

CENTRE FOR STUDIES ON APPLIED TECHNIQUES (CETA)

2024 Activity Report

“Promoting the improvement of environmental quality, the strengthening of knowledge transfer and technical, scientific and professional training”

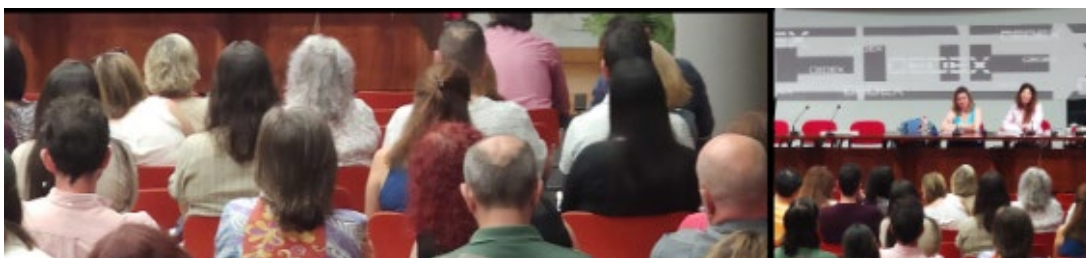
The activity carried out by CETA in 2024 has been oriented towards two main lines of action:

Training and Knowledge Transfer

The CEDEX Training and Documentation Office is a strategic pillar in the provision of horizontal services aimed at the transfer of technical and scientific knowledge generated in the organization. This work is articulated through the organization of specialized training activities, such as courses, technical seminars and events, as well as through the production and dissemination of CEDEX's publishing program.

During the year 2024, for which several outstanding training activities have been developed, including:

- **XLI Course on Wastewater Treatment and Operation of Wastewater Treatment Plants** (November 11 to 22, 2024).
- **Master's Degree in Soil Mechanics and Geotechnical Engineering**, a benchmark postgraduate program in the field of geotechnics.
- **Technical conferences and online courses** aimed at civil engineering professionals, both from the public and private sectors.
- **Agreements for the development of Educational Cooperation Programs.** We have developed **agreements with universities** for the development of external academic internships, including the development of Final Degree Projects, Master's Degree Projects, Final Degree Projects or Doctoral Theses.



Environmental activities

Within the scope of the **environmental activities** that characterize the Centre, throughout the year 2024, intense work has continued in the field of **High-Level Technical Assistance** provided both to the Ministries to which CEDEX reports, as well as to other independent bodies such as the **Nuclear Safety Council (CSN)** and other administrations and private companies.

In the field of **protection of the aquatic environment against radioactivity and the characterization of the hydrological cycle** by means of tracers and environmental isotopes, in line with **Goal 6 of the SDGs**, CEDEX has continued to provide high-level technical services to the CSN in the work related to the radiological monitoring network of Spanish waters, giving continuity to the work started in 1976 by CEDEX. In this sense, the institution participated in the 29th Annual Conference on Radiological Monitoring in the Control of Environmental Radioactivity held at the CSN, where the results of the analytical intercomparison campaign carried out in 2023 on biota samples were presented. Radiological surveillance technical assistance has also continued to be provided to different Nuclear Power Plants through the periodic analysis of isotopes in different water samples from their surroundings to verify the conditions for discharge authorization, as well as for several companies that have requested this type of analysis.

On the other hand, it has participated in the **XII Conference on Quality Control in Environmental Radioactivity**, organized

by the Illes Balears University under the auspices of the CSN and the Spanish Society of Radiological Protection. The National Accreditation Body ENAC carried out the follow-up audit of the file LE/1955 (LE/1955R2S3) of the **Laboratory of the Isotopic Applications Area**.

In addition, research work is applied to the study of the isotopic variability in the hydrological cycle. In this sense, we have participated in the final conference of the **COST WATSON Action** "Water isotopes in the critical zone: from groundwater recharge to plant transpiration", and we continue to deploy the Spanish Network of Isotope Monitoring in Precipitation (REVIP) in collaboration with other organizations such as the AEMET. These activities have been reflected, for example, in the participation in the **XXIII Science and Innovation Week of the Community of Madrid** with visits to the laboratory under the slogan "The isotopic composition of rainwater: from your umbrella to the tap at home".



Monitoring and sampling of the Naixement de Bellús (spring that supplies Xàtiva) to verify that the water in the Bellús reservoir is not affected.

The **study to support "Canal de Isabel II Gestión"** for groundwater dating with tritium and radiocarbon in the Madrid detritic aquifer was completed. Likewise, the **2023 Annual Reports** have been

completed for the "Experimental study for the development of a methodology based on the analysis of environmental isotopes to determine the evolution of nutrient pollution in the water environment (2022-2026)" commissioned by **the Water Directorate**, and for the **Júcar River Basin Authority** for the "Monitoring of the possible effect of the Bellús reservoir on the groundwater in its surroundings (2023-2026)".

The study of the origin and age of the seepage water from the Mariaga Tunnel (Fuente la Higuera, Valencia) was also completed using isotopic techniques in support of the Geotechnical Laboratory for the evaluation of the cause of the pathologies observed in the A-33 highway.

In this **thematic area**, **12 reports** have been prepared in 2024 for different clients, such as the CSN, the Water Directorate, the Júcar River Basin Authority, the La Laguna University, Asesoría y Control en Protección Radiológica (ACPRO), S.L.U., A.I.E. CC.NN. Almaraz-Trillo, Ascó - Vandellós II Nuclear Association, A.I.E. Amphos 21 Consulting S.L., EPTISA Servicios de Ingeniería, S.L. and Medidas Ambientales, S.L.

International cooperation

In the area of **international cooperation**, three representatives of the **European Atomic Energy Community** visited the Isotopic Applications Area Laboratory for verification of compliance with article 35 of the Euratom Treaty in the city of Madrid on April 18. Two researchers from the **Institute of Advanced Studies of Venezuela** made technical visits to the

CEDEX laboratories at CETA and CEH and to the Tous and Bellús reservoirs in Valencia on a cooperation mission sponsored by the **International Atomic Energy Agency (IAEA)** to verify the use of isotope techniques for water tightness and water quality studies in reservoirs.

In terms of **training**, a **technical workshop for liquid scintillation** users was held, attended by representatives of universities, technology centres and private companies that use this technique to guarantee the quality of their sustainable energy and chemical products, such as biofuels.



Start of TEFIVA marked by the P-24 sign and footprints found on the margins

In relation to the lines of activity of **Habitat Fragmentation and Adaptation to Climate Change**, it should be noted that the work started in 2023 for the **Directorate General of Roads** continues through the commission to carry out "Technical Assistance, Research And Technological Development In Biodiversity Conservation, Environmental Noise And Adaptation To Climate Change In Matters Within The Competence Of The Directorate General Of Roads (2023-2027)" which includes the performance of various specific works such as resilience to extreme phenomena as a result of climate change in the **State**

Highway Network and the analysis of the **Sections of Special Frequency of Road Incidents with Animals (TEFIVA)** in the State Road Network.

In this last line, the field review of these Sections has begun. In this way, environmental integration is reinforced in the decision-making processes in the management of road infrastructures, reducing economic costs associated with the maintenance of the assets of the State Road Network.

In the area of **Air Quality, Mitigation and Adaptation to Climate Change**, the publication 'Carbon Footprint and Improvement Plan 2024' has been prepared, which analyses the carbon footprint of CEDEX with scope 1, 2 and 3, and documents the best environmental practices carried out to improve energy efficiency and reduce the carbon footprint, reflecting the activities coordinated by the CETA of the **CEDEX Environmental Management System** in accordance with the ISO 14001:2015 standard. Support is also being provided to Adif and Adif-AV in the calculation and registration of their carbon footprint.

Adaptation to climate change

In the **area of adaptation to climate change**, work is being carried out on integrating resilience to climate change in the State Road Network. In this regard, the **Climate Change Adaptation Plan for the State Road Network** is being drawn up in conjunction with the **MITMS**, based on the Climate Change Adaptation Methodology developed by the Environment Committee of the **ATC**. In relation to this work, two

reports on resilience to climate change were issued.

In the area of atmospheric emissions, the monograph 'Tool for calculating energy consumption and pollutant and greenhouse gas (GHG) emissions in road plans, programmes and projects' has been published.

As part of this same assignment from ADIF, the course of action in **Ecosystem Restoration** is carrying out various analyses to improve restoration actions on land affected by railway infrastructure and propose technical recommendations for future projects. In October, the assessment of the environmental restoration actions on the viaducts of the Valladolid-Burgos-Vitoria **High Speed Line (HSL)** was completed, which included a technical visit in January to different viaducts of this HSL in the province of Palencia.

Likewise, a technical visit was made to different borrow pits and landfills in the Basque Country region to assess the state of the revegetation carried out by ADIF on the **Vitoria - Bilbao - San Sebastián HSL**. This work was presented in November at the internal conference to disseminate the results of the **ADIF-CEDEX assignment**, together with **the carbon footprint calculation work**.

In this same course of action, the project for the **recovery of the river ecosystem** Manzanares - Gavia - Bulera. Green and blue infrastructure of the Metropolitan Forest of Madrid is still going on. With the support of the **Biodiversity Foundation of the Ministry for Ecological Transition and**

the Demographic Challenge and within the framework of the **Plan for Recovery, Transformation and Resilience (PRTR)**, the project has been financed by the **European Union – NextGenerationEU**, and CEDEX has teamed up with **Madrid City Council** and the **CONAMA Foundation** for its development. An important effort has been made to disseminate the results. This effort has been materialised with a presentation at CONAMA 2024 Conference, an oral communication on the application of remote sensing imagery to monitor the recovery of the Manzanares-Gavia-Bulera river ecosystem in the Geodata 2024 Conference, an oral communication and two posters at the 8th IAHR Europe Congress ‘Water - Across Boundaries’ and a presentation on the insect community at the National Congress of Environmental Impact Assessment, in Vitoria.

Also in this line of activity, the **study of the characterisation and proposed restoration of the streams of the “raña” in the Cabañeros National Park** was completed in October. It was preceded in February by a technical reconnaissance visit with the staff of the Cabañeros National Park to identify the streams to be restored in the “raña” area.

In order to meet the mandate of the **General Directorate Of The Coast And The Sea** To CEDEX, work has been carried out on two specific tasks, such as technical support in the field of connectivity and restoration of coastal ecosystems to achieve the specific

objectives of different goals of the National Strategy for Green Infrastructure and Ecological Connectivity and Restoration (EIVCRE) and Monitoring studies of restoration actions in the coastal environment.

This last task was presented at the **IAHR-Spain Water Meeting** titled ‘Sustainable Seas and Coasts: Restoration and Environmental Protection in Spain’ with an oral communication on the evaluation of restoration actions in coastal areas. In October, the methodological proposal for the evaluation of these actions in the coastal environment was concluded.