Copernicus Tools for Monitoring Global Change Effects in Rivers and Riparian Zones

(Cop.RIVER)

-

Deliverable 13: Workshop opened at EU level 2

Reporting period 2024 - 2025

INDEX

1 BACKGROUND

Cop.RIVER aims to promote the use of Earth Observation (EO) in applications and services related to the ecological status of fluvial landscapes (*i.e.*, rivers and their associated alluvial plains, floodplains and riparian forests). The action will strengthen the Copernicus user uptake by supporting regional and national authorities in the implementation of the EU Biodiversity Strategy to 2020, the Habitats and Birds Directives and the Water Framework Directive by applying GAP analysis, to complement available Copernicus information on the state and characteristics of rivers and riparian zones.

The expert workshop "**Needs and Methodologies for the Characterization of Water and Sediments in Fluvial Ecosystems**" was conceived within the framework of the European project Copernicus Tools for Monitoring Global Change Effects in Rivers and Riparian Zones (Cop.RIVER). The Cop.RIVER project, developed by IHCantabria, aims to assess the applicability of remote sensing tools provided by the COPERNICUS program (European Space Agency) for monitoring the effects of global change in rivers and riparian zones.

To this end, key stakeholders involved in the implementation of regulations, such as the Water Framework Directive, have been identified, along with experts in the characterization of fluvial landscape components (e.g., remote sensing specialists).

The specific objectives of this workshop were:

i) To identify the needs of public administrations for the management, monitoring, and assessment of water bodies associated with fluvial ecosystems.

ii) To identify existing methodologies for characterizing the aquatic component and sediments across multiple spatial and temporal scales.

iii) To detect methodological or knowledge gaps and potential improvements.

2 WORKSHOP OPENED AT EU LEVEL 2

This workshop, held on September 23, 2026, brought together more than 30 participants from public organizations (General Directorate of Water, Biodiversity Foundation, Catalan Water Agency, Tragsa Group) and academic institutions (IHCantabria, Cartographic and Geological Institute of Catalonia), as well as companies specializing in the application of remote sensing for monitoring the status of water bodies (AQUACORP, S.L., Zenithal Blue Technologies S.L.U.).

2.1 Summary

The session opened with a welcome and an overview of the Cop.RIVER project by Laura Concostrina Zubiri and Pepe Barquín from the Freshwater Ecosystems Group at IHCantabria. They highlighted the project's objectives: assessing the applicability of Copernicus Earth Observation tools for monitoring global change impacts on rivers and riparian zones, and fostering collaboration among key stakeholders.

The first block of presentations focused on institutional needs and technological solutions. Juan Alández Rodríguez, Francisco Javier Monte and Gonzalo Magdaleno Payán, from the General

Directorate of Water (MITECO), addressed regulatory requirements and operational challenges in implementing directives such as the Water Framework Directive and the opportunities and limitations that remote sensing derived products present in this context. Then, Pablo Pérez and Judit Mielgo from Aquacorp S.L. showcased innovative optical sensing technologies for real-time water quality monitoring and their role in supporting management decisions. Next, Jordi Cobera (Cartographic and Geological Institute of Catalonia – ICGC), in collaboration with the Catalan Water Agency presented their experience in exploring the potential of satellite imagery for tracking changes in river morphology and water body dynamics.

The second block focused on methodological advances and practical tools. Álvaro Fernández Menéndez (IHCantabria) demonstrated how Sentinel-2 imagery can be leveraged to detect geomorphological changes in riparian zones, including the characterization of water and sediment spatial and temporal dynamics. Then, Laura Concostrina Zubiri and Fernando Rodríguez Montoya (IHCantabria) introduced the Cop.RIVER toolkit (available here), a decision-support tool designed to integrate remote sensing derived ecological indicators for assessing fluvial landscape conservation status.

This workshop was also attended by participants from the field of river landscape administration and management (TRAGSA group and Fundación Biodiversidad, among others), as well as scientists and other companies developing remote sensing products that address environmental monitoring needs (Zenithal Blue Technologies S.L.U.). Originally, this workshop was intended to be open to the EU. Although several speakers and participants from outside Spain were invited, only national participants attended. This does not diminish the relevance of the workshop, which is grounded in identifying needs and opportunities for characterising water and sediments in freshwater ecosystems, based on input from a range of stakeholders working within European Directives, Strategies, and Actions related to ecosystem monitoring and conservation.

The workshop concluded with a roundtable discussion, where participants exchanged insights, raised questions, and proposed future collaborations to address methodological gaps and improve monitoring strategies.

2.2 Results of the survey on the application of remote sensing in riparian vegetation characterization

The participants of workshop belonged mainly to the technical, management and scientific fields, and to a lesser extent to technical experts and startups. The vast majority of them work in aquatic habitats, but also in riparian zones, terrestrial and aquatic habitats, an in the integrated water cycle. Approximately 40% of the participants use field data as a source of information, while the other half combine field work and the use of remote sensing, but also the use of GIS tools and predictive modelling. The vast majority of participants work at various temporal scales, although some of them focus on conservation status reporting periods (*i.e.*, every 6 years).

Only half the participants were aware of the existence of Copernicus Land Monitoring Service (CLMS) products. Those participants with experience using CLMS products referred the use of Dynamic Land Cover, Corine Land Cover, Tree Cover Density and Riparian Zones, among others.

Some examples of how participants make use of remote sensing are:

- Riparian forest characterization
- Fluvial connectivity
- Land cover and topographic variables in the fluvial landscape
- Water surface characterization
- Sediment transport processes

3 CONCLUSIONS

The expert workshop allowed to share needs, interests and future developments related to the use of remote sensing in the characterisation of water and sediment components of fluvial landscapes, as well as in the monitoring of components, processes and conservation status occurring in the aquatic component of rivers.

The most relevant conclusions of the workshop were i) remote sensing is a useful tool to characterise river spatial limits, the presence of sediments and water quality, ii) remote sensing has limitations for certain types of river reaches (*e.g.*, headwater reaches, urban) and variables (*e.g.*, biological activity) due to resolution and optical limitations, iii) it is crucial to select the appropriate remote sensing indicators according to the object of study, the spatial scale at which it can be assessed and the needs for reporting or modelling, and iv) validation using ground truth data is key to advance the use of remote sensing in fluvial landscapes assessment.

Interaction between technology developers, technicians and environmental authorities is essential to advance in the implementation of tools that provide accurate and useful information for the management and conservation of river landscapes, such as those based on remote sensing.

4 ACKNOWLEDGMENTS

This work is supported by the European Union's Caroline Herschel Framework Partnership Agreement on Copernicus User Uptake under grant agreement No FPA 275/G/GRO/COPE/17/10042, project FPCUP (Framework Partnership Agreement on Copernicus User Uptake), Action 2021-1-2 "Copernicus Tools for Monitoring Global Change Effects in Rivers and Riparian Zones" (SPECIFIC AGREEMENT Nº19 - 2022/S12.879177 /19).