

EARSC Response - Call for Evidence on the Water Resilience Strategy

The European Association of Remote Sensing Companies ([EARSC](#)) is a trade association representing over 140 members across Europe in the Earth observation (EO) industry. EARSC welcomes the European Commission initiative to draft a Water Resilience Strategy to set a clear path towards water security and resilience. Water is life, and ensuring water resilience in Europe is fundamental. As one of the most cross-cutting policy domains, coordinated and comprehensive action at the EU level is paramount.

Earth observation is a key tool for supporting water resilience, and to effectively meet the goals of the EU in this domain, **this should be recognised in the forthcoming strategy**. Earth observation has proven invaluable for the implementation for multiple aspects of water management globally both in support of SDG6 on clean water and sanitation for all, and across Europe. EO has supported the implementation of the Water Framework Directive for many years.¹ The downstream EO industry in Europe is actively engaged in this domain, and stands ready to continue supporting water resilience initiatives at the European level.²

The EEA's Europe State of Water 2024 report highlights the importance of EO for this domain: *'Improved monitoring systems combined with remote sensing technologies (such as Copernicus) can support better-informed decisions for aquatic ecosystem restoration at different scales.'*³ The latest FORENV report on water resilience also references the value of Earth observation as a tool for managing large river basins, and recognises remote sensing as a key opportunity to optimise water use for agriculture.⁴ The European Parliament Draft Report on the Water Resilience Strategy also stresses the importance of digitalisation and AI for improving monitoring and management of water; calls on institutional stakeholders to enhance evidence-based decision making and enable distance monitoring and reporting on water quality, leakage, use, and resources.⁵

The integrity of water resources links closely to the health of nature. Both are crucial for human well-being and the environment, offering food and shelter to countless species. However, many of Europe's ecosystems and waters face significant threats from land-use changes, overexploitation, pollution, and climate change. Water resilience is essential for maintaining ecosystem services, biodiversity, and human well-being. Ecosystem functions and services are critical components of ecological health, directly influencing the water resilience of freshwater and coastal systems. These services include water purification, carbon

¹ [Water Quality Monitoring in the Netherlands. Sentinel Benefit Studies; Water Quality in Finland, Sentinel Benefit Studies; Water Quality Management in Germany. Sentinel Benefit Studies.](#)

² Table 1 constitutes a non-exhaustive list of activities of EARSC members in the water resilience domain.

³ [European Environment Agency, State of Water 2024 Report \(p.90\).](#)

⁴ [Emerging environmental and other issues impacting our ability to achieve a water-resilient Europe by 2050 - Final report of the 2022-23 cycle. FORENV - The EU Foresight System for the Environment. 2023.](#)

⁵ [DRAFT REPORT on the European Water Resilience Strategy \(2024/2104\(INI\)\) Committee on the Environment, Climate and Food Safety, European Parliament.](#)

sequestration, flood regulation, and habitats for biodiversity. Immediate efforts are essential to restore lakes, rivers, and coastal areas, ensuring the health and resilience of water resources for future generations.

EO services contribute to better water resources management for water availability, water access, water quality and quantity and have played an important role for the monitoring of inland and coastal waters. However, the role of EO extends beyond monitoring capabilities. **EO can cover large areas efficiently, reducing costs, while providing consistent and high-resolution insights and local, regional, national, and global scales.** Multi-mission and multi-sensor EO capabilities are key for predictive modeling, and can provide **near real-time information** for early warning capacities for support to decision-makers and civil security initiatives and disaster management. An advantage of EO is its **scalability**. In-situ data collection requires stationary sensors and manual effort for on-the ground data collection. EO can help support this. **Synergies between in-situ measurements and EO enhance accuracy, precision and reliability of ground observation data.** EO capabilities extend beyond images, enabling data-driven insights which can be tailored to solve problems. There are opportunities to enhance the symbiosis of enhanced analytics, modeling, and platform development, which can further strengthen effective water management decision support in domains such as integrated water resource distribution, land management, or conservation to maximise competitiveness and sustainability. Harnessing AI within these systems enhances real-time monitoring, strengthens early warning capabilities, and enables predictive forecasting, turning EO data into actionable intelligence for proactive water management.

In conclusion, EO plays a key role in inland and coastal water monitoring, providing critical insights for areas such as water quality assessment, water resource distribution, flood and drought detection, and ecosystem health evaluation. Leveraging EO technologies, decision-makers and implementers can take proactive measures, essential for biodiversity, ecosystem services, and the well-being of citizens. The low cost, high accuracy and precision, continuous coverage, and data availability at local to global scales which EO supports is vital for the holistic development and pragmatic implementation of an EU Water Resilience Strategy.

Table 1. Sample of commercial Earth observation services for supporting water resilience

EO Service or Application	Description	Importance for water resilience
constellr high resolution land/sea surface temperature (LST / SST)	30m resolution thermal infrared imagery plus ability to provide LST/SSTzoom at 10m resolution	<ul style="list-style-type: none"> • Temperature as proxy for water quality • Early detection of algae blooms • Monitoring of soil moisture and early warning of drought risk • LST helps optimize irrigation, thus saving water
European Space Imaging (EUSI)	<ul style="list-style-type: none"> • 30 - 50 cm Multispectral VNIR + SWIR • 5 - 10 m Hyperspectral VNIR + SWIR • 25 - 100 cm SAR • processing & analysis partners 	<ul style="list-style-type: none"> • Impervious surface mapping w/ VHR imagery via DLR or Ecopia • Water quality analysis with Hyperspectral • Soil moisture & irrigation management with SWIR • Flood rapid response & prediction modeling
Starion Group	Project "WISER" (<u>W</u> ater <u>I</u> ntelligence with <u>S</u> atellite-based <u>E</u> stimation and <u>R</u> egulation) for the Italian Space Agency (ASI), Kick-Off foreseen in April 2025	<ul style="list-style-type: none"> • Public cloud-based platform integrating EO data, weather forecasts and in-situ observations • AI-powered Digital Twin integrating information on rainfall, soil moisture, evapotranspiration, rivers' flow and natural/artificial basins' capacity • High spatial (<100 m) and temporal (< 1 day) resolutions • What-if scenarios predicting water resource availability based on simulated urban, agricultural and industrial water consumption models • Flood risk and damage assessment at urban level
EOMAP GmbH	eoAPP AQUA & Water Quality analytics	<ul style="list-style-type: none"> • Award winning cloud-based Web App for EO based water quality information • Digital Twin solution integrating multiple EO satellite analytics with in-situ data • Valuable insights into the ecological status, dynamics and trends of inland and marine waters • Water quality assessments include turbidity, suspended matter, chlorophyll-a, harmful algae bloom and trophic state classification

		<ul style="list-style-type: none"> ● Assessment, Monitoring and Early Alert capabilities for water resources management and water resilience ● Algae bloom monitoring & alert ● Water availability estimations and monitoring (Hydropower - Hypos, reservoir storage) ● Snow Water Equivalent - discharge modelling ● Water quality & Civil security/health
NEO	EO-Hub	<ul style="list-style-type: none"> ● Tree shading on waterways: Relevant for ecological assessments and target species monitoring. ● Monitoring of water quality management practices such as nature friendly riverbanks ● Surface water presence or drought detection: Identifying raised or depressed parcels helping to resolve disputes with farmers through data-driven insights. ● Irrigation detection. ● Crop type identification: Links crop types to pesticide use and assesses the risk of runoff into surface waters and monitors nature friendly field borders in supporting water quality management. ● Landcover change monitoring. ● Manure silo detection (pollution hotspot detection)
Earthdaily Agro	Earthdaily Constellation (launch 2025) daily thermal infrared, SWIR and NIR imagery	<ul style="list-style-type: none"> ● Crop water status monitoring ● Crop water stress detection
Soilmate	Analytics platform for crop and forest stress monitoring	<ul style="list-style-type: none"> ● Soil moisture anomaly detection ● Change detection in field boundaries (essential to monitor soil degradation and results of flood events) ● Deforestation, afforestation detection for monitoring changes in wetlands and riverbanks.