DIRECTORATE GENERAL
ENVIRONMENT
Directorate C
Unit C1

Service contract n°ENV.D.1/SER/2013/0010

Pilot Project - Atmospheric Precipitation - Protection and efficient use of Fresh Water: Integration of Natural Water Retention Measures in River basin management

Synthesis of the Mediterranean Regional Workshop

Alcalá de Henares, Spain. January 28th-29th, 2014

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Note to the reader

This note was prepared by Gonzalo Delacámara, Estefanía Ibáñez, and Marta Rodríguez (IMDEA), with contributions from facilitators from the breakout working group sessions: Ayis Iacovides (IACO), Maggie Kossida (IACO) and Heather Williams (AMEC), and also from speakers and other workshop participants.

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Please note that an evaluation among all registered participants was run by the organization of the event. Results are available at the end of this document.

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1. The context

a. The NWRM initiative in a nutshell

Within the context of the EU Green Infrastructure Policy[1], an increasing policy interest has emerged as to the so-called Natural Water Retention Measures (NWRM). NWRMs have been brought to the water policy arena because of their potential contribution for water management[2], among other important contributions to attain environmental policy objectives.

More specifically, "among the measures that can greatly contribute to limiting the negative effects of floods and droughts, it is green infrastructure, particularly natural water retention measures. These include restoring and maintaining floodplains and wetlands, which can hold water in periods of abundant — or excessive — precipitation for use in periods of scarcity. Green infrastructure can help ensure the provision of ecosystem services in line with the EU Biodiversity Strategy. Reducing soil sealing is another measure that can diminish flood risks. These measures should be included in both RBMPs and [Flood Risk Management Plans] (FRMPs) and… should become a priority for financing under the [Common Agricultural Policy] (CAP), Cohesion and Structural Funds" (COM (2012) 673).

To respond to this interest, DG ENV launched a dedicated study entitled **Pilot Project - Atmospheric Precipitation - Protection and efficient use of Fresh Water: Integration of Natural Water Retention Measures in River basin management**. This study has a dual aim:

- To develop sound and comprehensive **European (web-based) knowledge on NWRM**. The knowledge base will structure available information on technical, environmental, socio-economic, governance and implementation aspects of NWRM, mobilizing existing practical experiences, studies and stakeholders' knowledge.
- To contribute to the development of a **European NWRM "community of practice"** by bringing together all parties interested in the design and implementation of NWRM in the context of the planning process of the WFD or the Floods Directive, the development of a climate change adaptation strategy or the establishment of sustainable urban plans. This is achieved by the development of **four informal regional networks:** the Danube river basin, the Mediterranean Sea region, the Baltic Sea, and Western Europe. These networks were defined on the basis of similarities in bioclimatic, hydromorphological and water management conditions, although they do not have strict geographic boundaries and may overlap (they actually do). They also include non-EU countries (mostly candidate countries).

In close interaction with NWRM practitioners and experts, the initiative will ultimately produce a **NWRM practical guide** that can **support the design and implementation of NWRM** in Europe.

Dedicated web-based NWRM discussion fora were created to host this community and build such networks of experts and practitioners on NWRM. At the EU level, the forum aims to bring together existing initiatives and research projects on NWRM. At the regional level, discussions on NWRM implementation focus on the specific regional characteristics as well as common challenges faced at

[1] http://ec.europa.eu/environment/nature/ecosystems/

[2] Other mentions to NWRMs in the Blueprint to Safeguard Europe's Water Resources (COM (2012) 673), its Impact Assessment (SWD (2012) 382) or the Stella Report (Stella Consulting, 2012) develop a particular aspect: NWRMs are a type of Green Infrastructure; NWRMs are one amongst other kinds of measures to enhance resource efficiency; etc.

the regional level (see below). This will allow for the identification of best practices (including a practical reflection on what a best practice is) as well as practical solutions to common issues.

These regional processes involve constant work in progress, which is fed by the contributions of NWRM experts, practitioners and other stakeholders. The synthesis of discussions and views expressed in the web-forum or discussed during the regional workshops will be systematically accounted for when developing the deliverables of the initiative for DG Environment. In addition, the knowledge gathered and synthesised will feed into discussions of the working groups (notably the WG on Programmes of Measures) established under the EU WFD Common Implementation Strategy (CIS), a collaborative effort associating the European Commission, Member States' and stakeholder representatives for supporting a coherent and efficient implementation of the WFD and the Floods Directive.

NWRMs can help meet the aims of RBMPs, as well as of wider drivers including the FD, the Strategy for Water Scarcity and Droughts, climate change adaptation, sustainable urban development, and may potentially offer cost-effective solutions as compared to other types of measures – this project is intended, among other things, to provide such evidence.

The potential effectiveness of NWRMs in contributing to attaining RBMP objectives seems clear. The potential of NWRMs for flood management is also quite evident since enhancing the water storage potential is a means to enhance the natural provision of flood security (e.g. restoring floodplains is a way to dissipate energy through reducing flows and slowing its pace as a way to reduce flood risk).

The ability of NWRMs to improve the potential to deliver water quality services is a new opportunity for water policy (e.g. higher phreatic strata prevent saltwater intrusion, higher rates of water infiltration may be an alternative to wastewater treatment plants as a means to improve water quality in aquifers, and re-naturalizing a river is in turn a means to increase its resilience to water pollution and its natural water purification potential).

By protecting rivers and freshwater sources, NWRMs entail important benefits related to reduction and avoidance of costs and damages. Increasing the rivers' natural assimilation capacity may actually make other quality measures redundant. For example, mulching and other NWRMs may reduce erosion and as a result help to extend the lifespan of reservoirs, while reduce their existing maintenance costs for sediment management. NWRM come along with other ancillary benefits such as biodiversity and amenity that are exclusive of natural preservation and not easily attainable via alternative water policy measures.

b. Objectives of the workshop

The Regional Workshops are part of the Regional Processes outlined above. The overall objectives of these workshops are to:

- Update participants on activities within the NWRM initiative;
- Consolidate the exchange of experiences and knowledge initiated in the regional networks and web fora, ultimately strengthening the regional networks.

The present workshop was the first to be held in the context of the Mediterranean Regional Network; a second workshop will be held in July / September 2014, will be potentially held in coordination with the activities of the Presidency of the Council of the European Union, either in Greece (holding this position from 1 January – 30 June 2014) or Italy (incumbent country for the second semester). The two rounds of workshops are held in parallel in all four Regional Networks established under the NWRM initiative and have common overall objectives. This first round of workshops, in particular, aims at:

- Introducing NWRM and shedding light on what is understood under that notion;
- Presenting the NWRM initiative and regional process;
- Sharing views on constraints, difficulties, factors for success that are relevant to the design and implementation of NWRM, with emphasis on the practical relevance of these measures for the next planning cycle within the WFD and other Directives;
- Collecting views on the structure of the knowledge base (Task 1), and the facilities that are offered to users to extract information (i.e. queries);
- Identifying expectations vis-à-vis the practical guide to be developed along the project and delivered tight at the end (Task 3);
- Agreeing on follow-up steps for the regional network, while encouraging contribution to the case studies.

To ensure coherence among workshops held in the four regions, the workshop agenda was developed according to common building blocks.

The present document provides a synthesis of the main elements and lessons learnt which emerged during the first Mediterranean Workshop.

2. NWRM in the Mediterranean Region

a. Main features of NWRM implementation in the Mediterranean Region

This regional process intends to take into account Mediterranean-specific issues around the design and implementation of NWRM, providing case studies of NWRM applications in Mediterranean basins, as well as creating a Mediterranean network on NWRM, a community of practice involving practitioners, other experts, and stakeholders.

The Mediterranean process focuses on the required characteristics of NWRM in order to best deliver their intended benefits, and seeks to promote the discussion about Mediterranean specific challenges and priorities, having in mind the specificities of hydromorphological features and main pressures on water resources in Mediterranean river basin districts (working at different spatial levels in catchment). NWRMs applicable elsewhere in the EU are also being discussed accordingly for Mediterranean conditions and NWRMs specifically applicable to the region are highlighted.

The objective is both ambitious and exciting: to create a community of practice on NWRM in the Mediterranean that can take over the study's outcomes once the project itself is over (late in 2014). Conditions will be created for network members to enhance their understanding of the functioning, intended benefits and effectiveness of the NWRM, to pool expertise on the design, selection and application of NWRM, to build or consolidate partnerships, to foster the use of NWRM in the new water planning cycle starting in 2015, and to promote a policy agenda tackling main challenges related to their implementation (financing, co-ordination of water and land-use policies, etc.).

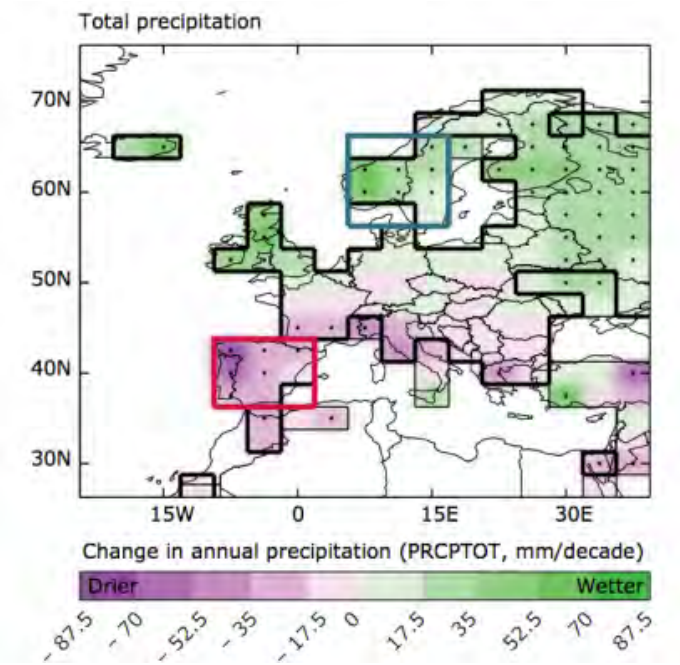
The Mediterranean community of practice on NWRM covers Portugal (despite being an Atlantic country), Spain, (southern) France, Italy, Malta, Greece, Cyprus, and Croatia (which is also part of the Danube regional network). Mediterranean relevant contributions are also welcome from Slovenia, and some EU candidate countries such as Bosnia and Herzegovina, Montenegro, Serbia, Albania, and Turkey (the latter already involved in this first Regional Workshop).

The Mediterranean network, in turn, also benefits from insights from the other three regional processes developed within the context of this study. Further to a very fluid communication between the Mediterranean Regional Coordinator (Gonzalo Delacámara) and the other three Regional Coordinators (Heather Williams, Kristina Veidemane, and Jovanka Ignatovic), Gonzalo was actively involved in the Western Workshop and Heather was involved in the Mediterranean one.

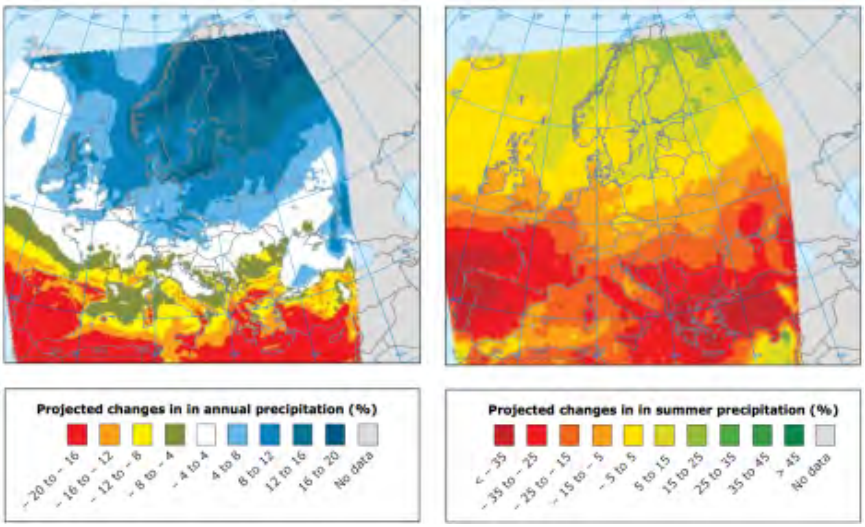
b. Main challenges and issues with respect to NWRM implementation in the Mediterranean Region

As discussed by **Gonzalo Delacámara (IMDEA, Spain) (Session 1)**, the spatiotemporal rainfall and runoff variability, particularly pronounced in some areas of our region, shapes the particularities of the Mediterranean basins in terms of water resources availability and distribution. Mediterranean rivers have large periodic floods, transporting significant amounts of sediments, shaping braided channels, while many streams are intermittent or ephemeral.

Trends in annual precipitation across Europe (1960 – 2012)
Source: EEA (2012)



Projected changes in annual (*left*) and summer (*right*) precipitation (%) between 1961 -1990 and 2071 – 2100
Source: EEA (2012)

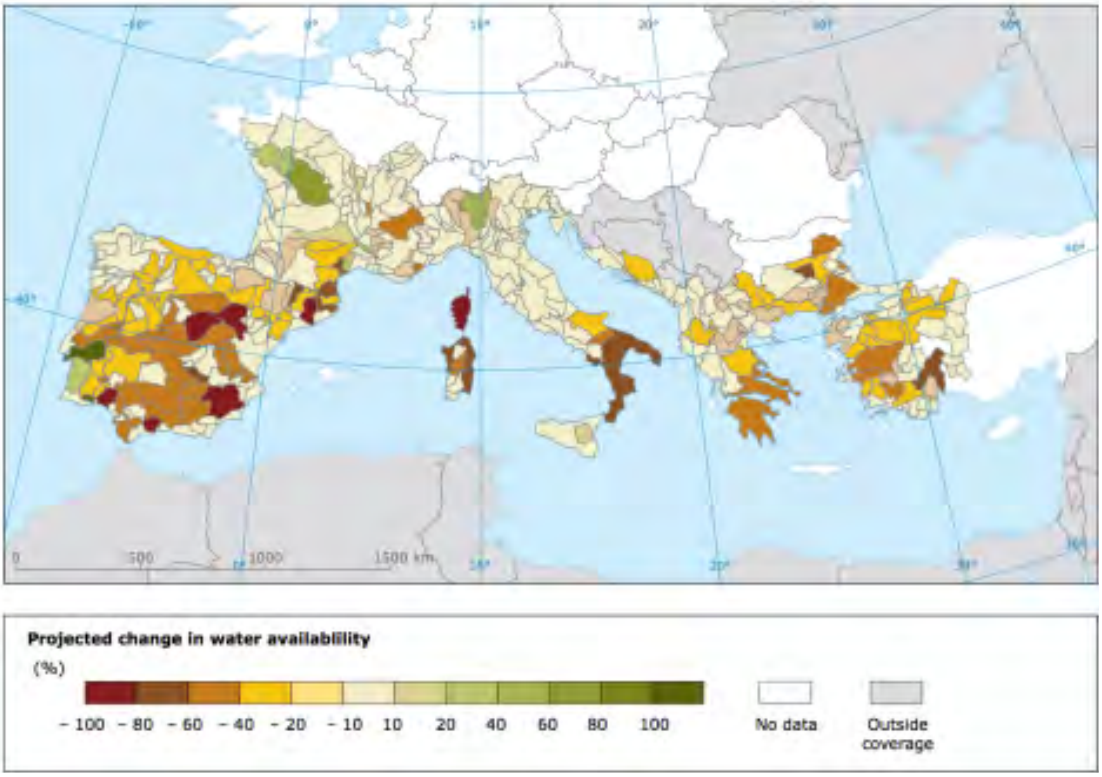


Overall, these rainfall and runoff patterns concur with the intensive use of water resources, mostly in agriculture, in some cases due to a quite complex system of dams and reservoirs, part of which have induced significant hydromorphological alterations. Downstream reaches are commonly deprived of high flows, which carry sediments, modify channel morphology, and maintain habitat complexity.

Given the limited decoupling between water use and economic growth trends, growing water demand has led to increasing water scarcity and related risk. In some cases, this is also the result of the lack of coordination of sectoral policies that, in some Mediterranean countries, has led to oversized infrastructures and increasingly idle facilities. Additionally, it is common to find flawed enforcement (and inadequate structure) of water use rights, mostly regarding groundwater resources, and over-allocation of surface water use rights, leading to potential overexploitation.

Projected change in water availability for irrigation in the MED region by 2071 – 2100

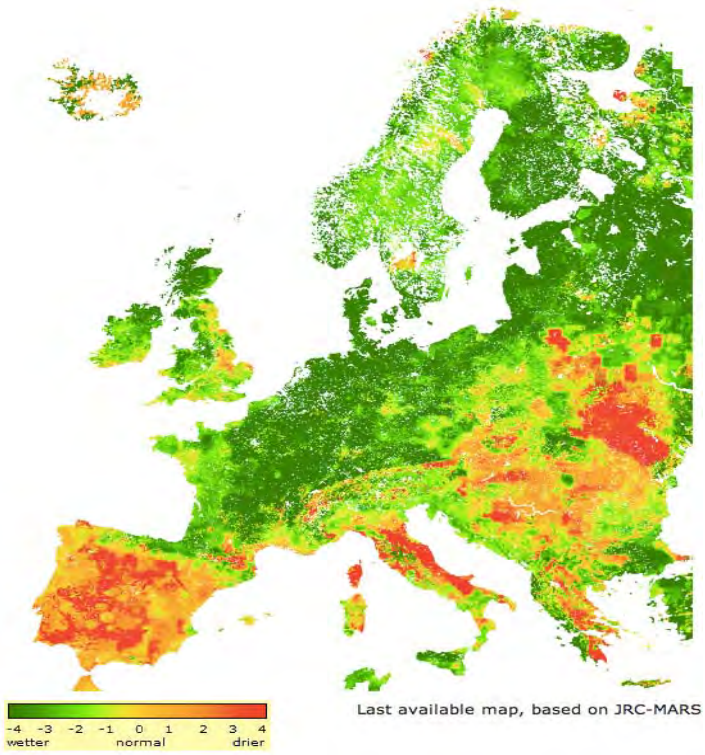
Source: EEA (2012)



The fact that drought events are becoming more frequent in the Mediterranean basins, where the average annual demand of water is already higher than the long-term renewable resources (i.e. availability), has led to an increased uncertainty about the reliability of water supply exacerbated by climate change. These critical issues call for improved adaptation mechanisms and strengthened resilience, both in terms of demand reduction and increase on the supply side.

Increasing drought exposure

(JRC-MARS, 2013)



Overview of water stress in the Mediterranean basin, highlighting water exploitation as well as existing and planned desalination plants

Source: GRID-Arendal (2013)

In most water scarce areas, competitiveness of both the urban and rural economy is heavily dependent on the availability of a sufficient and reliable provision of water services in particular for agriculture, agro-food industries, and tourism. Opportunities can be identified to reduce water use (e.g. by increasing irrigation efficiency) or to enhance availability. Increasing the water stored in aquifers through recharge facilities such as ponds, temporary delay of runoff by low retention dykes etc., provides infiltration opportunities (including infiltration of treated effluent into aquifers for pumping in the summer and re-use for irrigation), which contribute to increasing water availability (or reallocating it in time). This makes these measures of particular interest in the area, although just if linked to the enhancement, protection or restoration of a natural function (i.e. if linked to positive environmental outcomes). After all, it is not about retaining water *per se* but doing it for environmental purposes.

Yet, not everything is about scarcity and droughts in the Mediterranean. Torrential rains are common in Mediterranean catchments, which lead to hazards of flash floods, stream flooding, and landslides. The technical analysis of Mediterranean ephemeral streams and mountain torrent floods is quite different to that of flood events in other European rivers (notably due to the sediment load) and opportunities to use the excess floodwater do arise.

In terms of agriculture, hypothetically some relevant NWRM for the Mediterranean may be early sowing, which can contribute to mitigate the extreme evapotranspiration rates typical of Mediterranean summers, and traditional terracing.

As to forestry, it is common to find targeted planting in Mediterranean areas to harvest water, since there is some evidence that planting on some Mediterranean hill slopes may assist in cloud formation and precipitation; in addition, the afforestation of riparian areas is also a common NWRM in Mediterranean basins.

In natural areas, re-meandering, floodplain reconnection and restoration, or wetland restoration and creation are also common practices.

Last but not least, for urban areas, floodplain restoration, wetland preservation or creation, or urban channel restoration can be seen as likely practices.

3. Key messages and lessons learnt from workshop presentations & plenary and breakout group discussions

Session 2 was intended to provide the policy context and seize the expectations from the European Commission (DG ENV) on the study as well as to shed light on conceptual issues from the onset.

Lucía Bernal (DG ENV, EC) presented on behalf of the project officer (Evdokia Achilleos) the EU policy context for this project, along three main lines: the policy background, the study within the context of the Blueprint and the CIS process, and related policy and financial opportunities.

The assessment of RBMPs identified that hydromorphological alterations and diffuse pollution are the most significant issues leading to massive failure in the status of water bodies. Furthermore, measures implemented so far to tackle these and other water policy challenges are deemed insufficient. In addition, the Blueprint stresses that the main causes of negative impacts on water status are interlinked, including climate change, land use and land use change, agriculture, tourism, urban development and demographic change, among others.

Beyond the 'Blueprint to safeguard Europe's water resources' (2012), the policy background for NWRM as a complement of conventional measures includes the White Paper on Adaptation to Climate Change (2009), the Green Infrastructure Communication (2013), the Climate Change Adaptation Strategy (2013) and an information package delivered to the EU MS Water Directors (Towards better environmental options in flood risk management).

Given the stress on the relevance of green infrastructures to reduce the impacts of floods, droughts, and land-use related pressures, the Blueprint proposed Member States (MS) these infrastructures in their RBMPs as part of an integrated approach to manage water resources across policy areas and sectors.

NWRM are to be supported in at least three different ways: the EC to develop CIS tools to favour the uptake of these measures in the RBMPs and FRMPs, through prioritising funding of natural infrastructures and ecosystem-based adaptation for the water sector in the ESIF (EU Structural and Investment Funds), and via conditionalities such as greening of the CAP.

It is also relevant to mention that the EC draws attention to the inclusion of green infrastructure in the Partnership Agreements negotiated with MS (i.e. funding priorities for the current 7-yr budgetary cycle being identified). Furthermore, synergies with other EU policies are to be harnessed.

Within the context of the new CIS work programme, closely linked to the second water planning cycle, WG PoM will draft a guidance document on NWRM, sharing best practices on PoM and pinpointing funding measures outside the CAP; WG Agriculture will develop tools for the delivery of NWRM and other WFD measures, in particular in the upcoming Rural Development Programmes (RDP); WG ECOSTAT will be working on the intercalibration of the ecological potential (EP), including the definition of measures; WG E-flows will develop guidance on ecological parameters / e-flows and hydrological parameters to assess quantitative aspects and link to the good ecological status (GES) of water bodies; WG Floods will work on a resource document on the links between the WFD and the

FD, which should include NWRM; WG Economics will be reviewing the WATECO Guidance to shed light on cost-recovery and cost-benefit analysis (CBA) by 2014.

Our project is expected to have links with other EU policies, such environmental policy (Nature 2000, Habitats Directive, LIFE, Soil Strategy, Biodiversity Strategy); climate change adaptation, (CCA Strategy) green infrastructure policy (Communication on GI); forestry (new Forestry Strategy); Regional Policy (Cohesion Funds, ERDF); agricultural policy (CAP, EAFRD); and research and innovation funds.

Last but not least, Lucía presented the financing potential for NWRM, with an explicit reference to promoting NWRM in ESIF (Partnership Agreements): ERDF, CF, EAFRD, ESF, and EMFF. In addition, the CAP (including 2 out of 6 relevant rural development priorities and links with Pillar I; research and innovation funds; LIFE programme; and other financial instruments (i.e. EIB) can be perceived as opportunities.

Carlos M. Gómez (IMDEA, Spain), the main co-author of the Concept Note (a collective effort) drafted at the onset of this project and that has served as a substantive input for the drafting group of the WG PoM, discussed the concepts and often claimed myths around NWRM.

Firstly, there should be recognition of the fact that NWRM might mean different things to different people. In other words, rather than a new concept they might be seen as an old one with a new suit on. Practitioners and other experts during the workshop actually referred to runoff attenuation features, sustainable drainage systems (either rural or urban), green infrastructures, bioengineering, natural flood management, soil and water conservation practices, etc.

As Carlos M. explained, NWRM might be defined in a restrictive and accurate way: “the implementation of appropriate Natural Water Retention Measures (NWRMs) have as main purpose a reduction in surface runoff following rainfall events in order to reduce flood risk” (JRC, 2012: p.11) or in a broader and generic way, as in our working definition: “Natural Water Retention Measures aim at restoring and maintaining water related ecosystems by natural means. They are Green Infrastructures intended to maintain and restore landscape, soils and aquifers in order to improve their natural properties, the environmental services they provide, and to favour climate change adaptation and reduced vulnerability to floods and droughts.” (NWRM Concept Note).

The definition is not relevant in itself but because it points out the distinctive character of NWRM: they appeal to a single purpose: (i.e. restoring and maintaining aquatic ecosystems) and to a particular set of means (i.e. by natural means). As a result of this, it should be clear that not every measure that increases the water stored in water bodies is a NWRM; NWRM are interventions over water related ecosystems and should therefore have an environmental objective; NWRM use natural processes (functions usually performed by nature); water retention is not the end but the means; NWRM are not simply means to restore to its original natural condition the assets modified by human action, which is often not an affordable (if at all possible) task, but to adapt current developments in order to enhance or recover water regulation functions they provide and that were reduced or lost when these developments took place.

NWRM are measures intended to improve the water storage potential of both natural and modified systems: they may consist in creating new green infrastructures or in maximizing the potential of grey infrastructures to contribute to recharge. For that purpose they rely on functions usually performed by natural ecosystems (infiltration, natural runoff, soil and biomass retention, etc.) to

increase the ability of those systems to emulate the usual functions of natural systems. What is of paramount importance is that NWRM are aimed at providing the critical ecosystem services that people and the economy depend on.

Carlos M. emphasised on a not so evident paradox. On the one hand, restoring and protecting the natural water storage capacity is the source of many different and simultaneous beneficial effects. In addition to their contribution to the purposes of water management NWRM are associated to significant co-benefits in many relevant policy domains. On the other, the choice of the adequate means to restore and protect natural water storage capacity requires dealing with important trade offs (as in JRC, 2012), such as for instance:

- Afforestation of mountainous areas is an effective way to reduce peak flows but may increases water stress in the soil and reduce groundwater recharge.
- Improved crop practices reduce water stress in the soil but increase evapotranspiration and might reduce groundwater recharge.
- Buffer strips are beneficial for water management but may reduce crop areas and yields.
- Reduced tillage improves soil structure and reduces the exposure of agriculture to flood risk and drought vulnerability but increases pest infestation risks and the use of agrochemicals.

In other words, NWRM represent an opportunity to design better programmes of measures for water management, because they are measures to more than one pressure, but its adequate assessment requires considering their pros and cons, their additional benefits and opportunity costs, as entailed in any land-use change.

Session 3 was intended to show that NWRM are often implemented embedded in complex river or floodplain restoration projects, therefore highlighting the need to assess NWRM performance not as individual measures and also showing the links between different objectives (WFD, FD, etc.) and benefits. Links with Life+ RESTORE partnership work, recently completed, were built.

Fernando Magdaleno (CEDEX, Spain) emphasised, mainly from a biophysical perspective, on one of the main features that Carlos M. had pointed out: natural water retention, especially if part of complex river and floodplain restoration projects, does contribute to multiple benefits, to combined outcomes: flood risk management, improved eco-hydrological connectivity, and recovery of priority river habitats.

A pervasive idea (and not just in the Mediterranean workshop) is that to build the case for NWRM an explicit link with the WFD (and RBMP) needs to be made, as well as recognising the multi-dimensional feature of these measures, which, as it was clear in Fernando's presentation, are essential to fully integrate the WFD, the FD, the BHD and other related Directives. GES, ESS, and other relevant concepts are all progressing in parallel paths, but have to be adequately interconnected through NWRM. As a matter of fact, Fernando went further: Mediterranean basins need NWRM to avoid collapse (desertification, climate change, anthropogenic impacts).

River and floodplain restoration contribute to natural water retention in different ways: improving (3D) eco-hydrological connectivity, increasing the heterogeneity of river environments, enhancing the role of natural habitats as traps for water and sediments, improving the functionality of the flow regime to contribute to good status of rivers and floodplains, and supporting public awareness about the vital role of natural water retention for people.

To illustrate his arguments, Fernando reviewed different case studies:

- Restoration of the Arga-Aragón system (Ebro basin, northern Spain) (2008-2015), which includes the restoration of riverbed, riparian woodlands, floodplains, meanders and wetlands, and is mainly funded through the Life+ project "Mink territory" (2010-2015).
- Measures to control temporary flooding in the Ebro basin northern Spain.
- Restoration of the Órbigo river (Duero basin, northern Spain) (2011-2012), through floodplain reconnection and improvement of hydro-geomorphic processes.
- Flood bypass systems, such as the Yolo Bypass (California) and the reconnected floodplain in the Sigma project (Belgium).

Andrea Goltara (CIRF & Life+ RESTORE partnership, Italy) presented a very wide array of NWRM (always within the context of complex river restoration projects) to shed light on key challenges in relation to flood risk management for joint WFD and FD implementation.

From Andrea's perception as an expert and practitioner, too much emphasis tends to be placed on reducing flood hazard when, as a matter of fact, from his standpoint what is actually relevant is to reduce vulnerability and to increase resilience.

The traditional approach to tackling flood risk is based on the channelization of riverbeds, embankments, straightening, sediment extraction, and the removal of bank and in-stream vegetation. This is the case, for instance, of the flash flood of the Magra river basin (2011).

Andrea showed different examples, mainly in Italy, where traditional flood management systems to mitigate risk and hazard do actually end up increasing risk and damage not only downstream but also locally.

Embankment, for instance, may reduce the probability of flood by factor of 5; yet, as a result of new urban developments, the potential damage might be multiplied by 10. This can be seen in T. Astico, near Lugo di Vicenza (Italy). A critical outcome of Andrea's reasoning is that halting soil sealing is a top priority, which creates a fertile space for NWRM implementation.

A second example would be that of the conventional approach to address morphological (erosion) risk based on bank protection works, weirs, sills, and sediment extraction to stabilize the riverbed. This quite often results in riverbed incision (with the subsequent collapse of structures and the lowering of the water table in the aquifer, as well as the salinization of surface and groundwater); narrowing of riverbeds and the change of typology.

There are some references at a MS level that are contributing to the idea of providing more space for rivers, which essentially implies floodplain restoration: "Making space for water" (DEFRA, 2005) in the UK, the "Ruimte voor de rivier" programme in The Netherlands, or "Préservation de l'espace de liberté de l'Allier sur le site Loire: préservation de nature de Varennes/Moulins" in France.

RESTORE's experience provides evidence on some critical issues for floodplain restoration: availability of the areas (former floodplains are mostly subject to private property rights nowadays), population support, clear legislative support for the removal of protection works, clear policy support, and technical issues regarding planning and implementation.

Session 4, in turn, was devoted to more specific (facilitated) discussion and presentation of specific NWRM applications in different countries of the Mediterranean region. These breakout groups were organized in forestry and natural areas, agriculture, and urban measures.

WG1 (Forestry and Natural Areas)

Samantha J. Hughes (UTAD, Portugal), provided a very insightful view on the links between integrated characterization, requalification and monitoring of Mediterranean freshwater systems, illustrating her research with the case of the Odelouca river (southern Portugal), an intermittent Mediterranean basin, which is home to critically threatened endemic fish species and has extensive mature riparian galleries, all within a region in which there are intense pressures related to water demand. The Odelouca case is a good example of the qualities of a holistic approach (in other words, NWRM in context), which includes restoration measures, bioengineering, NWRM, monitoring, reporting, and stakeholder involvement.

This working group was also useful in order to better delineate the concept of NWRM. **Eleni Stylianopoulou (Ministry of Agriculture, Cyprus)** presented a reforestation project in the abandoned Asbestos Mine in the Amiantos Area (Cyprus); **Thanassis Bourletsikas (IMFE-FPT, Greece)** presented the post-fire water retention management in Olympia (Greece). In both cases one may say that what makes a NWRM special is not the ends pursued but the means that are used. Any reforestation or afforestation project has a not minor water retention dimension. Yet, not every afforestation or reforestation project is an example of a NWRM itself. As above, one may decide to afforestate / reforestate to retain water, but water retention is a means, not an end, and therefore what needs to be clear is what water retention is for.

In the Cypriot case study, the environmental objectives and outcomes are quite clear but these are not the result (and were not the main aim), of any water retention measure. 115 ha were reforested, the choice of species was successful, this contributed in a somewhat imprecise way to deal with asbestos waste, it provided topsoil at a reasonable cost… but no evidence was provided on how water retention did actually contribute to meet these targets.

In Olympia, the direct objective of implemented measures was not water retention using natural means but rather to tackle wildfire negative effects (increases in surface runoff, severe soil erosion, decrease in the soil infiltration capacity, or the occurrence of critical flooding problems as a result of some of the above). Water retention is clearly a result of the targeted increase in the infiltration capacity and the reduction of surface runoff but overall the project is intended to prevent further soil erosion.

WG2 (Agriculture)

RBMP aim at improving and protecting the status of the water bodies involved and thus their water storage potential, among other objectives. However, this end is only exceptionally pursued by direct interventions over freshwater ecosystems. For example, retaining water in an aquifer (as in the first case to be mentioned under this section) may be the result of afforestation and changes in land practices that reduce runoff and increase water infiltration or, alternatively, of reductions in water abstractions due to demand management, water savings, substitution of water sources, and technical efficiency improvements. The first set of measures belongs to the category of natural water retention ones while the latter does not, a division that can be confirmed in the Stella Report (Stella

Consulting, 2012, p. 131), where a clear division is drawn between saving and efficiency measures on one side and NWRMs on the other.

Antonis Antoniou (Water Development Department, Cyprus), presented the artificial recharge of tertiary treated sewage to the Ezousas Aquifer (Cyprus). This case study is a useful one to reflect on the difference between natural and non-natural water retention measures. Paradoxically, the artificial recharge of aquifers is, for the state of the art, a clear example of a natural water retention measure but this is subject to controversy among workshop participants and project partners (since this Cypriot case uses reused water reclaimed from the wastewater treatment plant). This apparent contradiction fades when one observes that an artificial recharge is a direct intervention over a disturbed system that increases the amount of water it stores. The same outcome may be obtained by reducing abstractions but the measures required are not direct interventions over the aquifer as such but actions taken somewhere else in the economy (water savings, substitution, efficiency, etc.… which are not NWRM).

Eleftherios Evangelou (DG Agricultural Research, Institute of Soil Mapping and Classification, Greece) showed the water retention capacity of agricultural soils in Pinios river basin (central Greece), the most important agricultural area in the country.

In Pinios, the water retention capacity is increased via the increasing application rate of sewage sludge (!). Repeated sludge application over four growing seasons improved soil fertility by means of increased soil organic matter, associated nutrient content and improvement of soil physical properties.

Further to controversies about the use of sewage sludge, it will be noted that some of the above comments regarding reforestation of the asbestos mine and the artificial recharge of an aquifer (both in Cyprus), also apply this time.

A clear NWRM application was rather presented by **José A. Gómez (IAS-CSIC, Spain)**. José A. analysed the hydrological impact of green cover crops in olive orchards, illustrating that with different experiences, mostly in Andalusia (southern Spain), where olive trees cover 70% of cropland. One third of the crops are on slopes, causing severe erosion problems. Benefits from cover crops have to do with erosion control, increase of infiltration and nutrient content, occasionally pasture, improved water quality, biodiversity, etc. Yet, as explained by Carlos M. Gómez in session 2, these measures also entail some trade-offs: competition for water with the tree, pest and disease associated, wildfires, etc. Unlike other NWRM, there is widespread empirical evidence of the use of cover crops on runoff, soil properties, and soil-water balance.

Ruth Pereira (CIIMAR-UP, Portugal), one of the attendees of this WG, provided during and after the events very valuable views on these case studies.

As to the aquifer recharge in Cyprus, Ruth emphasised on the need to distinguish between injection and passive recharge. With the former, soil filtering is lost thus affecting water quality. In addition, from her viewpoint, it is critical to reflect on the type of treated wastewater suitable for recharge. Most WWTP are not prepared for treating the great diversity of emergent compounds that now appear in our wastewaters (i.e. pharmaceuticals, hormones, pesticides, etc.). Although at low concentrations, some of these compounds are responsible for eco-toxicological and toxicological effects. Cumulative effects must be taken into account due to their persistence and potential synergies between them.

Sewage sludge form WWTP pose similar risk than those for treated wastewater. Whereas high organic matter content of biosolids can contribute to improve the water retention capacity, it is crucial to define thresholds for several other persistent chemicals, and rules for the application of biosolids in soils should be defined in terms of: type of soils, vulnerable regions, land use etc. Mulching from organic waste of agriculture could also be a solution for reducing runoff, controlling soil temperature, and keeping soil moisture.

Regarding artificial ponds, Ruth perceives them as a relevant NWRM for the Mediterranean region. Nevertheless, it is also crucial to set rules for the construction of these artificial ponds, as some of them may not provide the services (i.e. biodiversity conservation) expected from them. This highlights the importance of more naturalized ponds: with structure and macrophytes community. In addition, if placed downstream a conventional WWTP, they could contribute to improve even more water quality (for uses like irrigation).

WG3 (SUDS)

Fabio Masi (IRIDRA & IWA, Italy), presented wetland systems for Combined Sewer Overflow on-site treatment, as well as other SUDS for stormwater management. Mixed sewers represent the most adopted solution for the collection of untreated wastewater: the high flux of water eases the transport of solids and the washout of sediments at every rain event.

Fabio emphasised on the relevance of green infrastructures for stormwater management, to increase the water quality in the receiving water bodies, to take account of public health concerns, and to mitigate flooding risk. Conventional solutions (i.e. segregation of fluxes entail high investments and very long timespans). Fabio presented an alternative: flush storage tanks (targeting water quality), eventually integrated with extended retention basins (reduction of flood risk). This was illustrated with cases from the UK, USA, and Italy (Gorla Maggiore, Vasca Volano, etc.), mostly, but also from France (Lyon), Germany (Hannover, Berlin), Austria (Vienna), also providing links with the FP7 OPENNESS project.

Iacovos Papaiacovou (Sewerage Board of Limassol-Amathus, Cyprus), explained the progressive introduction of sustainable urban drainage systems from the mid 2000s. Some institutional dimensions of the practical implementation of SUDS in Limassol are worth mentioning: compliance with the law, close co-operation between SBLA and local authorities during the process of approval of building permits and new projects of land development, a new set of requirements or restrictions imposed on new building licenses in order to use SUDS and minimize overflow of rainwater into public roads, etc.

The former includes the construction of rainwater absorption pits in every new housing or commercial development, open areas and parking places; the use of permeable materials where possible, in the construction of passages and ancillary roads; the avoidance of the use of concrete in the construction of stormwater drainage systems; etc.

Session 5 was intended to report back to the plenary from the discussion in Session 4 and also to open the discussion to all attendees to pool expertise and feedback on the project and NWRM implementation. Some of the main discussions in that session follow:

- The scale of implementation tends to be very local and technically biased, which implies that inputs from other interested parties could be overlooked. The discussion on the spatial scale, far from being a technical one, is of paramount importance for the successful implementation of NWRM.
- Some NWRM may have a controversial impact. On one side, it is important to recognise, on the grounds of intellectual honesty, both pros and cons of these measures; on the other, it is critical to discern which are actually NWRM, not as a part of a linguistic dispute but rather a meaningful one in terms of their integration in the PoMs of RBMPs.
- A relevant factor in the application of NWRM is that these measures need a long-term horizon, and there is often a lack of financial support to develop the full process. The lack of financial sources (or awareness about existing ones) needs to be tackled.
- Some NWRM lead to public contest. One of the main challenges of this project is therefore to raise awareness and convey clear messages to make the case for NWRM implementation.
- Cultural backgrounds are relevant at least in two ways: traditional knowledge on natural flood management is essential; in addition conventional practices may hinder the use of NWRM (i.e. green cover crops in regions where it is very traditional to have clean soil under the trees).
- Practitioners demand technical support about specific details. Clear guidance is also a relevant need.
- Transparency and accountability about water management is essential. This could be seen as a too generic discussion but it is not: transparency about the cost of traditional and non-traditional measures is very scarce.
- Guidance should not only target practitioners but also policy-makers. It is important to recognise that some NWRM are adopted for reasons other than water retention. Multi-benefits of NWRM are a crucial feature.
- There is some lack of understanding about the efficiency and applicability of these (and other) measures both for practitioners and policy-makers. This project should contribute with more analytical insights and not just a collection of practices.
- Scaling up is a real challenge.
- There is some perception that measuring benefits is not that easy, especially in complex river restoration projects.
- Most river restoration projects are not subject to sound monitoring: there might be data on the project but not a thorough assessment. Furthermore, when there is monitoring, this is technically biased. The lack of evaluation culture (ex ante, in itinere, and ex post) is to be overcome.

- There are risks in a joint discussion of very different measures (forestry, agriculture, SUDS, etc.).

Session 6 was intended to present some of the two main features / activities of the project: the knowledge base (task 1) and regional processes (task 2). For the latter, Heather Williams, from the NWRM Western Regional Network kindly delivered a presentation on the Western Workshop, held the week before in Brussels (Belgium).

Gloria de Paoli (ACTeon, Italy), presented the project-based tools that create the knowledge base of the project. The objectives of these tools are to develop a shared online knowledge base to allow common understanding and aggregation of knowledge on NWRM at EU level; to contribute to develop the sharing of good practices in designing, selecting and monitoring of NWRM; to establish a practical guide to allow the platform user to identify relevant information to implement NWRM.

The key components of the knowledge base are: a glossary (to gather concepts and their connections), four regional fora (to gather the expertise), and a catalogue of NWRM and case studies (to gather the knowledge on practical applications). This knowledge base is intended to be an analytical one, pooling the key recommendations for further (and better) use of NWRM and is closely linked to the development of practical guidance for different target groups.

Heather Williams (AMEC, UK), responsible for the coordination of the NWRM Western network and workshop (held in the previous week in Brussels), emphasised on the added value of regional networks and presented some experiences and key lessons drawn in the Western workshop.

It is clear that regional networks allow experts and practitioners in different fields to engage with each other; sharing experiences of NWRM implementation, including introducing the 'concept' of NWRM to those who know it by other names or apply it incidentally; understanding challenges and barriers to implementation; and realising that many drivers can lead to the same benefits, but that this alone may not encourage uptake of NWRM.

The Western workshop was a remarkable opportunity to realise the value of case studies to understand how measures are situated in the catchment and in relation to other measures, provide realism about the limits of effectiveness, information on time taken for implementation, and engagement with landowners and other stakeholders. Furthermore, these regional networks are critical to inform on how to make the best use of existing information (i.e. databases), to shed light on the purpose and benefits of NWRM and to be clear about demands from end-users.

Session 7 was intended to emphasise on some crosscutting issues, mainly socio-economic and institutional. A contribution from the Danube was included.

Although initially meant to touch on the biophysical effects of NWRM, the most significant value of the presentation by **Goran Gugic (Lonjsko Polje Nature Park Public Service, Croatia)** was the recognition of traditional knowledge on natural flood management.

The Sava river is a tributary to the Danube river (which brings some insights from a different European region), although the Central Sava river basin, where Lonjsko Polje is located, receives water from two rivers (Una and Kupa) which are thoroughly influenced by the Mediterranean climate region. Lonjsko Polje is a unique organically evolved landscape with a preserved medieval system of

the common pasturing typical of the whole of Central Europe until the 2nd half of the 19th century, as well as largest riparian hardwood forest ecosystem of the Western Palaearctic. Goran showed how water retention is linked to a wide array of benefits, ranging from flood management to biodiversity conservation.

Carlos M. Gómez (IMDEA, Spain) focused on one of the critical mainstreaming aspects of NWRM assessment: economic analysis.

There is a clear need to go beyond the project appraisal: NWRMs are good themselves because they serve to restore the environment and thus biophysical flows of ecosystems services it delivers. But, self-evidence of advantages tends to ignore the opportunity cost of the resources implied and the existence of alternatives that may serve the same purpose. Besides its rationality for nature restoration, NWRMs need to be judged against its potential contribution to other objectives as stated in the WFD, FD, Biodiversity, Climate Change Strategy, Drought and Scarcity Strategy, CAP...

Sometimes purely financial reasons are good enough – NWRMs might be cost-effective alternatives to attain particular objectives such as improving the status of water bodies, mitigating flood risks, etc. This can be illustrated by the NYC Green Infrastructure Plan (2012). A new challenge, though, is linked to the belief that costs other than pure financial ones may be more relevant in most of the cases:

- It is the case of non-recurring and recurring costs for regulators: these are associated with the set-up, administration and enforcement and monitoring of a new measure or a change in policy.
- It is also the case of cost savings: avoided water provision costs, avoided remediation costs (dredging, pest control, invasive species removal...)
- Non-water environmental costs/benefits including change in habitat, landscape, emissions to air, noise, etc. that may result from changes in land use (e.g. due to changes in agricultural practices or forestry).
- Wider economic effects: any knock-on effects that are passed on or through to other sectors, organizations, etc. This includes the effects on producers and consumers in related markets that are not captured by the estimation of direct non-recurring costs and recurring costs.

Carlos M. made it clear that NWRM cost advantages are better captured within integrated PoMs. The water-related benefits of NWRM might consist in the avoided costs of reaching the GES/GEP in the interconnected water bodies. Yet, incomplete cost-effectiveness analysis can lead to biased comparisons against a wider application of NWRM.

As important as setting the right incentives in place (something illustrated with a case study on flushing floods in the Lower Ebro river, in NE Spain), it is essential to avoid existing incentives making NWRMs nicer than they effectively are.

A critical question is that if in addition to water management NWRM serve many other purposes how should these measures be financed? Can payment for environmental services be based upon public information and *ex-post* evaluation?

On institutional grounds, the implementation of NWRM requires breaking up the institutional silos at all levels (EU, National and sub-national levels). Besides the purposes of water management NWRMs are outstanding opportunities for a better coordination of different sectoral policies including land planning, spatial development, rural development, agricultural policy, climate change adaptation,

etc. Cooperation between the private and the public sector, different areas are required to coordinate objectives and lower compliance costs through the simultaneous attainment of different policy objectives.

Furthermore, economic analysis not only highlights some critical institutional dimensions; it also evidences some information gaps to be bridged: evidence on effectiveness mostly refers to design conditions; few projects have been assessed in terms of its contribution to water policy objectives (many river restoration projects have also found no or minor ecological improvements; virtually all restoration project evaluations are restricted to a few years after restoration (e.g., 3-5 years), and significant uncertainties remain surrounding the long-term effects and sustainability of restoration measures (Feld et al., 2011); and the watershed and river network conditions must be more strongly considered.

Session 8 was intended to present one of the main outputs of the project (the practical guidance, task 3) and to show, in the discussion of a specific case study in northern Spain (internationally awarded) how this guidance could be of relevance. A final discussion and a wrap-up session to build consensus was also held to finish the event.

Another key output of the project is the practical guide, that aims at accompanying NWRM design and implementation, taking into account the (relative) "novelty" and diversity of NWRM, and responding to the wide range of contexts, objectives and challenges (WFD, FD, climate change adaptation...) in which they are developed. **Gloria de Paoli (ACTeon, Italy)** explained that this work progresses in parallel to building a collective knowledge and sharing practice and experience through regional processes.

The proposed draft structure for the guidance has three parts. The first part is devoted to the basics about NWRM implementation: what NWRM are, why to implement NWRM, how to design NWRM, which pre-conditions are needed for successful NWRM implementation, etc. The second part reviews and gathers specific experiences (fact sheets). Finally, the last part is focused on the tools: glossary, widening the knowledge base, and methods and tools. The guidance will combine text, quiz or multiple-choice questions, data and information from the different case studies, analytical results from the comparative assessments made between case studies, schematic diagrams, direct feedback and "share of experience" from practitioners, pictures to help understand "NWRM in practice", data sources, contact details of experts/ practitioners/organisations, etc.

Key questions that are still to be answered are related to the target audience of the guidance (WHO), the contents (WHAT), and the format (HOW).

The consortium is expected to take care of the practical and operational development of the guide (how "best" to do), complementing a CIS WG PoM policy document on NWRM, to connect it to the collective knowledge base, and to provide an electronic and paper version of the document (translated into EU languages

José Ignacio Santillán (Duero River Basin Authority, Spain), presented an awarded best practice in river restoration so as to illustrate how the guidance could be relevant for practitioners, especially for those involved in the second planning cycle for 2015.

Several river restoration measures have been carried out in the last 8 years in the Spanish part of the Duero River Basin: mainly, recovery of longitudinal continuity and improvement of lateral connectivity.

Longitudinal continuity interventions basically correspond to levelling of dams/longitudinal barriers. Lateral connectivity interventions correspond to several NWRM: floodplain reconnection and restoration, re-meandering, revitalisation of flowing waters, reconnection of hydraulic annexes, natural bank stabilisation, elimination of riverbank protection, afforestation of riparian areas, and riparian trees in agricultural landscape.

These measures aim at:

- Improving the hydro-morphological and quality conditions in water bodies (WFD)
- Controlling the increase in flood risk (Floods Directive)
- Improving water infiltration in alluvial areas (Groundwater Directive)
- Improving natural treatment capacity of water bodies [of receiving environment] (several directives in water quality)
- Fluvial ecosystem recovery (Nature Network 2000: Habitats and Birds Directives)

Particular attention was given to the Órbigo River Restoration Project (finalist in the 2013 European River Prize). In short, the project included the elimination rip-raps, removal levees and rip-raps, the movement of earth embankments away from the channel (levees set-back), secondary channels recovered, flood-prone areas recovered, and forestry works aimed at natural bank stabilization.

An **open discussion** yielded further insights from attendees:

- How to evaluate if a proposed case study deserves to be included in that database? What is the ideal entry for this database? Are we expecting individual measure or complex process with more than one measure? We need to go beyond the measure itself. In terms of the assessment of any case study that should be in the database, we have created an internal structure in the project that will look at the CS in a more analytical way instead of a more descriptive one.
- It is a good idea to have the regional clusters working together: in the Western cluster you work mostly with runoff attenuation, in the Mediterranean area there is clearly a problem of floods but also the challenge of droughts. There is a perception that buffer strips may not work in the Mediterranean, for instance, but the project should be able to collate evidence.
- How to define a scientific method to calculate the cost that you are going to avoid when you set up a NWRM upstream (for example for floods)? A single measure may not solve a problem. To date, many resources have been spent in repairing the damages, in emergency responses (i.e. current floods in the UK, drought events in Spain). This definitely calls for prevention.

- The format of the guidance, if the audience is going to be a policy-making community [comment was made by a national authority], should be a document with messages to take away. As agreed in the CIS WG PoM, it is critical to highlight the effectiveness of measures. PoM are not scientific programmes of measures. Measures have to be scientifically grounded but the focus should be more political and socio-economic.

- FP7 REFORM project is trying to produce indicators and they are focused on key processes. They can imagine indicators for water retention measures, i.e. effectiveness of removing barriers (sediment and water flows would be the indicator).

- Suggestions on the next steps of the project: it would be very useful to try and have different potential targets with different tools, using different 'languages' for different end users. It would be useful to give priority to critical factors hindering NWRM implementation…discussing single measures and involving stakeholders.

Wrapping up, **Gonzalo Delacámara (IMDEA, Spain)** suggested a few conclusions to the plenary:

- Public participation and a higher awareness among policy makers and the public is a must for a successful uptake and performance of NWRM.

- There's a clear need to build an explicit link with the WFD (and discussions about art. 5 are a fertile space for that).

- One may still find controversies about the typology of measures. The current typology will still be streamlined.

- The need to make the best use out of available information. Evdokia Achilleos (EC DG ENV) expressed from Brussels: "the project is 'meta analysing' and drawing from available knowledge and studies. The purpose at the end of the day is to have useful factsheets (and data) on the measures that can be used at different levels (policy implementation and technical)".

- Riparian issues did not receive much attention in the WFD but they did in the FD, the Birds or the Habitats Directive. All Directives need to be taken into account at the same time. Demand for a more complex (though not necessarily more complicated) approach.

- Combined benefits of NWRM are critical. The rationale for NWRM is mainly provided by their multiple objectives / benefits. Not only benefits are specific of NWRM – opportunity costs are.

- While it is acknowledged that case studies encompass a combination of measures, the possibility to extract (and store) some information on 'individual measures' (from case studies or from research studies that have specifically investigated a given measure) is one the project team is also committed to.

- 'Water bodies' (central to the WFD) might be hindering a good approach to NWRM, which clearly demands a less restrictive scope (and more relevance for hydromorphological issues),

including land-use concerns, spatial development, and biophysical flows of ecosystem services... with the catchment as the (likely) relevant scale.

- Being aware of trade-offs according to the local value of water.
- Evidence on effectiveness mostly refers to design conditions. Few projects assessed against their contribution to solve water policy objectives.
- The purposes of NWRM for water management are outstanding opportunities for a better coordination of different sectoral policies including spatial development, rural development, agricultural policy, and climate change adaptation...
- Subsidiarity should not be disregarded. The EC and the project consortium work on the development of guidance documents but Member States specificities and decisions are critical to the process.
- Despite the EU-wide nature of this project, regional diversity and the recognition of disparities and asymmetries is one of the main features of the project and its outputs.

Annex I - Workshop Agenda

MEDITERRANEAN NETWORK WORKSHOP AGENDA

PARADOR DE ALCALÁ DE HENARES http://goo.gl/t8WA4y | 28-29.01.2014

Colegios, 8, 28801 Alcalá de Henares, Madrid, Spain

Day 1 (28.01)

REGISTRATION & LUNCH > 13:00 -14:00

AGENDA | MENU	PRESENTATION	SPEAKER
SESSION 1: "APPETIZERS" (14:00 – 14:15)	Introductory session: setting the scene (project overview & workshop objectives)	Gonzalo Delacámara (IMDEA – NWRM Med Co-ordinator, ES)
SESSION 2: "TAPAS" (14:15 – 15:00) Chair: Gonzalo Delacámara (IMDEA, ES)	NWRM: the policy context	Lucía Bernal (EC DG ENV, ES)
	NWRM: the concepts & oft-claimed myths. Why natural? Why retention? What is the actual aim?	Carlos M. Gómez (IMDEA, ES)
ON THE TABLE (15:00 – 15:15)	Discussion	All participants
Break 1 (15:15 – 15:45)		
SESSION 3: "MAIN COURSES" (15:45 – 16:30) Chair: Maggie Kossida (IACO, GR)	Why are NWRMs needed? Key challenges in relation to flood risk management for joint WFD and FD implementation (including Med NWRM applications from the LIFE+ RESTORE project) NWRM app 1	Andrea Goltara (CIRF, IT) * Link to LIFE+ RESTORE partnership
	River and floodplain restoration – natural water retention for combined outcomes (flood risk management, improved eco-hydrological connectivity and recovery of priority river habitats) NWRM app 2	Fernando Magdaleno (CEDEX, ES)
ON THE TABLE (16:30 – 16:45)	Discussion	All participants of WGs
SESSION 4: "COOKING NWRM" (16:45 – 18:15) - Breakout groups -3 * 20-min presentations + 30-min discussion		
WG1: Forestry (Facilitator / rapporteur: Ayis Iacovides, IACO, CY)	Reforestation of the abandoned Asbestos Mine in the Amiantos Area, Cyprus NWRM app 3	Eleni Stylianopoulou (Environment Department, CY)

Where? Plenary room	Post-fire water retention management in Olympia, Greece NWRM app 4	Thanassis Bourletsikas (Inst. of Mediterranean Forest Ecosystems and Forest Products Technology, GR)
	Integrated characterization, requalification and monitoring of Mediterranean freshwater systems: the case of the Odelouca River, Portugal NWRM app 5	Samantha J. Hughes (UTAD, PT)
	Discussion	All WG1 participants
WG2: Agriculture (Facilitator / rapporteur: Maggie Kossida, IACO, GR) Where? CIFF room 1 (Directions will be provided)	Artificial recharge of tertiary treated sewage to the Ezousas Aquifer, Cyprus NWRM app 6	Antonis Antoniou (Water Development Department, CY)
	Water retention capacity of agricultural soils in Pinios River Basin in Central Greece NWRM app 7	Eleftherios Evaggelou (Hellenic Agricultural Org. - DEMETER, GR)
	Implementation and evaluation of the hydrological impact of green cover crops in olive orchards: a review of different experiences (Spain) NWRM app 8	José A. Gómez (IAS-CSIC, ES)
	Discussion	All WG2 participants
WG3: SUDS (Facilitator / rapporteur: Heather Williams, AMEC, UK) Where? CIFF room 2 (Directions will be provided)	Wetland systems for Combined Sewer Overflow on-site treatment NWRM app 9	Fabio Masi (IRIDRA, IT) * Link to IWA SG on Wetland Systems
	SUDS in Limassol, Cyprus NWRM app 10	Iacovos Papaiacovou (Sewerage Board of Limassol, CY)
	Discussion	All WG3 participants
Break 2 (18:15 – 18:30)		
SESSION 5: "DESSERT" (18:30 – 19:00) Chair: Gonzalo Delacámara	Brief reporting to the plenary and wrap-up discussion	All rapporteurs & all participants

CONFERENCE DINNER > 20:00 – RESTAURANTE SANTO TOMÁS

(MAIN RESTAURANT AT 'EL PARADOR' – YOUR HOTEL)

Day 2 (29.01)

AGENDA | MENU	PRESENTATION	SPEAKER
SESSION 6: "APPETIZERS" (9:30 – 10:10) Chair: Gonzalo Delacámara (IMDEA, ES)	Structure of the knowledge base: co-operative efforts	Gloria de Paoli (ACTeon, IT)
	The added value of regional networks: insights from the NWRM Western network	Heather Williams (AMEC – NWRM Western Co-ordinator, UK)
ON THE TABLE (10:10-10:30)	Discussion	All participants
Break 3 (10:30 – 10:50)		
SESSION 7: "MAIN COURSES" (10:50 – 11:35) Chair: Ayis Iacovides (IACO, CY)	Biophysical impacts of NWRM: how effective are they? (Lonjsko Polje Nature Park, Croatia) NWRM app 11	Goran Gugić (Lonjsko Polje Nature Park Public Service, HR) * Shared insights from the Danube and the Mediterranean
	Socio-economic aspects of NWRM implementation & some governance dimensions	Carlos M. Gómez (IMDEA, ES)
ON THE TABLE (11:35 – 12:00)	Discussion	All participants
Break 4 (12:00 – 12:30)		
SESSION 8: "DESSERT" (12:30 – 14:00) Chair: Gonzalo Delacámara	A practical guide on NWRM implementation	Facilitated session Gloria de Paoli (ACTeon, IT) Brief insights followed by questions to participants on their expectations, needs, etc.
	A glimpse on a specific experience: what would the guidance be useful for? NWRM app 12	Ignacio Rodríguez (Duero River Basin Authority, ES)
	Wrap-up session & final discussion	Gonzalo Delacámara & all participants

LUNCH & INFORMAL DEBRIEFING > 14:00 -15:00

Funded by

This initiative takes place in the framework of ''ENV.D.l/SER/2013/0010 "Pilot Project - Atmospheric Precipitation - Protection and efficient use of Fresh Water: Integration of Natural Water Retention Measures in River Basin Management" with the support of the European Commission, however it reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

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Acknowledgement (for breakout groups rooms)

Please contact us @ mediterranean@nwrm.eu

- Gonzalo Delacámara – NWRM Mediterranean Regional Co-ordinator for questions about the programme
- Estefanía Ibáñez for questions about the organization

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