

Brussels, 23 June 2017

COST 019/17

## DECISION

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Subject: **Memorandum of Understanding for the implementation of the COST Action “KNOWLEDGE CONVERSION FOR ENHANCING MANAGEMENT OF EUROPEAN RIPARIAN ECOSYSTEMS AND SERVICES” (CONVERGES) CA16208**

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The COST Member Countries and/or the COST Cooperating State will find attached the Memorandum of Understanding for the COST Action KNOWLEDGE CONVERSION FOR ENHANCING MANAGEMENT OF EUROPEAN RIPARIAN ECOSYSTEMS AND SERVICES approved by the Committee of Senior Officials through written procedure on 23 June 2017.

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## MEMORANDUM OF UNDERSTANDING

For the implementation of a COST Action designated as

**COST Action CA16208**  
**KNOWLEDGE CONVERSION FOR ENHANCING MANAGEMENT OF EUROPEAN RIPARIAN  
ECOSYSTEMS AND SERVICES (CONVERGES)**

The COST Member Countries and/or the COST Cooperating State, accepting the present Memorandum of Understanding (MoU) wish to undertake joint activities of mutual interest and declare their common intention to participate in the COST Action (the Action), referred to above and described in the Technical Annex of this MoU.

The Action will be carried out in accordance with the set of COST Implementation Rules approved by the Committee of Senior Officials (CSO), or any new document amending or replacing them:

- a. "Rules for Participation in and Implementation of COST Activities" (COST 132/14);
- b. "COST Action Proposal Submission, Evaluation, Selection and Approval" (COST 133/14);
- c. "COST Action Management, Monitoring and Final Assessment" (COST 134/14);
- d. "COST International Cooperation and Specific Organisations Participation" (COST 135/14).

The main aim and objective of the Action is to bring together the diverse body of knowledge that exists across Europe about riparian vegetation in order to create a new synthesis that will correct the misalignment of frames between stakeholders in riparian research and management and help to mitigate several environmental issues that affect COST Countries. This will be achieved through the specific objectives detailed in the Technical Annex.

The economic dimension of the activities carried out under the Action has been estimated, on the basis of information available during the planning of the Action, at EUR 92 million in 2016.

The MoU will enter into force once at least five (5) COST Member Countries and/or COST Cooperating State have accepted it, and the corresponding Management Committee Members have been appointed, as described in the CSO Decision COST 134/14.

The COST Action will start from the date of the first Management Committee meeting and shall be implemented for a period of four (4) years, unless an extension is approved by the CSO following the procedure described in the CSO Decision COST 134/14.

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**OVERVIEW**

**Summary**

Vegetation is a central component of riparian landscapes, and provides multiple ecosystem services. The scientific community is aware of the importance of riparian vegetation and its role in both biological and physical processes. In recent decades such importance stimulated a steadily growing number of investigations focussing on riparian vegetation. However scientific investigations in this field are proceeding as isolated initiatives that translate to common practices at a very slow rate and with limited input from the practitioners. Evidence of poor knowledge conversion at societal levels includes the marginality of riparian vegetation in EU normative assets (e.g. the Water Framework Directive) and the complete neglect of vegetation-mediated processes in water policy debates. The limited consideration of riparian vegetation is also demonstrated by the widespread degradation of riparian forest resulting from centuries of water use and environmental pressures exerted by society on rivers. Such degradation motivated many restoration and mitigation projects aiming at the improvement of riparian status. Alas, many have failed because of scarce consideration of vegetation-mediated processes, so that public resources have been ineffectively allocated. In order to address the above-mentioned issues, this action aims to establish a baseline in the state of knowledge regarding riparian vegetation, coordinate research efforts, contribute to knowledge conversion from science to practitioners and to COST Inclusiveness Target Countries and to promote practitioners research interests in the scientific community.

<p><b>Areas of Expertise Relevant for the Action</b></p> <ul style="list-style-type: none"> <li>● Earth and related Environmental sciences: Terrestrial ecology, land cover change</li> <li>● Earth and related Environmental sciences: Hydrology, water resources</li> <li>● Agriculture, Forestry, and Fisheries: Sustainable forest management</li> <li>● Agriculture, Forestry, and Fisheries: Conservation biology, ecology, genetics</li> <li>● Agriculture, Forestry, and Fisheries: Non wood forest products - environmental services</li> </ul>	<p><b>Keywords</b></p> <ul style="list-style-type: none"> <li>● vegetation</li> <li>● fluvial processes</li> <li>● ecosystem services</li> <li>● resilient management</li> <li>● water</li> </ul>
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**Specific Objectives**

To achieve the main objective described in this MoU, the following specific objectives shall be accomplished:

Research Coordination

- Synthesise current knowledge to characterise the status of riparian vegetation, their main stressors and management responses across Europe.
- Convey and share riparian knowledge among scientists, policy makers and stakeholders from different scientific disciplines, geographical regions and management contexts to understand how riparian vegetation is framed by different communities and thereby facilitate effective knowledge conversion.
- Identify misalignments among actors in how to understand and conceptualize riparian vegetation in order to prioritise areas for knowledge conversion efforts as well as research gaps and policy/strategy improvements.
- Determine evidence-based best practices in riparian management and develop effective tools and indicators to assess ecological status using riparian vegetation. Tools and indicators shall be crafted drawing from different disciplines and conveyed to practitioners in order to fulfil relevant policy targets.

Capacity Building

- Facilitate interaction among experts with expertise in different disciplines, geographical contexts and skill sets. Riparian ecosystems are complex and a holistic understanding depends on the expertise of several academic disciplines and non-academic actors. The network will provide an arena for discussion of

terminology, concepts, methods and practices.

- Provide training for Early Career Investigators. CONVERGES Action will include a significant proportion of ECIs so that they will be trained in interdisciplinary understanding of riparian vegetation and can therefore facilitate knowledge conversion and further research from an essential interdisciplinary baseline.
- Improve understanding of riparian vegetation amongst a wide group of stakeholders across a wide geographical area. CONVERGES Action outputs will be presented in terms that will be clear to various stakeholders and disseminated widely in the form of 'briefing notes' in all major European languages.
- Develop a critical mass of experts in both academic and management sectors. The above objectives will help to create a body of expertise and activity that will ensure that riparian ecosystems are considered and included in relevant policy instruments and management plans.

## 1) S&T EXCELLENCE

### A) CHALLENGE

#### I) DESCRIPTION OF THE CHALLENGE (MAIN AIM)

**Riparian ecosystems** comprise the physical environment and biological communities that lay at the interface of freshwater and terrestrial systems. They are recognised as ecosystems that are highly diverse and contain specialist ecological communities, as well as providers of multiple ecosystem services. Throughout European history, riparian areas have been heavily managed and have consequently experienced widespread degradation. Recognition of the importance of riparian ecosystems has resulted in much research within Europe. The majority of this research has focused on **riparian vegetation (RV)**, as plant community is the main structural component of riparian ecosystems and thus its structure and change provide useful information on the underlying changes in the fluvial system, and is a reliable tool for monitoring riparian ecosystems state and related services. Despite this body of work and policy motivation, progress in improving the state of riparian ecosystems across Europe has been very limited. This is probably because of a misalignment of ‘frames’ (i.e. the ways in which individuals or organisations with different backgrounds, geographical origin, cultural contexts, or purpose, know and conceive of such complex systems). For example, research has been focused on scientific aspects (ecological or hydromorphological response features) meanwhile problems related to riparian ecosystems are often social (e.g. flood control) and economic (e.g. land use); thus, research efforts have been put in the front room, and policy and management have been addressed only secondarily.

**Specific issues** related to the misalignment of frames between stakeholders in riparian research and management are the following ones: (i) the wide geographical dispersion and heterogeneity of current knowledge across Europe with different environmental and socioecological contexts, which limits comparability and transferability of results from place to place; (ii) a lack of effective communication and sharing of knowledge among scientists from different disciplines and from different countries, who generally work in relative isolation; (iii) insufficient and problematic knowledge conversion and experiences from academics to managers/practitioners; (iv) a lack of suitable assessment tools that allow comparability between fluvial systems; (v) insufficient momentum behind the body of research to create effective coordinated actions or policy creation at the level needed to improve riparian ecosystems within European landscapes. As a result, RV remain marginal in environmental policies (e.g., within the EU *Water Framework Directive (WFD)* where it is only included within the hydromorphological characterization), and management tends to be focused on the control of riparian ecosystems (for example prevention of vegetation regeneration) than re-creating appropriate levels of functioning. Significant challenges therefore remain for riparian ecosystem management.

CONVERGES Action aims to bring together the diverse body of knowledge that exists across Europe for all aspects of RV (from physical processes and ecology through society to societal and management issues to restoration and improvement) in order to create a **new synthesis** that will correct the misalignment of frames between stakeholders in riparian research and management, and thereby form a new framework of understanding for future progress. Such

efforts will require not just the conversion and exchange of knowledge but an understanding of how RV is 'framed' by different scientific disciplines and management practices and the conversion of knowledge between frames so that it is understandable by all stakeholders. This can only realistically be achieved through the creation of a European network to create an arena for scientists and managers/practitioners to meet and exchange experiences.

## II) RELEVANCE AND TIMELINESS

Enhanced functioning of degraded riparian ecosystems helps to mitigate a range of ongoing and emerging environmental issues that affect European countries, and which are addressed by various policy instruments and strategies. These include **(i) water management:** The WFD requirement for water bodies to achieve 'good ecological status' (GES) by 2027 is unlikely to be realised given uncertainty on how to manage increasing demands for water resources and increasing spread of hydromorphological changes of freshwater systems, unless rapid progress is made. Riparian ecosystems are an integral though overlooked element of these efforts and their enhancement will lead to wider ecological improvements within the water bodies that will increase the services they provide as well as their resilience to change. CONVERGES Action will also inform the third round of the River Basin Management planning cycle, contribute to the Strategic Implementation Plan of the European Innovation Platform for Water (EIP Water), and facilitate implantation of the Nitrates Directive (1991) through the understanding of how RV may best regulate nitrate pollution. **(ii) climate change:** riparian ecosystems have long been recognised as 'early warning' systems to indicate environmental change, particularly in relation to climate change impacts that affect hydrology and temperature. Functional riparian zones will increase the resilience of freshwater systems in the face of climate change and its associated hydrological impacts (e.g. increase in extreme flood events) and therefore contribute to the EU Strategy on Adaptation to Climate Change (2013) and Europe 2020 climate/energy objectives. Societal benefits will be particularly manifest in terms of flood regulation and risk reduction through increased understanding of the roles of RV in relation to flooding, thereby contributing to ongoing management as part of the EU Floods Directive (2007) and the European Natural Water Retention Measures Platform; **(iii) biodiversity:** riparian ecosystems are highly biodiverse ecosystems within their biogeographic regions and as such better management for functional attributes will help to meet Aichi targets for Restoration (2010) and the EU Biodiversity Strategy 2020 to halt the loss of biodiversity and ecosystem services. It will also help to serve the EU Habitats (1992, updated in 2013) and Birds (2009) Directives and the Natura 2000 network, as many species rely on RV for all or part of their habitat requirements.

As a result of these interrelated benefits of enhanced riparian management and contribution to policy instruments, CONVERGES Action will help to facilitate the EU Sustainable Development Strategy (2007), particularly in relation to natural resources, and the 2009 EU Strategy on Green Infrastructure. It will also go beyond its EU focus by supporting the United Nations 2030 Agenda for Sustainable Development.

Alongside its policy relevance, CONVERGES Action has clear synergies with recent EC Joint Research Centre and Institute for Environment and Sustainability efforts to map European riparian areas and ecosystem services.

Overall, the combination of a significant but disparate body of research into riparian ecosystems with an urgent need for improved management of riparian zones makes the creation of CONVERGES Action highly relevant at the current time.

## B) SPECIFIC OBJECTIVES

### I) RESEARCH COORDINATION OBJECTIVES

The overall aim of CONVERGES Action is to create a European network for the conversion of knowledge on RV, its services and management practices among scientists, stakeholders and policy makers. CONVERGES Action will thus facilitate enhanced management of RV via current EU policies and contribute to define RV research priorities. The network will focus in

particular on RV as the main structural component of riparian ecosystems that is widely researched and which can be used as an indicator of ecosystem structure, function and change. Improving RV management will assist COST Countries and COST Near Neighbour Countries (NNC) in improving policies and strategies for managing biological and water resources sustainably, notably to adapt to climate change and contribute to its mitigation (Warsaw Resolution, 5<sup>th</sup> MCPFE, 2007). The Action's principal research coordination objectives are:

- a) **Synthesise** current knowledge to characterise the status of RV, their main stressors and management responses across Europe.
- b) **Convey and share** riparian knowledge among scientists, policy makers and stakeholders from different scientific disciplines, geographical regions and management contexts to understand how RV is framed by different communities and thereby facilitate effective knowledge conversion.
- c) **Identify misalignments** among actors in how to understand and conceptualize RV in order to prioritise areas for knowledge conversion efforts as well as research gaps and policy/strategy.
- d) Determine evidence-based **best practice** in riparian management and develop effective tools and indicators to assess ecological status using RV. Tools and indicators shall be crafted drawing from different disciplines and conveyed to practitioners in order to fulfil relevant policy targets.

## II) CAPACITY-BUILDING OBJECTIVES

CONVERGES Action will increase the capacity of scientists, managers and policy makers working with riparian ecosystems across Europe to communicate and exchange experiences and ideas. It will allow these stakeholders to work together and produce guidance and recommendations on how to study and manage river systems to enhance the status of RV in particular, and thus the functioning of the wider systems of which they are a part. The capacity-building objectives are to:

**a) Facilitate interaction among experts with expertise in different disciplines, geographical contexts and skill sets.** Riparian ecosystems are complex and a holistic understanding depends on the expertise of hydrologists, geomorphologists, ecologists, biologists, conservationists, engineers, social scientists and managers, among others. The network will provide a much-needed arena for discussion of terminology, concepts and practices, which are essential for knowledge conversion and will lead to new academic relationships and innovation. This is particularly important in a European context due to language barriers and differences in terminology that may obscure meaning during information exchange. Such interactions will be further promoted by the creation of a skills database available on-line.

**b) Provide training for Early Career Investigators (ECIs).** CONVERGES Action will include a significant proportion of members that are ECIs so that they will be trained in interdisciplinary understanding of RV and can therefore facilitate knowledge conversion and further research from an essential interdisciplinary baseline. This will be achieved by incorporating ECIs at all stages of the Action, as well as through dedicated workshops and training sessions (Training Schools).

**c) Improving understanding of riparian vegetation amongst a wide group of stakeholders across a broad geographical spectrum.** CONVERGES Action outputs and recommendations will be presented in terms that will be clear to various stakeholders (scientists, managers, Small and Medium Enterprises (SMEs)) with different backgrounds and levels of education and disseminated widely in the form of 'briefing notes' in all major European languages. These will be made available via a dedicated website and circulated directly to relevant stakeholders via the country representatives within the network. There will be particular emphasis on disseminating knowledge and best practices from countries with long established bodies of riparian research to those without.

**d) Develop a critical mass of experts in both academic and management sectors.** Progress in riparian ecosystem management has been compromised by a lack of consistent

and sustained research and implementation. The above objectives will help to create a body of expertise and activity that will ensure that riparian ecosystems are considered and included in relevant policy instruments and management plans.

In reaching these objectives, CONVERGES Action will strive also to:

**Improve geographic balance.** CONVERGES Action will increase the access of Inclusiveness Target Countries (ITCs) to international expertise and funding, identifying and promoting excellence in riparian science and management across Europe. It will encourage ITC researchers and institutions to lead workshop activities and play important roles in Action delivery by hosting events and providing candidates for early career training. Particular efforts will be made to ensure that the Action outputs and their dissemination involve and are made available to ITC researchers, and that they overcome language and terminology barriers.

**Improve age and gender balance:** CONVERGES Action aims to exceed 40% female representation in member composition and 50% in Training Schools, and will positively select women for leadership roles to complement scientific quality and geographic balance. Its Gender Action Plan will form an integral part of the Action's Dissemination and Exploitation Plan (described in WG4 Work Plan). CONVERGES Action will also ensure that younger researchers play important proactive roles in network activities and outputs, in line with capacity-building objective (b) for training of ECIs.

## C) PROGRESS BEYOND THE STATE-OF-THE-ART AND INNOVATION POTENTIAL

### I) DESCRIPTION OF THE STATE-OF-THE-ART

Riparian ecosystems and its vegetation belong to the ecosystems most degraded by human pressures, despite that RV fulfil multiple ecosystem functions: RV (1) is a species-rich habitat, often with large proportions of riparian-specialist species; (2) protects stream water quality by filtering out toxic compounds and excess nutrients from runoff; (3) is a source of organic material to aquatic ecosystems forming the base of aquatic food chains; (4) stabilizes river banks and reduces erosion. Riparian ecosystems including RV also (5) function as corridors for dispersal by being linear (dendritic) habitats across landscapes; and (6) contribute to socio-cultural services (e.g., aesthetics, recreation, spiritual values).

Recognition of the importance of riparian ecosystems has resulted in much research within Europe, often with a specific focus on its composition, historical dynamic, functioning and interaction with geomorphic, hydrologic and biotic processes. Web of Science records over 800 published articles containing the terms 'riparian' and 'Europ\*', though much knowledge of riparian systems is localised and/or found within 'grey' literature. Most of this research has focused on RV, as plant community is the main structural component of riparian ecosystems and thus its structure and change provide useful information on underlying changes in the fluvial system. For example, research on flows of energy, species and matter across ecosystem boundaries has shown the importance of RV in subsidizing aquatic ecosystems, in receiving aquatic subsidies, and in intermitting flows of energy and matter from terrestrial to aquatic areas. The role of RV in contributing to stream channel dynamics, carbon storage and stream metabolism has also been emphasised. The rapid progress has come through the innovative use of novel methods, such as remote sensing, genomics and the use of functional traits, as well as novel experimental designs. This research has highlighted that riparian ecosystems are integrated, influenced by drivers at multiple scales (landscape, catchment, reach) and exert control over other physical and biotic components in the catchment. Despite recurrent calls for holistic and integrated management, this has seldom been realised. There have also been many successful riparian restoration projects across the EU, but most have addressed single drivers and management responses, making it hard to know how applicable results are in other areas. Part of this has been driven by the EU WFD requirement for Member States to restore waterbodies to GES by 2027.

Despite the advances in RV research, lack of communication and knowledge conversion among (1) scientific disciplines, (2) between scientists and managers, and (3) among geographic areas have stalled scientific progress and implementation of new management

methods. In science, engineers, geographers and biologists mostly work in separate spheres, publish in different journals and go to different meetings, resulting in lack of interaction and integration among riparian scientists. There are also delays and insufficiencies in how new scientific findings are converted into RV management methods and policies. Although scientists and managers often collaborate, so that new findings and methods are implemented locally, the lack of platforms for interaction and discussions on in which situations, new methods and policies are applicable means that good examples and innovations do not spread. There are also geographic divides, with lack of communication among riparian scientists working in different biogeographic regions and parts of the Europe, with north-south and east-west divides. Despite this, many challenges in the management of RV are shared across Europe, calling for efforts to learn from each other and share ideas and methods. To support effective water management EU policies Member States have to assess river ecological conditions and riverine habitats, and implement mitigation measures if needed (WFD 2000/60/EC), making knowledge about RV a common concern across the EU.

## II) PROGRESS BEYOND THE STATE-OF-THE-ART

CONVERGES Action will address gaps in knowledge sharing and conversion by providing a platform for networking among riparian scientists, and by addressing communication and knowledge conversion failures in three areas: (1) among scientists in different disciplines, (2) between academics and practitioners, (3) among geographic areas in Europe, and in the area of social awareness of the importance of RV.

**A platform for networking:** Given the importance of riparian ecosystems and the legislative demands to increase their ecological status, they are studied from many different perspectives by many people, but a platform or forum for sharing experiences is lacking. An increasing number of scientific studies about RV are published, but hitherto disciplines have been separated, publishing in different journals, and going to different meetings. Moreover, there have been few arenas where riparian scientists and practitioners across Europe have had opportunities to meet and interact. The amount and diversity of previous work is an opportunity: by creating a network of academics and practitioners working with RV across Europe, sharing of knowledge will become more effective, allowing novel methods and good examples to be applied more widely. CONVERGES Action will also allow sharing of experiences across geographic regions, representing variation in pressures, governance and ecological processes. Networking will result in more rapid scientific progress as people from different subdisciplines meet and share experience, methods and ideas. It will also result in more effective management, as riparian managers are exposed to new methods and ideas, and successful methods can be implemented over wider areas.

**Mapping the status of RV, pressures and management responses across Europe:** In the CONVERGES Action, the status and pressures on RV reported in the scientific literature will be reviewed. This will give understanding of variation in pressures against RV across geographic regions, and of how the status is affected by the variation and diversity of pressures. Usually pressures are considered locally, within specific geographic regions, without cross interactions. For example, there are many restoration projects to improve the status of RV across Europe, addressing different pressures and situated in different regions, making it hard to know the applicability of the methods in other areas. The review will provide a framework where it can be addressed how multiple pressures interact to affect RV status, and the context dependence of management responses: How do they vary depending on type of pressure, geographic region and type of governance? An outcome of the process will be an extended toolbox of management methods to use across COST Countries to help improve the status of RV to help meet the standards required by e.g. the WFD. The analysis will highlight and disperse best practices in RV management.

**Identify misalignments and suggest solutions and new methods:** Misalignments in this context represent failures of communication, knowledge conversion or in providing proper management responses to pressures. These may occur in interactions among scientists from different disciplines, between academics and practitioners, and between science and the policy arena. An analysis of these will help progress in several areas. By analysing the divide

among disciplines studying RV, CONVERGES Action will identify opportunities for synergy among disciplines and point out research priorities. This includes methods that can be used in more than one sub-discipline, as well as sharing concepts and research priorities among disciplines. This will speed up methodological development, help the spread of novel methods and concepts, and pave the way for interdisciplinary studies.

The work will improve knowledge conversion between stakeholders (e.g. scientists, managers, public). Science production is presently often misaligned with practitioner needs, implying that scientific progress is presently not made useful in management as effectively as it could. Likewise, research can be informed by perspectives provided by practitioners. Addressing these misalignments will result in scientific studies being more relevant in solving the problems and challenges met by practitioners managing RV.

Finally, the role of RV in legislation will be analysed, addressing how RV is treated in relevant EU directives such as the Species and Habitats directive, Floods Directive and the WFD. Analysing how RV is treated in EU directives and COST Country, International Partner Country (IPC) and NNC legislation and policies will make management and conservation of RV more effective. This will help implementing the WFD, Species and Habitats directives for RV. In addition, the social awareness of the importance of and threats against RV should be increased.

### III) INNOVATION IN TACKLING THE CHALLENGE

CONVERGES Action focuses on identifying misalignments and suggest solutions as a novel way to systematically improve the flow of communication among stakeholders in RV research and management that will result in scientific progress and better RV management. It will also highlight a new way of identifying problems and contradictions in legislation aiming at better ecosystem management.

CONVERGES Action will foster innovation projects involving authorities, managers, Non-Governmental Organisations (NGOs) and SMEs. EIP Water has identified water-related ecosystem services as one of five priorities because it offers market opportunities and the potential for establishing a market for quantified ecosystem services. By identifying best practices for enhancing ecosystem functions of RV, the Action will provide many opportunities for SMEs to be involved in both authority-driven work to meet EU legislation, as well as consumer-driven demand for riparian ecosystem services. This Action aims at improving the research and knowledge conversion about RV leading to restoration and sustainable management of ecosystem services from riparian ecosystems, which will benefit water innovation projects. The EU Science for Environmental Policy 'Future Brief: Innovation in the European water sector' emphasizes that 'water innovation applies not only to new sustainable technologies but also to new partnerships extending across public administrations, research and industry: new business models and new forms of water governance that are not only innovative themselves but can also stimulate and support technological innovations.' CONVERGES Action will lead to partnerships between researchers and practitioners, and research findings will be used to foster innovative management actions, providing opportunities for SMEs.

The fact that CONVERGES Action will enable interdisciplinary and international collaboration in tackling important issues regarding RV is also novel. Calls for integrated water management are often voiced, but in reality management often address single issues, and integration is not realised. In addition, the Action will lead to a more well balanced exchange of knowledge between science and management, combining "bottom-up" (managers to scientists) and "top-down" (scientists to managers) transfer of perspectives and ideas.

The mapping and analysis of status of and pressures on RV and responses to pressures will provide a framework for developing best practices for restoration and management of RV, to combat e.g. effects of invasive species, hydrological alterations and high nutrient load from runoff. Best practice schemes will be combined with providing recommendations and guidance to practitioners.

## D) ADDED VALUE OF NETWORKING

### I) IN RELATION TO THE CHALLENGE

The basic premise of CONVERGES Action is that the study and management of RV has been plagued by communication gaps, that the creation of a RV information community and network will help resolve. Lots of progress about RV has been made in recent years, but this knowledge is not shared across disciplines and among geographic regions (due to e.g. language barriers). Thus, a large body of knowledge has been produced but it has not been made useful. This knowledge needs placing into context to know when and where it is applicable to maximize its usefulness. This will result in formulation of guidance and recommendations.

The proposed CONVERGES Action is necessary to generalize knowledge acquired in particular geographical areas. Many exciting studies have been done but their findings should be spread more widely, calling for a framework to assess their applicability.

RV studies are multidisciplinary by nature, meaning that they require experts from different disciplines, and that the suggested network will result in studies of higher quality. The Action is also necessary to define similar research protocols to enhance study comparability. This will enable spread of novel study designs and technologies.

Inclusion of decision makers and managers in the network contributes to understand "practitioner oriented" research priorities. Networking between scientists and practitioners means that both are provided with important perspectives otherwise neglected – Flow of knowledge from research to practitioners make management more effective, but practitioner perspectives help scientists identify the most pressing research questions.

### II) IN RELATION TO EXISTING EFFORTS AT EUROPEAN AND/OR INTERNATIONAL LEVEL

CONVERGES Action is not redundant with other efforts because there is currently no pan-European project dedicated to riparian ecosystems. However, it is complementary to large-scale projects dedicated to rivers. Thus, it will extend and integrate existing European research on RV by the creation of a network of scientists and practitioners, as well as synthesizing, analysing and spreading information from previous and ongoing efforts, including:

**FP7:** RiPeak 'Responses of RiParian forests to hydroPeaking: towards a sustainable hydropower management' (2014-2017), REFRESH 'Adaptive Strategies to Mitigate the Impacts of Climate Change on European Freshwater Ecosystems', REFORM 'REstoring rivers FOR effective catchment Management' (2011-2015), BioFresh (2010-2014), MARS 'Managing Aquatic ecosystems and water Resources under multiple Stress, HOLRIVERMED 'Environmental River Management: An Innovative Holistic Approach for Mediterranean Streams' (2011-2013); wetWIN 'Enhancing the role of wetlands in integrated water resources management for twinned river basins in EU, Africa and South-America in support of EU Water Initiatives' (2008-2011). ERC: ESFFORES 'Evaluating success of floodplain forest restoration (2013-2016), ERAnet OSCAR 'optimising the configuration of woody riparian buffer strips along rivers to enhance biodiversity and ecosystem services'. **H2020:** AMBER 'Adaptive Management of Barriers in European Rivers' (2016-2020). **Several LIFE+ projects** have piloted different management actions to enhance biodiversity and ecosystem functions of RV, providing training as well as practices benefiting the present Action. The EU Centre for River Restoration hosts a portal ([restorerivers.eu](http://restorerivers.eu)) listing river restoration schemes across Europe.

**Previous Framework Program projects** funded several projects focusing on RV, having legacies in terms of training and practices, on which CONVERGES Action will build, including ERMAS 'European river margins; role of biodiversity in the functioning of riparian systems', ERMAS II 'European river margins; role of biodiversity in the functioning of riparian systems', FLOBAR 'Floodplain biodiversity and restoration: Hydrological and geomorphological mechanisms influencing floodplain diversity and their application to the restoration of floodplains', RIPFOR, 'Stream Restoration: Rehabilitation of a headwater stream and its riparian areas'.

The good coordination between CONVERGES Action and other efforts will be facilitated by the presence of some partners involved in both.

## 2) IMPACT

### A) EXPECTED IMPACT

#### I) SHORT-TERM AND LONG-TERM SCIENTIFIC, TECHNOLOGICAL, AND/OR SOCIOECONOMIC IMPACTS

The overall impact of the Action will be the improvement of river system status and associated human well-being in the face of major pressures and challenges such as climate change. Also, an important impact is related to a paradigm shift in the perception/awareness on RV, its mediated processes and associated ecosystem services, elements that have been hitherto disregarded notably at the social/management level.

##### Short-term impacts:

At the scientific and technology levels, the impacts will be i) the collection, synthesis and harmonization of existing knowledge; ii) the mapping of geographic inequalities and identification of cold spots across an uneven geography of knowledge; iii) the advancement in the identification of research priorities; iv) the provision of standards for field and experimental research on RV.

The socioeconomic impacts over the short term will be i) fostering the implementation of better management practices (e.g. the amelioration of landscape and urban planning criteria to achieve riparian ecosystem services improvement and flood control); ii) the encouragement of coordinated policies leading to better governance; iii) the improvement of societal (landowners, managers, policy-makers, scientists) understanding of the riparian degradation status and underlying ecosystem processes; iv) the amelioration of RV status across Europe in light of multiple pressures; v) boosting environmental services from riparian systems such as flood control, water quality improvement, wildlife habitat, fish populations; vi) progress in social learning, including the appreciation of the natural value of RV, the stimulus to scholar and stakeholder interaction searching for a common ground on priority needs and the training of European Innovation Council (EIC) professionals able to truly operate on a multidisciplinary level.

##### Long term impacts:

At the scientific and technological levels, the establishment, for the first time, of a solid research network with vocation to assemble a scientific community on RV, will enhance coordinated research addressing critical societal issues. Synergistic effects are expected from fostering interactions between specialists from different regions, sectors and research disciplines. This will cascade increased understanding of a complex issue that is transversal to water/land use/biodiversity fields and promote the use for innovative integrated approaches to adaptive management at proper spatial scales (landscape, catchment, reach). The use and deployment of upgraded research standards for field and experimental research on RV will be gradually incorporated into scientific procedures over the next decade. By providing a forum for scientific discourse, CONVERGES Action sets the ground for long-term international transdisciplinary collaborations that will result in joint research proposals that could not have been initiated without this Action.

The socioeconomic impacts over the long term will be i) contribution to halt riparian degradation and the associated loss of biodiversity (in line with EU Biodiversity Strategy to 2020); ii) an increment in ecosystem services provided by RV, such as flood and erosion control, biological corridor or recreational value; iii) enhancement of biochemical status of rivers by riparian buffering effects on diffuse pollution from agriculture, the single most important source of water pollution in Europe (European Environment Agency, 2012); iv) re-naturing cities and developing this line of research aligns with the EU R&I agenda for Nature-Based Solutions and Re-Naturing Cities; v) contribution to make fund allocation more efficient

which implies saving considerable public resources; vi) a raise in the competence of professionals working with adaptive management, restoration and enhancement of ecosystem services; vii) a qualitative improvement in environmental education; viii) a large increase in the scientific competence level of European scholars; ix) lessons from COST Countries experience will be translated and disseminated outside from COST Countries through transcontinental cooperation thank to NNCs and IPCs.

## **B) MEASURES TO MAXIMISE IMPACT**

### **I) PLAN FOR INVOLVING THE MOST RELEVANT STAKEHOLDERS**

The basis for ensuring knowledge conversion of enhanced approaches to RV management is an effective and close interaction between knowledgeable public and private actors. CONVERGES Action pursues to overcome barriers across sectors, regions and languages, in a broad sense. The plan to involve stakeholders is articulated across the Work Plan through two main axes: a transversal knowledge exchange for scientific knowledge gap-filling and a bidirectional conversion (bottom-up and top-down) of identified needs and proposed approaches for societal responses improvement (see PERT chart).

Our partnership already includes non-academic partners (SME and Public Administration), and connections will be extended during the Action life to involve more non-academic stakeholders from NGOs and other SMEs engaged in restoration planning and management to high level public entities and international bodies. Specific contacts have already been made to complete the network at international, continental and national scales. Relevant end users who can stimulate the adoption of enhanced approaches include: lawmakers in charge of drawing regulations of relevance for RV; SMEs, national organizations/authorities; river management bodies (basin authorities); local authorities (municipalities/local councils); National Parks, landowners, farmers, foresters and their lobby groups and advisors, government bodies/Agri-Environment-Scheme policy-makers; EIP Water Action Groups; etc.

The Work Plan is structured to facilitate the impacts enabling stakeholders to engage and interact in Action activities through meetings, seminars, workshops, Training Schools, Short Term Scientific Missions (STSMs) and related events. On the one hand, CONVERGES Action plans to promote enlarging the participation of academics nationally across all partner countries. On the other hand, the national consultation on society responses concerning RV degradation and management will be a powerful means of involving stakeholders. This will ensure that scientific knowledge transfer is validated by participants with real-life experience on riparian vegetation issues, and that the results of the Action feed directly to stakeholders at the frontline of RV restoration implementation. It will also imply the involvement of private companies responsible for the production of management plans in the formulation of guidance and recommendations to be effective and understandable.

A key route to overcome language barriers is the translation of guidance and recommendations to a minimum of six European languages; and the translation of briefing recommendation notes and summaries to an extensive number of local languages. For this purpose, CONVERGES Action will combine paid translations with the involvement of volunteer translation initiatives committed to avoid linguistic discrimination. This will reinforce the effective dissemination of Action findings to a more diverse range of social actors across regions.

### **II) DISSEMINATION AND/OR EXPLOITATION PLAN**

The importance of knowledge sharing is the foundation of CONVERGES Action. It will be ensured through the whole Action and by one dedicated Working Group (WG) to Dissemination and it will be prepared at the beginning of the Action and in accordance with COST dissemination guidelines. The Dissemination Plan will include a main tool based in the website that will be structured on different WGs/countries including information about COST and CONVERGES Action, Calls for Events and STSMs, minutes from the workshops/seminars,

repository of case-studies used in the Training Schools, CONVERGES Action documents and videos, the list of publications, available published materials and the skill database of riparian researchers. A wide range of publications will be produced, including synthesis , reports , management recommendation guidance , a Manifesto on Teaching priorities , review papers , conference proceedings . The Action will involve each University Press Office for those publications. CONVERGES Action outputs will be also disseminated through diverse events such as meetings in different countries, seminars and workshops with stakeholders , Training Schools , field trips , STSMs , and a final conference, as well as cascading dissemination through partnership organisations. In parallel with the website and the different events there will be full use of social media and the involvement of public outreach offices of the different institutions to promote engagement and expand awareness of results. This will maximise outreach and ensure end users become more confident and knowledgeable participants in RV management and restoration.

### **C) POTENTIAL FOR INNOVATION VERSUS RISK LEVEL**

#### **1) POTENTIAL FOR SCIENTIFIC, TECHNOLOGICAL AND/OR SOCIOECONOMIC INNOVATION BREAKTHROUGHS**

The identification of synergies by sharing concepts and approaches among disciplines and regions will accelerate methodological development promoting innovation. An extensive review of existing research will support the development of robust benchmarks, common terminology and standard metrics that will reduce risk in producing inappropriate approaches. The development of a tightly interlinked cross-country and within-country network will ensure the success in information flux and exchange among regions, sectors and disciplines. It is intended to assure effective flow in discussion, findings and approaches but also to incorporate sectional interests with embedded means to overcome sectorial, language or regional barriers of understanding.

Incorporating the Pressure-State-Response (PSR) framework will provide an integrated manner to depict the confluence of multiple impacts on RV and their underlying processes, to facilitate the mapping of misalignments between pressures exerted and societal responses and to identify opportunities of changing the course of misguided actions seeking best practices. The mapping of responses and identification of misalignments will use information-rich study cases, through stress-testing ideas, that will increase confidence in diagnosis and provide a powerful means of involving stakeholders in a more focused way. CONVERGES Action will globally contribute to unravel contradictions among national legislations/EU directives and their application with significant financial return of investment in riparian restoration and less risk of misspending resources.

## **3) IMPLEMENTATION**

### **A) DESCRIPTION OF THE WORK PLAN**

#### **1) DESCRIPTION OF WORKING GROUPS**

CONVERGES Action consists of a Management Committee (MC) and four WGs. MC will have two meetings per year in different countries. Each meeting will include a plenary dedicated to assess of WG progresses, to invited keynote speakers and to field visits. These meetings will be synchronized with WGs activities (workshops, etc.). Each Working Group Leader (WGL) will organise the tasks and the production of milestones and deliverables (reports, Training Schools, etc.). They can also schedule additional meetings as needed to reach the specific goals of each WG, notably at local and regional level.

The articulation of the WGs is adapted from the PSR Framework: Pressures/states and responses will be assessed separately (WG1 and WG2) and then compare to identify

misalignments (WG3). A WG dedicated to dissemination (WG4) will ensure both a good visibility of the result and good transfer of knowledge.

Three Training Schools based on real cases will be organised for ECIs and end users on specific key issues and will last four to five days. The workshops will last from two to three days. When it is possible Training Schools and workshops will occur close to other related conferences to guarantee a good visibility.

### **WG1: Characterising degradation of riparian vegetation across the EU: status and pressures**

Objective and methodology: WG1's objective is to assess RV at European scale. Current knowledge on RV will be obtained through a synthesis of scientific and management (grey) literature and stakeholder consultation within and across Europe. A standardised protocol for data collection will be cascaded through the network to ensure comparability and robustness of the exercise, and results will be shared for discussion and verification. The protocol will include a common terminology in form of chart/table and several metrics to assess status (i.e. structure, function and of related ecosystem services), pressures and changes. A conceptual process-based diagram stating relationships between pressures and riparian status will be designed.

	Month	Description
<b>Task</b>		
T1.1	1-11	Define a protocol to assess RV status and pressures
T1.2	12-30	Assess RV status
T1.3	12-30	Assess RV pressures
T1.4	12-30	Assess RV impacts
<b>Milestones</b>		
M1.1	4-8	STSMs to define the assessment protocol
M1.2	15-17	Assessment for each country/region
M1.3	20	Workshop for cross comparison of status and pressures (including a field trip)
M1.4	24	Process-based diagram about pressure/status relationships
M1.5	24	Training School for ECIs and end users about RV and related ecosystem services
M1.6	30	Workshop for final results presentation
M1.7	34	Submission of review paper(s)
<b>Deliverables</b>		
D1.1	10	Guidance to implement the protocol for the status/pressures assessment
D1.2	14	Report about ecosystem services provided by RV
D1.3	24	Graphic description of relationships between pressures and status
D1.4	32	Report about riparian status, pressures and changes in Europe
D1.5	36	Review paper

### **WG2: Visualisation of European responses to riparian vegetation degradation**

Objective and methodology: WG2's objective is to identify the responses to RV degradation. A common grid will be elaborated to analyse three types of responses: production of knowledge, management practices and tools and social response. For the last one, focus will be on policy/legislative awareness at the different scales of responsibility on water and nature management (EU, national and regional). For each type, a knowledge map will be built to present which response resides where (e.g. country, institution, people) and to identify the patterns of knowledge flow (source, medium, target). Each map will be based on literature synthesis and consultation, seminar with local/national managers involved in the Action and regional/national legislation review.

	Month	Description
<b>Task</b>		
T2.1	1-11	Define a grid to identify responses
T2.2	12-30	Map of scientific knowledge
T2.3	12-30	Map of management practices and tools
T2.4	12-30	Map of social awareness
<b>Milestones</b>		
M2.1	4-8	STSMs to define the grid of responses framework

M2.2	20	Seminar with managers in each country/region
M2.3	20	Workshop for discussion about responses (including a field trip)
M2.4	24	Training School for ECIs and end users about existing tools and management practices
M2.5	30	Workshop for final results presentation
M2.6	34	Submission of review paper(s)
<b>Deliverables</b>		
D2.1	10	Guidance to implement the protocol for the responses assessment
D2.2	14	Annotated bibliography of publications
D2.3	24	Report of existing management practices by country/region
D2.4	30	Synthesis of gaps in scientific knowledge
D2.5	30	Synthesis of best illustrative practices
D2.6	30	Synthesis of existing tools (indicators, models, etc.)
D2.7	30	Report about integration of riparian vegetation in current legislation
D2.8	36	Review paper(s)

### **WG 3: Establishing misalignments in riparian knowledge and priorities for knowledge conversion for enhanced management.**

Objective and methodology: Using the information obtained in WG1 and WG2, stakeholder discussions using tools such as concept mapping will be used to determine how riparian ecosystems are framed by different stakeholders. This approach will enable to establish where knowledge conversion needs to take place to maximise understanding, which research priorities exist, which strategies and tools may be most effective in achieving enhanced riparian management, and how best legislation or policy might be utilised to improve European riparian systems. Each task will determine what information needs to be improved, what information can be transferred across scales of governance, disciplines, regions and sectors and the key points to be solved to enhance transferability and legislation improvement.

	<b>Month</b>	<b>Description</b>
<b>Task</b>		
T3.1	24-48	Identify research priorities, barriers and opportunities
T3.2	24-48	Identify and overcome misalignments between science and management
T3.3	24-48	Identify and overcome misalignments between science or management and legislation
<b>Milestones</b>		
M3.1	28-38	STSMs to identify gaps between disciplines and regions in COST countries
M3.2	40	Workshop about research gaps, tools and indicators gaps and legislation issues
M3.3	44	Submission of Policy/forum paper
<b>Deliverables</b>		
D3.1	44	User guidance (for science/management relationships)
D3.2	46	Manifesto: what to include in teaching programs,
D3.3	46	Guidance including effective tools, indicators and legislative propositions
D3.4	48	Policy/forum paper (for scientific misalignments)

### **WG 4: Dissemination and outreach of results and outcomes**

Objective and methodology: WG4's objective is crucial because it is assumed that the room for improvement of RV understanding and management lies in a better transfer of existing knowledge and practices. Thus, a WG will be dedicated to communication and dissemination of the findings of the three others WG. Close collaboration will allow to fit dissemination mode, targeting the public and adjusting the message. A specific attention will be paid (1) to fit the communication mode to the target (in terms of actors, scale of governance, etc.) and (2) to enhance horizontal dissemination of outcomes by the different stakeholders (more than just a top-down flow of information). The final conference will illustrate the aim of involving different stakeholders by combining scientific presentations, forums and artistic actions.

	<b>Month</b>	<b>Description</b>
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### Task

T4.1	1-3	Built a dissemination framework
T4.2	1-48	Design, implement, promote and feed a website
T4.3	3-26	Look for new partners
T4.4	3-48	Promote the findings
T4.5	32-45	Organise the final conference

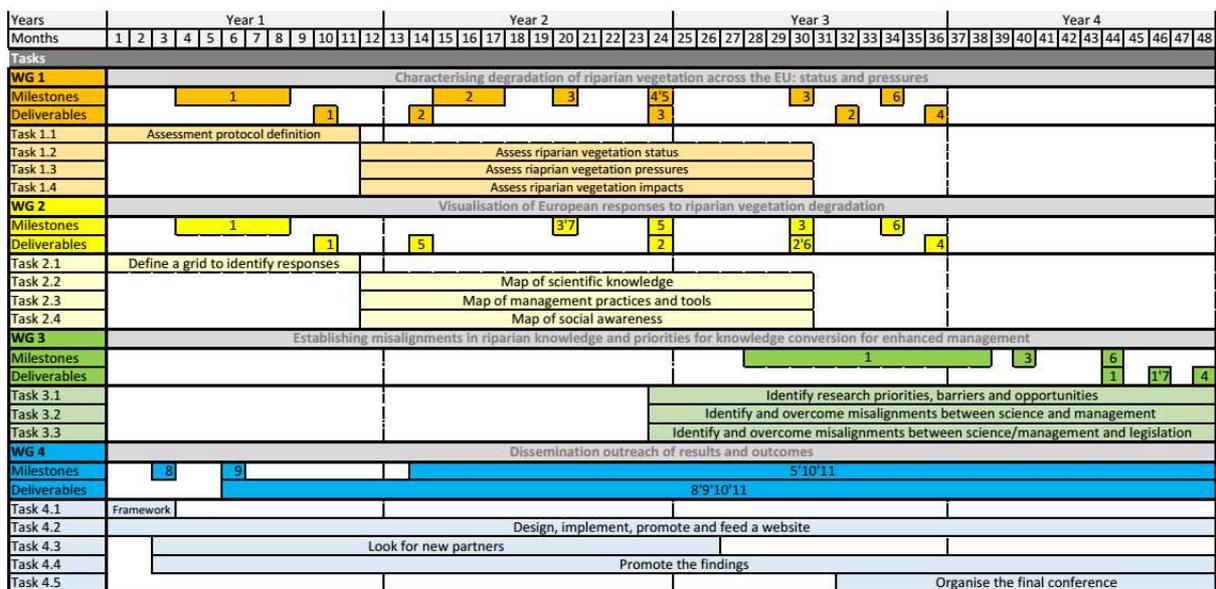
### Milestones

M4.1	3	Dissemination framework
M4.2	6	Launching the website
M4.3	14-48	Translation of synthesis and guidance document in at least 6 languages
M4.4	45	Final conference
M4.5	45	Training School

### Deliverables

D4.1	6-48	Website (access to all reports, documents, etc.)
D4.2	6-48	A series of videos to present the Action and the main findings
D4.3	14-48	Translated version of core documents
D4.4	20	Skill database of riparian researchers
D4.5	45-48	Final conference proceedings and videos

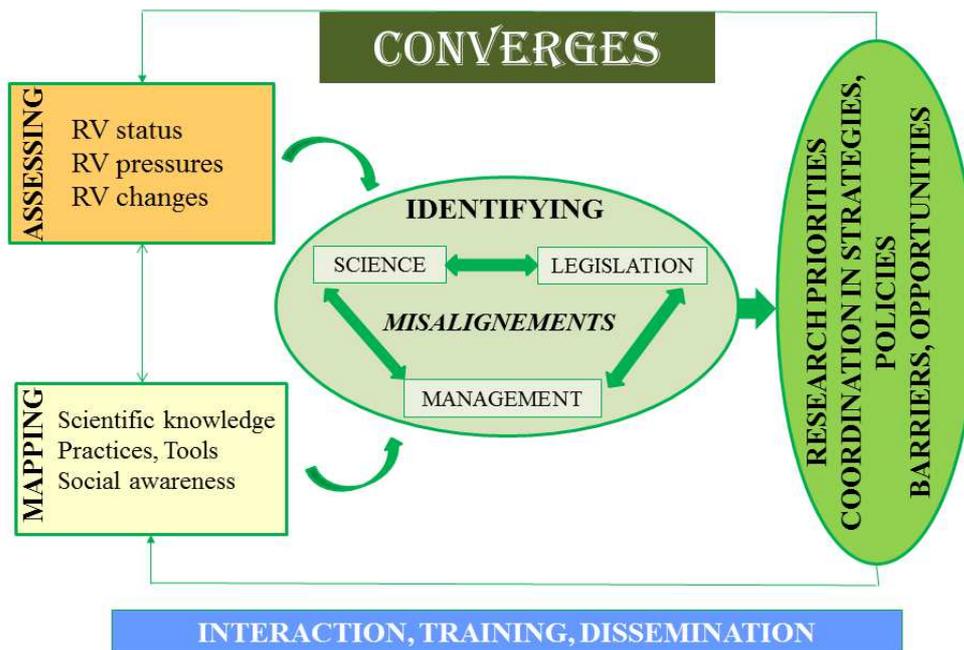
## II) GANTT DIAGRAM



Milestones: 1 = STSMs ; 2 = assessment ; 3 = workshop ; 4 diagram ; 5 = training school ; 6 = submission of paper ; 7 = seminar ; 8 = framework ; 9 = website launching ; 10 = conference ; 11 = translation

Deliverable: 1 = guidance ; 2 = report ; 3 = graphic ; 4 = paper ; 5 = bibliography ; 6 = synthesis ; 7 = manifesto ; 8 = website ; 9 = videos ; 10 = skill database ; 11 = conference proceedings

## III) PERT CHART (OPTIONAL)



#### IV) RISK AND CONTINGENCY PLANS

Potential risks and devised countermeasures are:

1. Poor management and administration: mitigated by the experience of several Action participants in managing large, international and multidisciplinary projects.
2. Scarce availability/ease of gathering on data restoration projects and sufficiently detailed modelling, field and experimental procedures: proposers already agree on sharing the vast amount of data and experience gathered in many years of research in the relevant fields.
3. Failure of the network to achieve a sufficient critical mass and impact: proposers and their large associated network will act as a leverage multiplier.
4. Risk of not achieving inclusion goals: inclusion goals have been taken care at the proposal preparation stage by including partners from many NNCs and ITCs, including ECIs, who have already manifested interest in the Action aims.
5. Lack of buy-in from stakeholders: stakeholders will be involved in WG1, WG3 and W4. Blending of scientist and stakeholders in WGs shall ensure that the scientific oriented tasks have outputs tailored also to stakeholders requirements and that the Action community develops a common language comprehensible to both scientific and non-scientific parties.

#### B) MANAGEMENT STRUCTURES AND PROCEDURES

CONVERGES Action will be coordinated by the MC in compliance with the 'Rules for Participating in and Implementation of COST Actions' COST132/14. Nomination and election of the key management persons such as Action Chair, Vice Chair and WGLs will take place at the Action kick-off meeting. Nominations and elections will ensure gender and geographical balance; these representation principles will be also applied to the MC meetings. Each WG will be led by a leader elected according to the above-mentioned representation criteria. In order to pursue the capacity building and inclusion objectives, WGLs where possible will be drawn from ITCs unless the expertise required to lead the WG is not available. In this latter case, a shadow ITC will be appointed for assisting the WGL. The mission of WGLs will be the facilitation of effective communication within and between WGs. WG meetings will be held on an annual basis and will provide a means of sharing knowledge and experiences. WGs will be

expected to organise Training Schools within the WG meetings so that the benefits of the training will reach the largest number of WG members. Training material will be later available online on the Action website to favour on-demand e-learning. Action's planning and development will be supervised by a Steering Group (SG) composed by the representative of the Grant Holder, Action Chair, Vice-Chair and WGLs. SG supervised activities will include liaison with local organisers in countries hosting Action's meetings, adequate support to STSM participants and STSM prioritisation. STSMs will be the central instrument by which deliverables will be achieved and networking fostered. More in detail: during STSMs, RV assessment protocols, responses to pressures and research gaps will be defined. STSMs achievements will be published on the Action's website and presented to the WG at the first viable occasion.

A Conference Committee will be drafted from the Action's participant by the MC. The Conference Committee will organise the final Action conference and edit the Conference Proceedings, which will be distributed only in digital form in order to minimize the carbon footprint of the Action. Following the same rationale, the Action will encourage videoconference sessions and travels by means of low emission transportation means.

### **C) NETWORK AS A WHOLE**

CONVERGES Action requires the expertise of ecologists, geomorphologists, river managers, hydraulic engineers, policy makers and societal players. The vast array of involved fields will ensure the creation of an extensive and multidisciplinary network that will aid the COST Countries and NNCs capacity of managing RV and related ecosystem services with state of the art scientific practices. The Action will in first place provide a baseline assessment of RV status, restoration and conservation practices and highlight misalignments between scientific research and RV management as well as social perception. Second, Europe-wide scientific knowledge will be converted into cutting edge RV management practices and contribute to the provision of RV related ecosystem services. The Action proposers strived for balanced representativeness of gender, ITCs, ECIs and geographical origin: at proposal submission time, female share was 47%, ITC share was 48% and ECI share was 78% (of academics). Furthermore, three NNC, one COST international partners, one International Organisations and one European Commission and EU Agencies are taking part to the proposal submission. The Action will bring together various disciplines (biological sciences, earth and related environmental sciences, agriculture, forestry, and fisheries, environmental engineering and social sciences) and institutions (higher education and associated organisations, other government/intergovernmental organisations, business enterprises). Nevertheless, the Action proposers are actively promoting the Action within their national, continental and international contacts in order to extend the network. Lastly, among the proposers there are several senior academics and public managers with proved experience in managing large international projects.