CAPPADOCIA UNIVERSITY
Logic - Wisdom - Equality - Tradition

SUSTAINABLE DEVELOPMENT GOALS • ANNUAL REPORT

Protecting aquatic life. Building ecological knowledge.

SDG 14 / LIFE BELOW WATER

Research-led freshwater biodiversity, river-basin science and community stewardship.

Cappadocia University | Reporting Period: 2025



Our Nature Society at Sultan Marshes on 22 March 2025. Original photographs: March 2025 Student Activities Bulletin, p. 11.

2025 • CAPPADOCIA UNIVERSITY • ENGLISH EDITION

2025 IN PERSPECTIVE

From river science to aquatic stewardship

Our work connects freshwater ecology, pollution research and public awareness with the wider protection of aquatic life.

At Cappadocia University, **we approach SDG 14 through the protection and sustainable use of aquatic ecosystems**, particularly rivers, wetlands and their catchments. Our location in inland Anatolia makes freshwater science a meaningful route to understanding aquatic biodiversity, pollution pressures and connections with receiving waters downstream.

Our contribution in **2025** centred on peer-reviewed science, continuing river-basin research, environmental information shared with the public and participation in wetland-focused learning. We also maintained waste-management and environmental protection arrangements that help address potential pathways by which land-based pollution can reach water bodies.

In keeping with the international assessment of aquatic ecosystems, we consider **lakes, ponds, streams, rivers and wetlands** alongside coastal and marine environments. Nevertheless, we do not present general campus water savings as evidence that a particular aquatic habitat has been restored.

Our evidence in context

Research and knowledge	Direct and continuing work	Community learning
2025 peer-reviewed publications on mayflies, diatoms, human–aquifer relationships and pollution detection	Ongoing Kızılırmak water-quality research and tributary assessment	22 March 2025 Sultan Marshes field visit; public messages about rivers and water

Publication year is not fieldwork year. Some research published in 2025 drew on samples collected in earlier years. We identify this distinction when interpreting the results and do not portray the earlier sampling campaigns as newly completed 2025 field surveys.

2025 PERFORMANCE DASHBOARD

Evidence of aquatic-ecosystem research

Documented scientific outputs, ongoing investigations and community activity provide complementary evidence of our 2025 contribution.

4	2	1
SELECTED PUBLICATIONS	**KIZILIRMAK RECORDS**	**WETLAND VISIT**
Published during 2025	Related active project entries	Completed on 22 March

Research results must retain their original units

20	17	117
SAMPLING LOCALITIES	**MAYFLY SPECIES**	**DIATOM TAXA**
Eastern Mediterranean study	Published 2025	Köprüçay study

These figures do not describe one University-wide survey. The **20 localities and 17 mayfly species** relate to the Eastern Mediterranean Basin study; **117 diatom taxa** relate to the Köprüçay River study. The studies were published in 2025, while their field observations took place earlier. The Kızılırmak projects were continuing work in the reporting year, not completed restoration interventions.

2025 contribution	Verified basis	Interpretation
Benthic macroinvertebrate ecology	Ecohydrology, first published 21 April 2025	Biological and physicochemical indicators of river condition
Diatom-based river assessment	Aquatic Ecology, first published 23 May 2025	Complementary water quality classifications and benthic biodiversity
Groundwater and ecosystem interactions	Landscape and Ecological Engineering, 2025	Stakeholder perceptions affecting an aquifer-linked lake ecosystem
Microplastic / metal detection methods	Elektronika ir Elektrotechnika, 2025	Technology-oriented research relevant to pollution monitoring

INSTITUTIONAL APPROACH

Aquatic ecosystems within our mission

Our 2023–2028 Strategic Plan connects research, environmental responsibility and engagement with communities.

We translate our strategic priorities into aquatic-ecosystem work through **research projects**, academic publishing, interdisciplinary teaching, public communication and environmental management. Our Sustainability Office and Sustainability Commission help coordinate the institutional sustainability framework; our vocational college, academic departments and research teams contribute scientific expertise in water quality and ecological assessment.

Our **Environment and Sustainability Policy**, the institutional **Cappadocia Water Programme** and our waste-management arrangements support pollution prevention and responsible resource use. These are enabling frameworks. They do not by themselves establish that we operated a fisheries programme, implemented a marine conservation project or restored a specific wetland during 2025.

Distinguishing our SDG 14 and SDG 6 contributions

SDG 14 — Life Below Water	SDG 6 — Clean Water and Sanitation
Aquatic biodiversity; ecological condition; river and wetland research; water-borne pollution pathways	Water access and efficiency; campus consumption; sanitary infrastructure; institutional water stewardship
Direct protection, knowledge and public engagement relating to aquatic ecosystems	Water-use monitoring and practical conservation measures in campus operations

Our 2025 water-consumption records form part of our wider commitment to responsible water management and the objectives of SDG 6. Our contribution to SDG 14 centres on protecting aquatic ecosystems, understanding the species they support and investigating pressures affecting water quality. We formally issued our Water Efficiency Policy in 2026, building on water-management practices and institutional efforts already underway in 2025.

AQUATIC BIODIVERSITY

Mayflies as indicators of river health

We contribute to understanding freshwater biodiversity through benthic macroinvertebrate research and ecological metrics.

In **April 2025**, our researcher Selda Öztürk and co-authors published *"Seasonal Evaluation of Ephemeroptera (Insecta) Fauna of Eastern Mediterranean Basin and Determination of Water Quality With Physicochemical Parameters and Benthic Metrics"* in **Ecohydrology**. The work integrated Ephemeroptera fauna, physicochemical measurements and benthic indices to characterise ecological condition across an environmentally diverse river basin.

965	17	20
INDIVIDUALS EXAMINED	**SPECIES RECORDED**	**FIELD LOCALITIES**
Research samples	Seven families	Original sampling network

The field sampling reported in the paper was conducted in **2019** across spring, summer and autumn. The **2025 contribution** is the peer-reviewed publication and dissemination of the findings, including the identification of previously unreported taxa for the studied basin and evidence of spatial and seasonal variation in aquatic condition. We do not count the 2019 sampling campaign as fieldwork carried out in 2025.

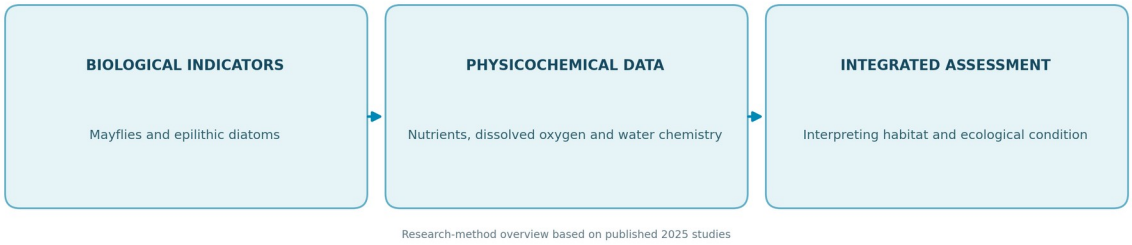


Figure 1. Integrating biological indicators with physicochemical observations in ecological water-quality assessment. Conceptual diagram based on our 2025 research publications.

Combining organism-based evidence with physical and chemical data helps interpret river health more robustly than reliance on a single variable. This creates a scientific foundation for future habitat monitoring, conservation priorities and catchment management; it is not itself a claim of restoration completed in the reporting year.

RIVER ECOLOGY

Diatoms and the Köprüçay River

Biological communities and water-chemistry indices offer complementary ways to interpret river quality.

In **May 2025**, Tuba Elif Özel and Selda Tekin-Özan published *"Determination of water quality in the Köprüçay river (Antalya-Türkiye) using various epilithic diatom and water quality indices"* in **Aquatic Ecology**. With the participation of our academic staff, the research combined water-chemistry measurements with multiple diatom-based indices to assess the Köprüçay River.

117	2019–20	2025
DIATOM TAXA	**FIELD PERIOD**	**PUBLICATION**
Across 51 genera	Reported in 2025 paper	Aquatic Ecology 59: 877–906

The paper recorded **117 epilithic diatom taxa from 51 genera**. Across the assessment approaches, water-quality classifications did not need to be identical: different indices respond to different environmental characteristics. Interpreting them together helps identify ecological pressures and strengthens understanding of the conditions experienced by aquatic organisms.

Scientific relevance

Research component	Contribution to aquatic-ecosystem understanding
Epilithic diatom assemblages	Biological response to water-quality conditions and nutrient pressures
Physicochemical variables	Environmental context for ecological interpretation
Multiple water-quality indices	Complementary assessments of river condition across sites and seasons

The seasonal observations were conducted between **October 2019 and July 2020**. Our 2025 institutional contribution consists of publishing and sharing their findings. We do not equate the publication with a new 2025 restoration or river-cleanup action.

WATER-DEPENDENT ECOSYSTEMS

The Palas Basin: people, groundwater and habitats

Understanding the decisions that shape groundwater use supports better stewardship of connected aquatic landscapes.

In **February 2025**, our academic Mehmet Soylu and Filiz Dadaşer-Çelik published a study of **human–aquifer interactions in the Palas Basin** in *Landscape and Ecological Engineering*. The study used fuzzy cognitive mapping to explore how farmers and public-sector water managers understand the relationship between irrigation, water availability, economic activity and aquifer condition.

The Palas system includes **Tuzla Lake**, a groundwater-dependent lake ecosystem affected by changing water availability. By comparing stakeholder perceptions and examining potential management scenarios, the research illustrates how decisions in the catchment can affect ecological resilience. It is an example of the social and environmental dimensions of water governance meeting within one landscape.

From stakeholder knowledge to future management

What the study examined	Why it matters
Farmers' irrigation and agricultural priorities	Demand for groundwater and competing uses
Officials' perspectives on basin management	Planning and water-resource governance
Potential alternative management scenarios	Understanding trade-offs for a groundwater-dependent ecosystem

This is **research informing possible management strategies**, not evidence that our University implemented all of the scenarios investigated. We therefore present the work as science supporting aquatic stewardship rather than a completed intervention in Tuzla Lake.

AQUATIC POLLUTION

Advancing methods to detect pollutants

Applied technology can strengthen the scientific capacity to identify potential pressures on water systems.

In **April 2025**, our academic Ekrem Kürşad Dal and collaborating researchers published *"An Innovative Multiparametric Sensor Design for Detecting Microplastics and Heavy Metals"* in **Elektronika ir Elektrotechnika**. The study explored an innovative sensor-based approach relevant to the detection of microplastics and metal contaminants, with optical and computational methods supporting interpretation of measurement signals.

Link to SDG 14

Pollutants released through domestic, agricultural or industrial pathways may enter streams and eventually downstream waters. **Detection technologies** are relevant because identifying substances and monitoring them reliably can strengthen future prevention and control. We present the research as a **technological contribution to monitoring**, not proof that a specific water body was cleaned or that an operational monitoring network was deployed in 2025.



Figure 2. Conceptual pathway linking land-based pollution pressures with rivers, wetlands and downstream receiving waters. This is an explanatory framework, not a mapped pollution-transport result.

Our 2025 scientific outputs thus address the aquatic environment at different levels: communities of living organisms, water chemistry, catchment decision-making and technologies relevant to contaminant identification.

RESEARCH PROJECTS

Investigating the Kızılırmak catchment

Our active projects examine river quality and the pressures associated with regional development and tributary inputs.

We supported continuing research on the **Kızılırmak River**, which passes through central Anatolia before discharging into the **Black Sea**. This hydrological connection gives local freshwater investigations broader relevance to the movement of pollutants through catchments.

Project / record	Research purpose	2025 status
KÜN.2025-BAGP-002	Assess the influence of activities in Nevşehir on Kızılırmak River water quality using indices, physicochemical parameters and heavy metals	University-funded project listed in 2025; research ongoing
AR-GE-KMYO-886	Investigate the effects of Damsa, Derinöz and Alaçoraközü tributaries on the Kızılırmak using physicochemical measurements	Ongoing research record

For **KÜN.2025-BAGP-002**, our official project information identifies **Tuba Elif Özel** as principal investigator, with **Mehmet Soylu** and **Bahadır Özel** as researchers. The research-office record was made public on **30 August 2025**, while the institutional research system lists a project period beginning earlier in 2025. We present the activity as work under way during the reporting year, not as a completed 15-month investigation.

Because the two project records address related catchment questions, we do **not** infer that they represent two wholly independent field campaigns or completed outcomes. The principal contribution is a structured research effort to understand spatial water-quality pressures and inform future environmental management.

POLLUTION PREVENTION

Reducing potential pathways from land to water

We connect environmental procedures to the protection of receiving ecosystems without overstating measured outcomes.

Our environmental management and waste-handling procedures distinguish **medical, hazardous, recyclable and other waste streams** and define arrangements for separation, temporary storage and transfer to appropriate services. Such controls matter to aquatic ecosystem protection because inadequate containment or disposal can create pathways for pollution to reach drainage systems, rivers and wetlands.

During **2025**, we maintained institutional arrangements for separate waste management and worked with **Mustafapaşa Municipality** under a **Zero Waste Co-operation Protocol signed on 30 April 2025**. We also promoted reuse, responsible procurement and reduced reliance on avoidable single-use materials. These actions primarily contribute to **SDG 12**, while their pollution-prevention rationale creates a defensible link with **SDG 14**.

Interpreting operational evidence correctly

What we can document	What we do not infer
Formal waste procedures, segregation and contractual pathways	A quantified reduction in river or marine pollution
Institutional zero-waste cooperation	A documented change in measured ecological water status
Research and education on plastics and pollutants	Completion of a separate marine restoration programme

We will strengthen this connection by seeking more systematic evidence of potential discharge pathways, incident prevention and environmental follow-up where such monitoring is available. These are development priorities, not assumed 2025 achievements.

WETLAND LEARNING

Sultan Marshes: experiencing an aquatic ecosystem

On World Water Day, our Nature Society brought students into direct contact with wetland biodiversity and landscape processes.

On **22 March 2025**, our **Nature Society visited Sultan Marshes** as part of its World Water Day activities. The **March 2025 Student Activities Bulletin** documents the visit with original photographs and a narrative of students learning about the importance of water resources and nature within the wetland setting.



Figure 3. Our Nature Society at Sultan Marshes on 22 March 2025, including the wetland walkway and Bird Museum. Original photographs: March 2025 Student Activities Bulletin, p. 11.

Sultan Marshes provides an especially relevant learning setting because freshwater and saline habitats, reedbeds and birdlife occur within the wider protected landscape. The activity created an opportunity to relate classroom discussions to living aquatic ecosystems. The photograph documents the **completed visit**; we do not assign an unverified participant count or treat the visit as a habitat-restoration intervention.

PUBLIC ENGAGEMENT

Connecting river protection with community awareness

Our 2025 public communications brought aquatic habitats and water resources into everyday conversations.

We published a **river-awareness message on 14 March 2025** featuring our academic expertise, drawing attention to the importance of rivers and water resources. On **22 March 2025**, World Water Day communications encouraged the conservation of water and highlighted the ecological significance of wetlands. Together with the Nature Society's completed visit, the programme connected public communication with direct learning in a freshwater ecosystem.

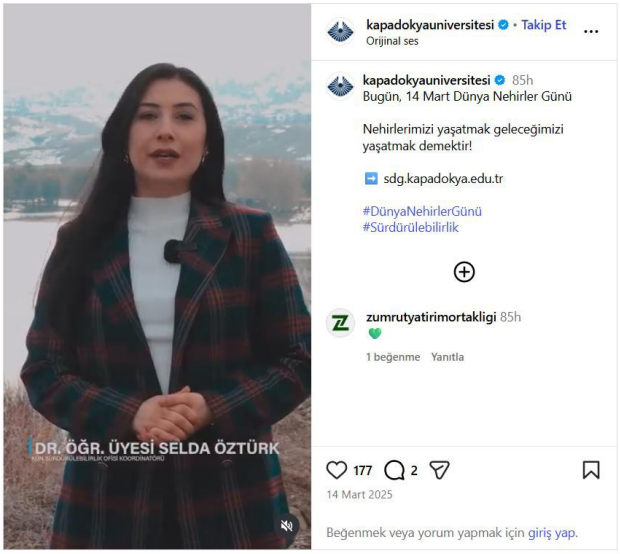


Figure 4. Public river-awareness video featuring our academic staff, shared on 14 March 2025. Original University social-media record.

We distinguish **publication of information** from the delivery of a formal community education programme or measured changes in public behaviour. This distinction is important when assessing the reach and outcomes of aquatic stewardship activity.

SCIENTIFIC OUTPUT

Peer-reviewed research supporting aquatic knowledge

Our 2025 publications extend beyond a single monitoring technique or geographic scale.

Publication / 2025 record	Focus and relevance
Öztürk, S., Çiçek, E. & Negiz, M. G. (2025), Ecohydrology, 18, e70040. DOI 10.1002/eco.70040	Ephemeroptera biodiversity, seasonal patterns and benthic water-quality indicators in the Eastern Mediterranean Basin
Özel, T. E. & Tekin-Özan, S. (2025), Aquatic Ecology, 59, 877–906. DOI 10.1007/s10452-025-10202-0	Epilithic diatom taxa, water chemistry and ecological classifications in Köprüçay River
Soylu, M. & Dadaşer-Çelik, F. (2025), Landscape and Ecological Engineering, 21, 287–302. DOI 10.1007/s11355-025-00641-0	Human–aquifer interaction and freshwater ecosystem management in Palas Basin
Dal, E. K., Güneş, A. & Kılıç, R. (2025), Elektronika ir Elektrotechnika, 31(2), 15–31. DOI 10.5755/j02.eie.40069	Technology-oriented detection of microplastic and heavy-metal contaminants

The selection is **not a claim to exhaustively count** all University publications assigned to SDG 14. It identifies four verifiable 2025 articles with clear relevance to freshwater biodiversity, water-related environmental pressures or monitoring methods.

Strengthening research use

We value outputs not only as bibliographic records, but as tools that can support future monitoring: **taxonomic evidence**, **ecological indices**, **stakeholder-based approaches** and **sensing methods** each reveal different dimensions of aquatic sustainability. The findings contribute evidence and knowledge; policy adoption and measured habitat improvement require separate verification.

AQUATIC STEWARDSHIP

From knowledge to responsible practice

We strengthen stewardship by connecting ecological research, campus management and the communities who share water landscapes.

The combination of **peer-reviewed freshwater science**, **continuing Kızılırmak investigations**, **wetland learning** and **public communication** defines our most directly evidenced contribution to SDG 14 during 2025. We do not frame general water-efficiency equipment as a substitute for habitat science, nor do we infer conservation outcomes solely from awareness activities.

Our documented routes to aquatic impact

Route	2025 illustration	Evidence boundary
Scientific knowledge	Published benthic-fauna and diatom research	Scientific findings, not restoration output
Catchment research	Kızılırmak water-quality project	Ongoing investigation, not a completed basin programme
Community learning	Sultan Marshes visit on 22 March	Completed field-based learning; unverified attendance total omitted
Pollution-prevention practices	Waste segregation and municipal cooperation	Operational controls, not measured river remediation

Our future priorities therefore include clearer links between data collection and decision-making, responsible public communication of ecological results and, where partners and resources allow, more systematic monitoring of local freshwater habitats.

CONNECTED CONTRIBUTIONS

How aquatic stewardship supports other SDGs

Freshwater ecosystems sit at the intersection of water security, resource use, climate adaptation and terrestrial biodiversity.

Related SDG	Connection illustrated by our 2025 work
SDG 6 — Clean Water and Sanitation	Campus water stewardship and research-based understanding of freshwater quality
SDG 12 — Responsible Consumption and Production	Source separation, pollution prevention and work on contaminant detection
SDG 13 — Climate Action	Climate-sensitive understanding of catchments and water-dependent habitats
SDG 15 — Life on Land	Wetland and riparian habitats connecting terrestrial and aquatic biological communities
SDG 4 — Quality Education	Research-informed learning and wetland awareness activities
SDG 17 — Partnerships for the Goals	Inter-institutional research authorship, community cooperation and shared environmental knowledge

The fact that one intervention relates to several SDGs does not mean that we count the same event as several independent outcomes. The relationships show how **aquatic health depends on actions across institutional functions and landscapes**.

OUR 2025 CONTRIBUTION

Protecting aquatic life through evidence and engagement

Our 2025 achievements establish a clear scientific and community basis for ongoing aquatic-ecosystem stewardship.

Our contribution to **SDG 14 in 2025** was led by research on **mayflies, diatoms, freshwater quality, groundwater-related ecosystems and contaminant detection**. In parallel, we supported ongoing water-quality projects in the **Kızılırmak catchment** and communicated the importance of rivers and wetlands through student activity and public-facing educational messages.

We continue to recognise the difference between **producing scientific evidence**, **delivering outreach**, **maintaining environmental procedures** and **demonstrating measurable ecological improvement**. Each is valuable, but they represent different types of contribution. Responsible reporting identifies them accurately and treats ongoing project aims as aims rather than completed results.

Priorities for continued development

Our next priorities are to deepen field-based ecological monitoring, connect research findings more closely with catchment stakeholders, improve reporting of participation and follow-up outcomes, and strengthen documentation of pollution-prevention practices relevant to aquatic environments.



Figure 5. Nature Society members at the Sultan Marshes Bird Museum during the 22 March 2025 visit. Original University activity photograph.

By placing aquatic biodiversity and scientific evidence at the centre of our work, we can continue making a meaningful contribution to freshwater ecosystems and to the connected waters beyond them.