BREATHE

Monitoring river metabolism to assess ecosystem services

Water4All
Water security for the planet

Abstract

Current indicators used in national river health assessment systems (e.g. EU Water Framework Directive) do not reflect well biodiversity, aquatic ecosystem functioning and services as needed for new and proposed policies. Progress in sensor technology over the last 20 years has allowed the continuous monitoring of dissolved oxygen and river metabolism (photosynthesis, respiration, metabolic balance) at unprecedented spatio-temporal scale and resolution.

BREATHE's main objective is to co-design an international sensor-based River Observation System (RIOS) including dissolved oxygen and whole river metabolism to quantify aquatic ecosystem services such as climate regulation, water purification, provisioning fisheries for the implementation of European and global policies (EU 2030 Biodiversity Strategy, European Green Deal net zero greenhouse gas emissions by 2050, United Nations Sustainable Development Goals – notably Water and Sanitation for all.

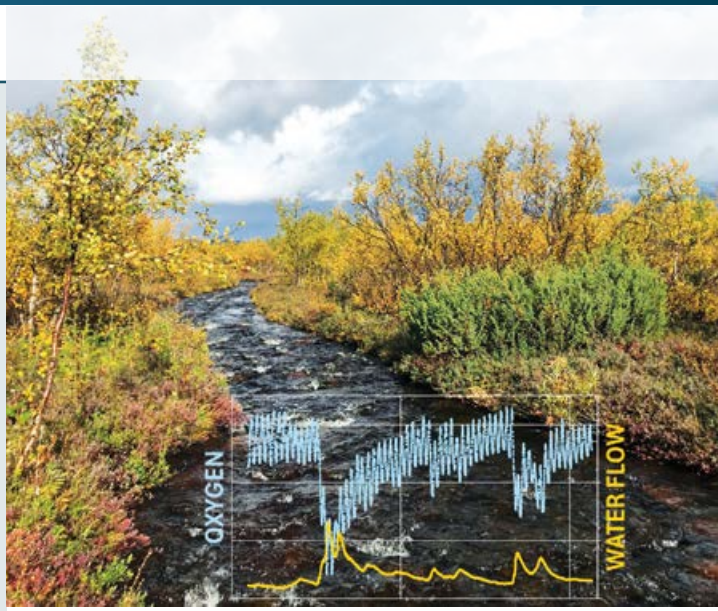
BREATHE will reach this goal by engaging with stakeholders to: first, co-design a workflow from data collection to storage, integration and modelling, and second, co-construct case studies to demonstrate how the workflow may be applied at the local scale and integrated internationally.

The case studies are including key environmental issues in six countries:

- forest restoration (Brazil),
- water scarcity (Spain),
- multiple stressors (Switzerland),
- urban anoxia (United Kingdom),
- water regulation (Norway) and
- peatland restoration (Sweden).

BREATHE will not only identify commonalities among regions, sharing solutions to barriers of implementation, but also focus on region-specific needs in aquatic ecosystem services and policies. Patterns, processes and experiences from low latitude might become future scenarios for higher latitudes.

BREATHE will provide guidance documents to optimise the development of monitoring networks, harmonise data collection and integration, and the modelling of the effect of drivers or remediation actions (restoration) on river ecosystem services.



Project coordinator

Benoît DEMARS - NORWEGIAN INSTITUTE FOR WATER RESEARCH - NORWAY

Project partners

- UMEÅ UNIVERSITY - SWEDEN
- AGENCIA ESTATAL CONSEJO SUPERIOR DE INVESTIGACIONES CIENTÍFICAS - SPAIN
- UNIVERSITY OF BRISTOL - UNITED KINGDOM
- ECOLE POLYTECHNIQUE FEDERALE DE LAUSANNE - SWITZERLAND
- FEDERAL UNIVERSITY OF SÃO JOÃO DEL-REI - BRAZIL

Funding organisations

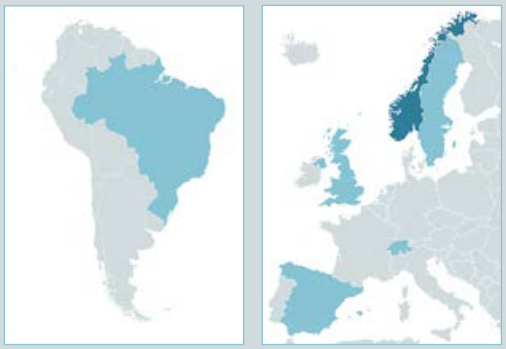
RCN (NORWAY) / FORMAS (SWEDEN) / AEI (SPAIN) / EPSRC UKRI (UNITED KINGDOM) / SNSF (SWITZERLAND) / FAPEMIG (BRAZIL)

Duration

3 years

Contact

Benoît DEMARS
benoit.demars@niva.no



KEYWORDS

river monitoring
in-situ sensor
dissolved oxygen
river functions
ecosystem services