

## **Eco-AlpsWater**

Innovative Ecological Assessment and Water Management Strategy for the  
Protection of Ecosystem Services in Alpine Lakes and Rivers

Priority 3: Liveable Alpine Space. SO3.2 - Enhance the protection, the  
conservation and the ecological connectivity of Alpine Space

**Project Eco-AlpsWater**

**Work Package WPT3**

**Activity A.T3.6**

**Deliverable D.T3.6.2**

**Version 1.0**

**Date October 2021**

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### **Deliverable D.T3.6.2**

**Defining agreements and areas of collaboration, with roles of PPs, relationships with  
members, actions, and durability strategy**

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Interreg Alpine Space - Eco-AlpsWater project – WP3

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## ABSTRACT

The effort to provide transferable, shared and approved tools and monitoring approaches for the assessment of ecological status and biodiversity of lakes and rivers in the Alpine Space region and Europe, allowed to create a living network, providing transferable instruments to be applied in other contexts. Following EUSALP AG1, the cooperation has been expanded between governmental agencies and academia, for a mutual exchange of knowledge and creation of a web of connections between project partners, observers, stakeholders and target groups deputed to the assessment of the ecological status of water resources in the Alpine Space area. In this deliverable we provide the description of all the activities performed to allow both the long duration of the connections born during the project and the knowledge exchange with governmental bodies and stakeholders.

## **Defining agreements and areas of collaboration, with roles of PPs, relationships with members, actions, and durability strategy**

The effort to provide transferable, shared and approved tools and monitoring approaches for the assessment of ecological status and biodiversity of lakes and rivers in the Alpine Space region and Europe, allowed to create a living network, providing transferable instruments to be applied in other contexts. Following EUSALP AG1, the cooperation has been expanded between governmental agencies and academia, for a mutual exchange of knowledge and creation of a web of connections between project partners, observers, stakeholders and target groups deputed to the assessment of the ecological status of water resources in the Alpine Space area.

The activities carried out during the implementation of the project, and in particular during the sampling activities, laboratory analysis and data analysis (mostly WPT3), required the cooperation of different multidisciplinary groups of experts belonging both to academia and government bodies. These continuous collaborations and interactions promoted the transfer of knowledge to the government bodies (such as Environmental agencies) responsible of the implementation of WFD/WPO. The aim of the “Alpine water cooperation network” (Figure 1) is to promote “a set of guidelines for the adoption of HTS and new biomonitoring tools in WFD by Environmental agencies, improving basin management plans and restoration actions.” The consortium is continuously promoting cooperation actions, especially during the last phases of the project. Long-term relationships among the official partners, observers, stakeholders, as well as new persons/bodies are the results of this interdisciplinary network that will ensure the collaboration also after the closure of the project. This is not a new strategy and several forms of “never-ending strategies” have been adopted; a good example is the Cyanocost network (<https://www.cyanocost.com/>), which was created during the implementation of a COST action, concluded in 2016. CYANOCOST is involved in the risk management of cyanobacteria and cyanotoxins in water bodies across Europe by establishing strong collaborations between academia, authorities, industry and citizens and creating solid knowledge network. CYANOCOST action aims to provide tools to end-users (public authorities, water utilities, aquaculture, tourism and recreation sectors) by pooling and coordinating expertise throughout

Europe and to harmonize methods and practices across Europe, thereby protecting public health, enterprises and investments.

Another example of cooperation is the active connection with **DNAqNet COST** action (<https://dnaqua.net/>). Members from FEM, NIB, INRAE and SUPSI have been closely involved in DNAqNet activities by meetings, presentation, ring-test for diatoms, stakeholder workshops. Similarly, synergies were also established with the SYNAQUA project (<https://www.interreg-francesuisse.eu/beneficiaire/synaqua-synergie-transfrontaliere-pour-la-bio-surveillance-et-la-preservation-des-ecosystemes-aquatiques/#>), which demonstrate cross-border synergy of two countries for biomonitoring and the preservation of aquatic ecosystems.

Synergies with two Interreg Alpine Space projects were established, namely [HymoCARES](https://www.alpine-space.eu/projects/hymocares/en/home) (<https://www.alpine-space.eu/projects/hymocares/en/home>) dealing with HydroMorphological assessment and management at basin scale for the Conservation of Alpine Rivers and related Ecosystem Services, and [SPARE](https://www.alpine-space.eu/projects/spare/en/home) (<https://www.alpine-space.eu/projects/spare/en/home>), Strategic Planning for Alpine River Ecosystems, which aimed to increase the awareness and knowledge level of the functions and services provided by rivers.

The Alpine water cooperation network (EAW network) is based on formal communication forms including mainly a comprehensive mailing list used to exchange experiences, questions, and maintaining future contacts and project opportunities. This topic has been further introduced during the last large international meetings in May and October, and also discussed in the EAW PSG organized in 2020 and 2021. A first mailing list has been used to disseminate the EAW newsletter.

The network is explicitly described in a full dedicated web-page of the project (Project Results/ EAW Alpine Network), which reports the rationale of the network, and invitation to provide feedback regarding the results of the project and invitation to join the mailing list. In this regard, a dedicated email will be used, e.g., [ecoalpswater@gmail.com](mailto:ecoalpswater@gmail.com), which is linked to the IT Google Drive platform that is used to exchange information and materials among the EAW partners. The aim of the EAW consortium network is to provide coordinated expertise and harmonised methods and guidelines across Europe and lay the foundation for a standardisation of eDNA metabarcoding approaches for biodiversity monitoring in the Alpine region and beyond.

Durability strategy with different communication channels is presented graphically on Figure 1 (roots).

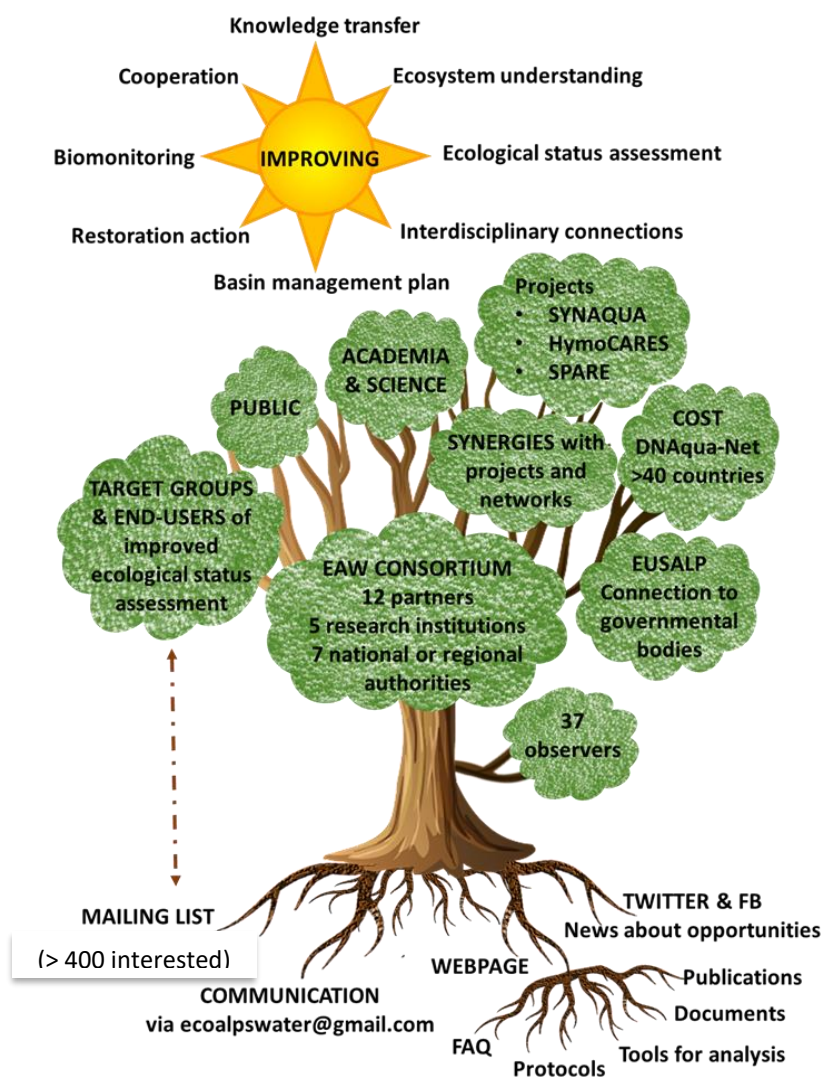


Figure 1: The Alpine water cooperation network is a web, represented by canopy of connections which enables interdisciplinary knowledge and know-how transfer. Alpine water cooperation network is improving important water connected issues, represented by the sun. The roots represent the channels for future cooperation, interactions and durability strategy of Alpine water cooperation network.

## Cooperation outside the Alpine area

### *Application of EAW protocols in central Italy*

EAW Italian partner Ispra has promoted and established a working group, in the framework of National System for Environmental Protection (SNPA), involving eleven ARPA (Campania, Emilia Romagna, Friuli Venezia Giulia, Lazio, Liguria, Lombardia, Marche, Puglia, Toscana, Umbria, Valle D'Aosta) and considering water bodies for the extra Alpine experimentation of metabarcoding techniques.

The working group met online several times to discuss and verify the feasibility of the protocols developed in the Alps basins and to select a limited number of informative and diversified water bodies.

**Table 1. Lakes and rivers initially considered for the extra alpine survey**

<b>LAKE</b>	Vico (Latium)	Trasimeno (Umbria)	-
<b>RIVER</b>	Fibreno (Latium)	Rio Freddo dell'Esino (Marche)	Torrente Stura (Tuscany)

In this regard, in 2020/2021 ISPRA has planned a trial of the methods developed for the Alpine space in the Mediterranean-Apennine territory of the Latium, Tuscany, Marche and Umbria region (Table 1). These sites were selected for their different environmental characteristics, for the high variability of species and for the presence of historical data series collected with traditional methods. Nevertheless, due to COVID19 pandemic restrictions, and in order to avoid too many contacts between field operators, it was not possible to extend the experimentation to all the former selected areas, and only the Latium Region's freshwaters were investigated. The experimentation was therefore performed in four water bodies, i.e the volcanic Lake Albano, the karst Lake Canterno and the rivers Aniene and Fibreno. Once collected, the water samples were shipped to the sequencing platform at FEM, and then processed with bioinformatic analyses to obtain taxonomic lists of phytoplankton, cyanobacteria, diatoms and fish. The results have been discussed at two national meetings organized in September 10 and October 13. In the near future, ISPRA has planned to promote additional trials in extra Alpine areas with

the collaboration of other environmental agencies; at the same time, the experimentation of the SNPA at national level is expected to continue.

### **Connection with the Long Term Ecological Research (LTER) network**

The key element of LTER investigations is their long-term approach, on time scales that go well beyond the typical duration of research projects. Scientific monitoring constitutes a central element of LTER research, including not only the collection of data (basic monitoring), but also their interpretation, modeling and experimental manipulation, with particular attention to key variables in order to identify significant environmental stressors affecting ecosystems, communities, species and populations. This approach necessarily requires to be implemented in a context of scientific research capable of maintaining a high level of quality both in the data collected and in their processing, interpretation, dissemination and enhancement in wider national and international contexts. To maintain a high level of quality of the data collected, the approaches adopted in LTER surveys must be subject to a continuous process of review and updating. One of the most active field of research in the freshwater, marine, and terrestrial LTER site is focused on the assessment of changes in biodiversity, which is considered as a central element in the functioning of ecosystems. Most of the time, biodiversity inventories are carried out by using traditional approaches, with all the limits that conventional methods have in terms of range of species detected, differences among taxonomic identifications, and replicability. In this regard, the integration of High Throughput Sequencing (HTS) approaches into the traditional biodiversity assessment protocols become necessary. This should, however, require a process of updating of competences not only within the research institutes, but also the government offices (e.g. environmental agencies) that are generally directly or indirectly involved in biodiversity investigations. In this process of upgrading, the EAW project played a central role in the integration of novel and traditional methods. In perspective, the EAW Alpine Network (<https://www.alpine-space.org/projects/eco-alpswater/en/project-results/eaw-alpine-network>) will have the role to maintain connected a living community focused on the adoption and testing of new developing ‘omics’ technologies into the conventional monitoring plans.