ecosystems, highly motivated students, and a team of professional and passionate colleagues. Special thanks to

Dr. Melita Mihaljević for her warm hospitality and outstanding coordination.

Warm regards,
Dr. Bilal Džur, BSc
11.07.2025

The experience at the Floodplain Ecology summer school was holistic in every sense, where we covered different aspects of floodplain ecosystems & their management. The professors, organisers & administrative staff was also very welcoming & hospitable. I would love to visit & experience it again!

— Bharvani Nerikar
11/07/25

Thank you for welcoming us in Osijek! It was a pleasure staying at Osijek! It was an unforgettable experience with such passionate teachers and scientists! Thank you!
— Laura, 06

Hrvatska nije samo more. Hvala Osijeku i univerzitetu na lijepim doživljajima i krasnom parku prirode. Vaš odjel zrači pozitivnom energijom, osjećam se kao u osnovnoj školi sa fotografijama prirode.

— Nadija

List of participants	
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Participant	University
Thomas Hein, PhD, Full Professor	BOKU
Olena Bilous, PhD	BOKU
Žiga Zwitter, PhD, Assistant Professor	University of Ljubljana, Faculty of Arts
Gorčin Cvijanović, PhD, Associate Professor	University of Belgrade, Institute for Multidisciplinary Research
Melita Mihaljević, PhD, Full Professor	UNIOS
Tanja Žuna Pfeiffer, PhD, Associate Professor	UNIOS
Dubravka Špoljarić Maronić, PhD, Associate Professor	UNIOS
Olga Jovanović Glavaš, PhD, Associate Professor	UNIOS
Anita Galir, PhD, Assistant Professor	UNIOS
Barbara Vlaičević, PhD, Assistant Professor	UNIOS
Vlatko Rožac, PhD, Senior Advisor	NPKR
Bhargavi Nerikar, student	BOKU
James Nxytubase Nkhoswe, student	BOKU
Laura Wagner, student	BOKU
Viola Çova, student	University of Tirana, Faculty of Natural Sciences
Nadija Čehajić, student	BOKU
Fran Prašnikar, assistant	UNIOS
Matea Dent, student	UNIOS

Nikolina Bek, PhD, assistant	UNIOS
*UNIOS – Josip Juraj Strossmayer University of Osijek	
*BOKU - Universität für Bodenkultur, Wien,	
*NPKR – Nature Park Kopački rit, Croatia	

Technical support: Fran Prašnikar

CEEPUS assistant: Mr. sc. Ines Arbanas

Summer School Team Leader: Prof. dr. sc. Melita Mihaljević

In Osijek, July, 2025.