# Building water resilience: towards better implementation of ecological flows and water allocation in Europe

The importance of building water resilience is becoming more and more clear to politicians and citizens as Europe is facing another summer of severe droughts leading to disruptions of water supply, damages to crop production and severe water stress in vulnerable aquatic ecosystems.

Strengthening Europe´s water resilience requires better strategies to tackle water scarcity and droughts, which are being intensified by climate change. The EU Biodiversity Strategy 2030 and the EU Climate Adaptation Strategy under the European Green Deal have set priorities to urge Member States to take action. These EU strategies ask EU Member States to strengthen the implementation of ecological flows and to improve water allocation systems.

European research delivers key insights on the design and implementation of regulations being used for water allocation and ecological flows in different countries and highlights areas where actions need to be strengthened.

## Key messages

- Regulatory frameworks for ecological flows should be fully elaborated and implemented, incorporating provisions for defining, implementing and monitoring ecological flows in national water policy and river basin management plans.
- A common understanding of the role of water allocation in the Water Framework Directive should be developed and regulatory barriers for reallocating water addressed. Lessons can be learned from European countries with more advanced water allocation decision-making frameworks, such as Spain, France and England.
- Comprehensive strategies are needed to address trade-offs with sectors when implementing ecological flows and planning water allocation. More attention should be paid to stakeholder engagement in planning and implementation, to coordination with sectoral planning processes and compensation mechanisms for water users.
- Knowledge and information systems must be strengthened to improve the definition and implementation of ecological flows and decision making for water allocation.
- Resources of authorities for monitoring and enforcement and legal and financial deterrents on non-compliance with water permit conditions must increase.

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## Ecological flows and water allocation - Two building blocks for water resilience

Water scarcity and more frequent drought events are becoming pressing problems in Europe, impacting not only the Mediterranean but also other regions in Europe. The intensified droughts and water scarcity lead to more competition for water resources, forcing difficult trade-offs between sufficient clean water supply for human use, supporting various economic sectors, and preserving water needs of the environment. This calls for innovative approaches to managing water to enhance resilience and includes the integration of ecological flows and water allocation mechanisms.

Ecological flow (eflow) is the amount of water required for the aquatic ecosystem to continue to thrive and provide the services we rely upon.[1] The EU Biodiversity Strategy 2030 calls on EU Member States to review water abstraction and impoundment permits to implement ecological flows in order to achieve good water status as required by the Water Framework Directive.[2]

Water allocation mechanisms define who is allowed to access water, how much may be taken and when, how it must be returned, and the conditions attached to the use of the water.[3] The EU Climate Adaptation Strategy specifically points towards the need to improve the use of water-permitting and allocation systems to mitigate climate-driven water scarcity and drought impacts.[4]

Ecological flows defined to sustain aquatic ecosystems provide ecological boundaries for water allocation regimes. The water allocation process must then harmonize the requirements of water users with these ecological limits. The integration of eflows in water allocation is therefore a crucial step for their implementation. Managing allocations for water resources also plays a crucial role in ensuring effective and equitable distribution of water as a common good.

## Understanding the issues at stake through stakeholder exchange and research

Recognising the need to take stock of country progress and to share current practices, the European Commission has established an ad-hoc task group on water scarcity and drought management under the Common Implementation Strategy for the Water Framework Directive. This group focuses on improving water scarcity and drought management in the context of river basin management and has worked on implementation challenges and good practices for implementing ecological flows[5] and water allocation[6] in the EU.

Bringing in a research perspective, the GOVAQUA project reviews how legal and regulatory regimes for water allocation[7] and ecological flows[8] are designed and implemented in Finland, France, Romania, Spain, Sweden and the UK identifying implementation challenges in the national context and potential innovative practices on regulatory design.

## An incomplete regulatory framework for ecological flows

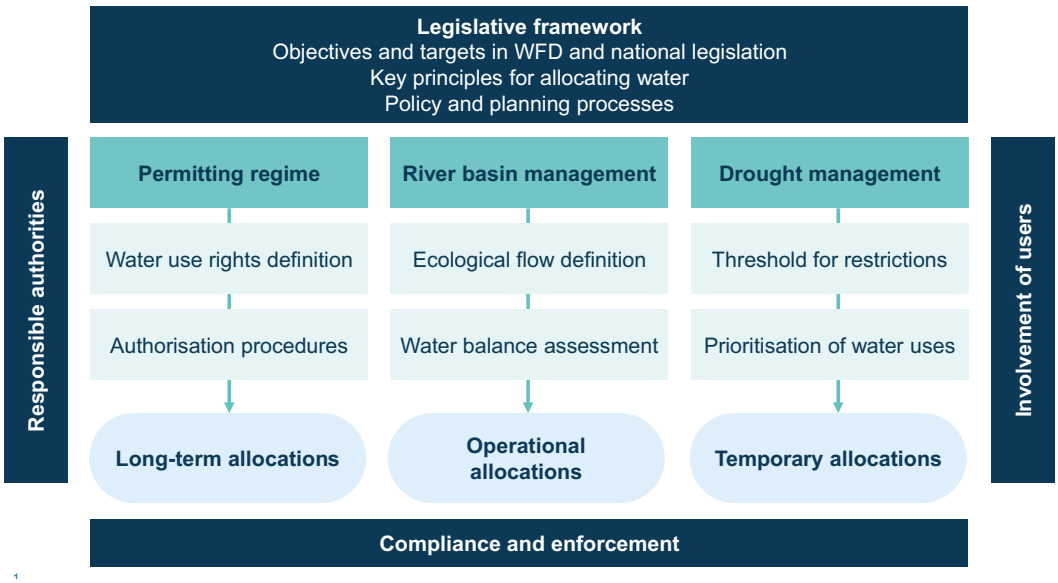
REGULATION OF EFLOWS

- The Water Framework Directive (WFD) acknowledges the importance of the flow regime for aquatic ecosystems by explicitly including it as a supporting quality element in its definition of ecological status of surface waters. For EU river basin managers, "ecological flow" is defined as a hydrological regime consistent with the achievement of the environmental objectives of the WFD in natural surface waters (achievement of good ecological status, non-deterioration of status, and compliance with objectives for protected areas, such as Natura 2000 sites).
- In several EU countries, the legal and policy basis for defining and implementing eflows is still not sufficiently elaborated.[9] This may entail the lack of eflows provisions under national water acts and river basin management plans as well as a lack of regulatory mechanisms to revise the environmental conditions of water use permits. In Finland and Sweden, there is no specific definition of eflows and eflows methodologies in national legislation yet. In Romania, eflows were only recently introduced in the legal framework and the eflows methodology is under development.
- Other European countries are at more advanced stages of policy development. France and Spain have a longer record of developing and implementing eflows, with advanced regulatory frameworks in place. In England, there is a well-defined eflows indicator used for application in river basin management plans by competent authorities.

## A lack of common understanding on water allocations

INSTITUTIONAL SETUP FOR WATER ALLOCATION

- The WFD requires the establishment of permitting regimes to regulate access and use of water. Yet, there are no agreed standards or guidance at European level on water allocation practices. Approaches are highly dependent on legal traditions and national institutional legacies.
- Spain, France and England have the most advanced water allocation decision making framework. Planning instruments exist for establishing basin-wide water balances and procedures to revise water use priorities with stakeholder input. They also present more advanced drought management plans with pre-agreed measures associated with triggers.
- Reallocating water for environmental, social or economic objectives faces many regulatory barriers, such as long permit durations and limited powers entrusted to water authorities. In some countries, no processes exist to revise permits or reallocate water. More advanced countries have institutionalised ways of reallocating water, such as water trading in Spain and the UK, and user-based reallocations in France.



## Limited awareness and trade-offs with sectors

SECTORAL AND SOCIETAL CHALLENGES

- Major challenges exist in transforming society and economic sectors towards a water saving culture, especially in the countries and regions with higher water scarcity or exposure to droughts.
- Common challenges faced by countries in the implementation of ecological flows are related to sectoral water uses. This involves tackling opposition to eflows implementation from water users that are affected by eflows the most, compensation options for water users, and the coordination of eflows policy with sectoral planning processes and investment decisions.
- Stakeholder engagement especially could be further institutionalised in different steps of the regulatory framework for permitting, planning and enforcing water allocations as well as for the implementation of measures to achieve ecological flows.

## Scientific advances and the lack of information systems

KNOWLEDGE AND SCIENCE

- European countries still face scientific knowledge gaps to improve eflows definition and implementation. In particular, the link between eflows and ecological response is poorly understood. Targeted and regular monitoring is key for assessing the impacts of implemented eflows on ecosystem condition to prove the ecological benefits of increased flow rates and to adapt eflows, where needed.
- Existing regulations and methods for eflows need to be adapted towards more holistic approaches based on the latest scientific evidence. Eflows regulations should take account of the declining water availability and increasing variability of the flow regime due to climate change in many European river basins. They should also take account of the needs of the environment over the entire hydrological cycle, which includes both low flows and high flows (floods) when they naturally occur.
- Allocation decision making is currently compounded by considerable uncertainties regarding surface water – groundwater interaction, inherent hydrological variability, and the increasing impact of climate change. There is a lack of decision support tools for water allocation, appropriately linking with eflows achievement, and sound water balances.

## Insufficient resources and legal provisions for enforcement of eflows and water allocation

ENFORCEMENT AND COMPLIANCE

- In the countries reviewed by GOVAQUA, major challenges concern the monitoring of water use. Countries face challenges in adequately resourcing regulatory authorities to monitor all abstraction points and follow up cases of illegal water use. This issue was highlighted in Spain where illegal groundwater abstraction is a major challenge.
- Many Member States struggle with implementing appropriate compliance mechanisms, particularly regarding permit conditions. Penalties for non-compliance are often inadequate and fail to deter illegal activities effectively. Strengthening penalties is deemed necessary in several Member States, including France, Spain, and England, to improve compliance. In Spain, illegal abstraction is controlled and prosecuted in certain “hot spots,” but overall monitoring remains inadequate due to authorities’ lack of resources and capacity.
- Available technologies such as ICT and satellite technologies could enhance compliance monitoring, but their use remains limited. Although pilots exist, none of the countries examined in GOVAQUA have yet systematised the use of real-time metering of abstraction. Spain and France have programmes to consolidate approaches to monitoring water use.

## Outlook - GOVAQUA good practice inventory

Towards 2025, GOVAQUA will continue its research on good practice regulatory approaches for eflows and water allocation as two key building blocks for a more water-resilient Europe. The GOVAQUA good practice inventory is currently in preparation; it will include approaches and instruments for the regulatory design and implementation of ecological flows and water allocation, which are not yet broadly applied but hold promise for replicability and up-scaling. The aim of the GOVAQUA good practice inventory is to provide innovative ideas for national and basin level water managers and other decision makers in water governance.

## Contacts

Josselin Rouillard
josselin.rouillard@ecologic.eu

Eleftheria Kampa
eleftheria.kampa@ecologic.eu

John Tarpey
john.tarpey@ecologic.eu

www.syke.fi/projects/govaqua

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## References

1. Tharme, R.E. (2003). A global perspective on environmental flow assessment: Emerging trends in the development and application of environmental flow methodologies for rivers. River Research and Applications 19(5-6): 397-441.
2. EC (2021). EU biodiversity strategy for 2030 – Bringing nature back into our lives, Publications Office of the European Union, 2021, https://data.europa.eu/doi/10.2779/677548
3. OECD (2015). Water Resources Allocation: Sharing Risks and Opportunities, OECD Studies on Water, OECD Publishing, Paris. http://dx.doi.org/10.1787/9789264229631-en
4. EC (2021). COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS Forging a climate-resilient Europe - the new EU Strategy on Adaptation to Climate Change. COM/2021/82 final.
5. EC (2024), Implementation of ecological flows in the EU – Final report, Publications Office of the European Union, 2024, https://data.europa.eu/doi/10.2779/704014
6. EC (2024), Implementation of water allocation in the EU – Final report, Publications Office of the European Union, 2024, https://data.europa.eu/doi/10.2779/62106
7. Rouillard, J., Tarpey, J., Kampa, E., Penttilä, O., Belinskij, A., Díaz, E., Berbel, J., Junjan, V., Molle, F., Ionescu, C. (forthcoming). GOVAQUA policy matrix – Review of national water allocation policies in six European countries. Deliverable number: 2.1, Part A.
8. Kampa, E., Rouillard, J., Tarpey, J., Penttilä, O., Belinskij, A., Díaz, E., Berbel, J., Junjan, V., Molle, F. (forthcoming). GOVAQUA policy matrix – Review of national eflows policies in six European countries. Deliverable number: 2.1, Part B.
9. CIS (2015). Ecological flows in the implementation of the Water Framework Directive. Guidance Document No. 31

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