European Commission

ONEMA
French national agency for water and aquatic environments

Science–policy interface in support of the water framework directive — CIS-SPI Activity report 2010–12

Research and Innovation

Science–policy interface in support of the water framework directive — CIS-SPI Activity report 2010–12

Research and Innovation

Europe Direct is a service to help you find answers to your questions about the European Union.
Freephone number (*):

00 800 6 7 8 9 10 11

(*) Certain mobile telephone operators do not allow access to 00 800 numbers or these calls may be billed.

Cataloguing data can be found at the end of this publication.

Luxembourg: Publications Office of the European Union, 2013

ISBN 978-92-79-25181-8

doi:10.2777/35629

Printed in Luxembourg

PRINTED ON RECYCLED PAPER

Science–policy interface in support of the water framework directive — CIS-SPI Activity report 2010–12

Authors

Frédérique Martini — French National Agency for Water and Aquatic Environments (ONEMA) — frederique.martini@onema.fr

Christos Fragakis — European Commission, DG Research and Innovation — christos.fragakis@ec.europa.eu

Michel Schouppe — European Commission, DG Research and Innovation — michel.schouppe@ec.europa.eu

Natacha Amorsi — International Office for Water (OIEau) — natacha.amorsi@oieau.fr

Kinga Gergely — ONEMA — kinga.gergely@onema.fr

Contacts

ONEMA: ***Frédérique Martini*** — *frederique.martini@onema.fr*

DG Research and Innovation: ***Christos Fragakis*** — *christos.fragakis@ec.europa.eu*

Other contributors

SPI correspondents: ***Robert Kase*** *(Swiss Centre for Applied Ecotoxicology — Eawag, Switzerland),* ***Giuseppina Monacelli*** *(ISPRA, Italy),* ***Yorick Reyjol*** *(ONEMA, France),* ***Robert Ward*** *(British Geological Survey, United Kingdom)*

Executive summary

In December 2009, the water directors of the European Union established an ad hoc activity on the water science–policy interface (CIS-SPI) under the common implementation strategy (CIS) of the water framework directive (WFD). The CIS-SPI activity aims to establish working relationships among research projects and WFD implementers. It has been jointly led by the European Commission (DG Research and Innovation) and the French National Agency for Water and Aquatic Environments (ONEMA) and has worked in close connection with the CIS working groups (WGs) and expert groups (EGs) through the SPI correspondents nominated by each CIS group and some European countries.

In the period 2010–12, this activity achieved several results and delivered various outputs that have been made available to the CIS groups, the Strategic Coordination Group (SCG), the water directors and the research-funding bodies. They have all been made available on the Communication and Information Resource Centre for Administrations, Businesses and Citizens (CIRCABC).

All of the results achieved may be sorted under six main results and summarised as follows.

1 Establishment of an SPI network in support of the CIS

The work undertaken by the CIS-SPI and the results achieved relied on a so-called SPI community which expanded over the years. This SPI community consisted of SPI correspondents from either the CIS groups or Member State representatives. It has been enlarged by including SPI-related projects and experts.

The purpose of this community was to contribute to the implementation of the various CIS-SPI tasks, in line with the mandate, and to contribute to demonstrating the applicability of SPI practices. This community, in particular the correspondents, worked on this activity on a best-effort basis on top of their usual work without recognition of their involvement.

This has also been achieved by relying on some tools, such as WISE-RTD ([1]) and the European water community ([2]), which deserve to be maintained in the future as they support the viability of science–policy interface practices.

2 Prioritised research needs expressed by the CIS groups

Thanks to a dedicated workshop (first CIS-SPI event 'Water science meets policy' — September 2010) followed by a long and systematic exercise undertaken with the CIS groups, a final list of prioritised research needs was drawn up and passed on to the research-funding organisa-

1 The water knowledge portal integrates information and results of relevant research projects in a unique location and makes it available to potential users (http://www.wise-rtd.info; contact: Guido Vaes, WISE-RTD Association, info@wise-rtd.org).

2 A virtual platform offering a dedicated social tool aiming at gathering people involved in IWRM-Net (FP6 ERA-Net project, 2006–10; coordinator: n.amorsi@oieau.fr, OIEau; aims to develop transnational research) (http://europeanwatercommunity.eu).

tions for possible uptake in their programming. The main outcome of this exercise consists of a validated list of research needs arising from the water policy side represented by the CIS groups. This list comprises around 10 top priorities for each group of the CIS, totalling about 59 water priorities altogether (see final exhaustive list in Annex II).

One must recognise that the activity encountered some difficulties throughout the process of finalising these prioritised lists of CIS needs. These difficulties were mainly due to time constraints faced by the participants and also, to a lesser extent, to some shortcomings in the applied methodology. Despite the elaboration by the CIS-SPI activity of a unique questionnaire approach, the approaches used and the time needed by the various CIS groups for the validation of prioritised research needs varied greatly between the groups. Whilst this variability in the approaches is a positive asset of the exercise since it provides a much broader framework of analysis regarding practices, the lengthy response delays made it difficult for the CIS-SPI activity to finalise the outputs and deliver them to programme funders and implementers in a timely manner. Moreover, the prioritised research needs proved to be evolving along the process. Nevertheless, this documented approach enabled a good identification and dissemination of knowledge and needs among the CIS groups.

It appears that the method of prioritising research needs via standard questionnaires needs to be revisited to improve its efficiency and timeliness, especially if conducted and updated on a more regular basis.

3 Mapping of existing research knowledge and initiatives of relevance to the CIS

Against the background of the list of top-priority research needs established by the CIS groups, a mapping of existing knowledge for each priority research issue was carried out on the basis of existing European and national projects. Some scientific syntheses have also been established by some groups. The outcome of this exercise was passed on to the CIS groups for their uptake and is available on CIRCABC. This mapping is presented in full in Annex III.

From this stage of the work, it appeared that the large majority of research needs identified by the CIS groups are at least partially covered by one or several research projects, publications or past or ongoing projects. This shows that new knowledge relevant to implementation of the WFD is being produced. Another observation is that some research needs identified by the CIS groups were deemed too vague to allow for a precise identification of relevant projects or research results addressing them.

This result demonstrates that, although available, a substantial amount of existing research outcomes are inadequately taken up by policymakers and even fewer are transferred to the basin level or the policy implementers. The outcomes are not reaching policy implementation and are not being adequately appropriated by the CIS groups.

Also, the wording of research needs as expressed by policymakers may sometimes not be precise enough to be usefully taken on board by the research community.

Therefore, to improve this situation, two tracks are proposed to be investigated in the future:

- to promote a continuous survey of research results and outputs and the sharing and transfer of related outputs to CIS groups to enable them to take these results on board in drafting their guidance documents, or to fast-track them to the appropriate policy implementation level (national, river basin, etc.);
- to better translate policy needs expressed by CIS groups into more precise research questions to be taken up by the research community, and also allow for a better definition of research gaps.

4 Prioritised research gaps

From the matching exercise between research needs expressed by the CIS and the mapping

of available knowledge, it was concluded that most priority research needs identified by the CIS groups are already partially covered by one or several existing research projects and there are relatively few real research gaps remaining.

An outline of the identified research gaps is presented in Annex IV.

The results of this exercise consist of identified research gaps that can then be communicated to the various research-funding organisations for their consideration in drafting and finalising their future research programmes (e.g. DG Research and Innovation, joint programming initiative (JPI) on water).

In addition, WG A and WG E were also able to generate specific SPI reports in 2012 for an improved information exchange within and outside their WGs.

5 A series of SPI events to improve dialogue between the science and policy communities

The series of CIS-SPI events, 'Water science meets policy', was a great opportunity to gather scientists and policymakers to jointly reflect on key questions and come up with recommendations.

Three events were organised in the period 2010–12.

The first one, held in September 2010, focused on the identification of research needs associated with the implementation of the WFD, its daughter directives and the floods directive. Its outcomes served as the basis for the other tasks that are described above. The report of this first event is available on CIRCABC and http://www.onema.fr/IMG/EV/EV/plus/wsmp_report.pdf.

The second event, held in September 2011, dealt with 'Implementation of the WFD: When ecosystem services come into play'. This was the occasion to share and transfer knowledge related to the use of the ecosystem services approach in the context of the implementation of these directives. The resulting report is publicly available on CIRCABC and http://www.onema.fr/IMG/EV/meetings/ecosystem-services.pdf.

The third and last annual event, entitled: 'Water science meets policy: How to streamline knowledge to address WFD challenges?', took place on 14–15 November 2012. It focused on how to improve the transfer and usability of the research outputs and promote knowledge-brokering practices as well as the operational structures needed to be put in place to streamline their implementation. This report is expected to be finalised by September 2013. The main recommendation relates to moving from an ad hoc SPI activity within the CIS structure towards a working principle of the CIS work programme. SPI activities in the CIS structure should rely on an SPI network consisting of committed people acting as knowledge brokers and having this task in their agreed mandate. The SPI should involve all three levels — European, national and river basin — and should enhance the uptake of research outputs at the river basin level. Appropriate tools for knowledge transfer should be either enhanced or developed.

In addition to the abovementioned annual events, an ad hoc SPI meeting was organised back to back with the meeting of the SCG of the CIS in November 2011. The purpose was to inform the SCG directly through a live 'policy briefing' about project outputs with relevance to the CIS topics. Although there is still scope to improve events of this nature in the future in order to enhance their usefulness, this exercise was highly appreciated by both the research participants and the SCG members. However, further reflection will be necessary to come up with the most appropriate format for events of this kind that would best fit the needs of the SCG.

Last but not least, as was clearly demonstrated by a thematic workshop organised by the expert group on water scarcity and drought in 2011, such thematic workshops can be extremely useful to gather policymakers and scientists to address a particular implementation question.

6 Policy briefs and other pilots for improving transfer and usability of research outputs

The CIS-SPI has also achieved the gathering and publication of 23 policy briefs that are available on CIRCABC: public library, framework_directive > thematic_documents > relevant_research > science-policy_briefs.

Following an analysis of these policy briefs, it is recommended to promote a unique policy brief format for EU-funded projects and request projects to deliver briefs in their early as well as final phases to promote awareness about the project's objectives and disseminate the final results. The aim is to improve the knowledge base of policymakers and practitioners. The activity has proposed guidelines for policy briefs that were adapted to the CIS groups (see Annex V for a full example).

7 Conclusions and recommendations for the future

Decision-makers are increasingly calling for scientific evidence to support them in policy-making. Practitioners are asking for science-based guidance for the formulation of cost-effective management measures in compliance with legislation.

As demonstrated by the CIS-SPI activity 2010–12, a sustainable science–policy interface within the common implementation strategy of the water framework directive could, if properly implemented, secure the uptake of research outcomes and therefore better knowledge-based decisions throughout the policy cycle (from policy design to implementation, monitoring and review).

Although still of an experimental nature, the rich diversity of SPI approaches within the CIS has been brought to the surface through this CIS-SPI activity. It also became evident that there is still scope for further improvements of these approaches through cross-group exchanges, benchmarking, fine-tuning and upscaling to further strengthen and promote a more sustainable SPI activity at the EU level.

Based on the experience gained during this 3-year mandate of an ad hoc experimental CIS-SPI activity, several recommendations may be drawn for the future which would be valuable if a continuous science–policy interface were to be implemented in the context of the CIS.

Recommendation 1: move from an ad hoc SPI activity towards a more sustainable and systematic one; this needs to rely on sustained, dedicated, appropriately resourced and trained people acting as SPI correspondents (such as knowledge brokers) having this activity in their agendas and mandates and thus avoiding potential conflicts of interest between time management and other tasks. Knowledge brokering has to be recognised and rewarded to promote the emergence of skilled experts; the availability of budget/resources for knowledge brokering may help. By adopting these new approaches, one can expect a significant improvement in the current situation which is based on the best efforts of a very few people already overloaded with other tasks; this would add significantly to the effectiveness of the process.

Recommendation 2: adopt the SPI as a pervasive CIS working principle and mainstream the SPI objectives and methodologies across all levels of the CIS in order to improve efficiency and consolidate today's very diverse SPI approaches by the CIS groups. Improve the active knowledge exchange directly within the CIS groups by making an efficient use of internal and external expertise on a needs-oriented basis. This could include formalising the requirement for CIS-SPI activities in each CIS WG by requiring the mandates to specify this. A successful trust-building in a continuous SPI activity could significantly improve participation at all levels as well as increasing SPI involvement from all Member States.

Recommendation 3: enhance the transfer and sharing of knowledge and experience focusing on CIS themes, in particular at the river basin level, test various tools and methods to

facilitate this transfer in close connection with CIS experts, develop and promote guidance for the concrete transfer of knowledge resulting from EU and national R & D projects, and agree on repositories and invent alert systems to reach policymakers and implementers from the EU to the catchment scale.

Recommendation 4: consolidate and implement a methodology for a regular and more frequent mapping of research and the prioritisation of research gaps to regularly feed into research call programming at EU and national or regional levels.

Recommendation 5: develop an 'archive' of successful past projects, by making information included on specialised project websites available even after the termination of the projects.

Recommendation 6: internationalise the CIS-SPI experience in connection with the SPI elements of the ministerial declaration resulting from the Sixth World Water Forum (WWF6).

Recommendation 7: explore the possibility for a new follow-up CIS activity on guidance for applying an ecosystem services approach (ESA) in support of the implementation of the WFD.

Introduction

The need for a sustainable science–policy interface (SPI) in support of water policies has been discussed for some years within the framework of the water framework directive (WFD) and related FP projects.

As a follow up, a preliminary activity was initiated on 24–25 November 2008 in Paris (France) with voluntary countries, stakeholders and the participation of the European Commission (DG Research and Innovation), aiming to investigate ways to establish an SPI mechanism making it possible to identify research gaps, ensure an effective communication and transfer of scientific information and help to highlight opportunities for demonstrating applicability at river basin level as well as helping WFD implementers to identify practical research needs to be communicated to RTD funding organisations for possible consideration.

Based on this work, the water directors of the European Union established at the end of 2009 an ad hoc activity on the water SPI under the common implementation strategy (CIS) of the WFD. In line with the 3-year mandate covering the period 2010–12, the CIS-SPI activity aims, through the establishment of close working relationships among research projects and WFD implementers, to implement the following three tasks:

- Task 1: inventory of research and implementation needs from CIS groups;
- Task 2: identification of available research and research gaps;
- Task 3: improvement of transfer and usability of research outputs.

This activity has been jointly led by the European Commission (DG Research and Innovation) and the French National Agency for Water and Aquatic Environments (ONEMA) and has been implemented in close connection with the CIS groups through their nominated 'SPI correspondents'. Reports on the progress achieved were made regularly to the Strategic Coordination Group (SCG) and the Water Directors' Group with a request for endorsement and guidance of the proposed future plans and actions.

The document at hand provides an extended report regarding the implementation of this activity over the last 3 years and the main outcomes of each task. It is structured around the six main results of this activity:

1. elaboration of an SPI network in support of the CIS;
2. prioritised research needs expressed by the CIS groups;
3. mapping of existing research knowledge and initiatives of relevance to the CIS;
4. prioritised research gaps;
5. a series of three annual SPI events to improve dialogue between the science and policy communities;
6. policy briefs and other pilots for improving the transfer and usability of research outputs.

Some salient points regarding the management of the CIS-SPI activity are also provided as well as some recommendations for the future.

This report is targeted specifically at the European water directors who established this activity in the first place. It has a restricted dissemination level.

Main results and deliverables

Achievement of the three tasks attributed to the CIS-SPI led to several results that may be classified as follows.

Result 1: Elaboration of an SPI network in support of the CIS

AN SPI NETWORK

The CIS-SPI activity has relied on a CIS-SPI network which has been progressively expanded over the period 2010–12. This network consisted of a core group gathering the CIS groups' SPI correspondents: all CIS working groups (WGs) and expert groups (EGs) were invited to nominate an SPI correspondent before 10 December 2010. The Member States which were not already part of the activity through the SPI correspondents had the opportunity to nominate focal points to take part in this CIS-SPI core group. Three Member States (water directors) designated their representatives for this activity.

In addition to this core group, some European projects or initiatives with a close connection to the CIS-SPI objectives were part of the enlarged network. The contribution of this enlarged group was mainly to participate in the annual SPI events. These events provided an opportunity to share views among participating Member States, the scientific community and CIS groups on the CIS-SPI activity.

By also including several seventh framework programme (FP7) SPI-related projects such as WaterDiss, Step-Wise and STREAM, or PSI-Connect, AWARE and Noviwam, in the end a large community of SPI practices was set up.

TOOLS AND PORTAL

The CIS-SPI activity has been supported by the following.

- The **European water community** (EWC), a virtual platform offering a dedicated social network (http://europeanwatercommunity.eu) aiming at gathering people involved in IWRM-Net (FP6 ERA-Net project, 2006–10; coordinator: n.amorsi@oieau.fr, OIEau; aiming at developing transnational research).

  The science–policy interface was one key component of the IWRM-Net method during the different stages of the research cycle, from the research identification to the results dissemination. In this context, the EWC aims at providing an appropriate platform for water stakeholders (managers, researchers, policymakers and implementers, etc. — 420 members and many discussion groups) to exchange ideas about needs and share information about existing and forthcoming solutions for water management.
- The **WISE-RTD water knowledge portal** (http://www.wise-rtd.info; contact: Guido Vaes, WISE-RTD Association, info@wise-rtd.org) integrates information and results of relevant research projects in a unique location and makes it available to potential users. The intention is to ensure that information is not lost and remains accessible to potential users even after the termination of the research projects.

  WISE-RTD connects policymakers with research project outcomes and results. It

will soon extend to industry. It contains more than 1 000 EU projects and guides policy implementers through easy-to-use searches to relevant research experiences based on all EU water directives and the US Clean Water Act. It also offers e-learning programmes for the three targeted stakeholders: policy-makers, researchers and industry.

Both mechanisms/tools demonstrated the added value of the SPI in support of the implementation of the WFD and the need for its further enhancement.

SESSIONS ON THE SPI

In addition, the CIS-SPI activity has been presented at dedicated SPI sessions in several international forums during which the value of the SPI was assessed and its applicability demonstrated with some practical examples. A non-exhaustive list of such outreach events is as follows:

- Sixth World Water Forum — dedicated SPI session (14 March 2012) http://worldwaterforum6.spisession.oieau.fr/index.html
- Green Week 2012 — dedicated SPI session (24 May 2012) http://ec.europa.eu/environment/greenweek2012/sessions/28-trickle-down-effect-science-and-evidence-based-environmental-policy-making-part-iin-part.html
- The United Nations University Institute for Water, Environment and Health (UNU-INWEH) K* conference dedicated to knowledge brokering (24–27 April 2012) http://www.inweh.unu.edu/River/KnowledgeManagement/Kstar2012.htm
- PSI-Connect workshop (20 April 2012).

DG Research and Innovation helped connect the CIS-SPI with the FP7 SPI cluster consisting of three FP7 projects dealing with science–policy interfacing in water management: STREAM, WaterDiss2.0 and Step-wise (http://www.spi-water.eu/index.cgi?s_id=76). This proved to be a useful additional pool of resources and expertise to help advance the CIS-SPI activity.

MAIN LESSONS LEARNT

Gathering and connecting initiatives related to the SPI is useful to enforce this working principle and make it part of the water management landscape.

If the CIS-SPI initiative is to be continued, it is essential that more effort and resources are dedicated in the future to improving the visibility of the initiative to ensure that it will be of benefit to and also draw benefit from a much broader community of users through sharing experiences. This will also contribute greatly to consolidating a European SPI community and promoting effective SPI practices. To this end, an appropriate communication strategy through, among others, a dedicated website and portal will need to be elaborated and implemented. Visible, virtual places (websites) on which tools and recommendations related to SPI can be found are very much needed.

Result 2: Prioritised research needs expressed by the CIS groups

ESTABLISHING A PRIORITISED LIST

The first milestone for the establishment of a list of prioritised research needs was the organisation of the first CIS-SPI event which was held on 30 September 2010 in Brussels, addressing policymakers, researchers and stakeholders (http://www.onema.fr/IMG/EV/cat1a-13.html). The nine parallel round tables organised at this event were aligned on the water themes addressed by the CIS groups ([3]) and on cross-cutting issues ([4]); they aimed to validate the research needs and identify the research and development gaps in relation to the implementation of the WFD.

Altogether, 59 research areas (representing about 180 specific research issues) were highlighted (for details, see the CIS-SPI first event

3 Ecological status, chemical aspects, groundwater, floods, water scarcity and droughts, WFD and agriculture, and hydromorphology.

4 Socioeconomics, integrated river basin management plans/management and dissemination.

report at http://www.onema.fr/IMG/EV/EV/plus/wsmp_report.pdf).

Moreover, the necessity to identify priority research needs was acknowledged. To obtain this prioritisation, a double-checking and updating of tasks was carried out with the CIS groups by SPI correspondents. The process relied on several ad hoc questionnaires and various methods chosen by the SPI correspondents in function of the specific needs of each group (see Annex I).

The methodology consisted of aggregating all SPI questionnaires with the objective of identifying around 10 research priorities for each CIS group and scoring them accordingly with regard to their priority (P), urgency (U) and knowledge (K). Respondents could also provide references and comments on the research needs and identify possible new research needs. In order to analyse the results of all SPI questionnaires and prioritise the research needs, a common approach was needed. The basic method was based on the common scoring system used in the SPI questionnaire. The approach was based on the arithmetic mean of the priority score. The values were then ranked and only the values ranked 1 to 10 were kept. The scores obtained were then used for the prioritisation.

This exercise resulted in a more precise list, comprising around 10 priorities for each CIS group (see the final exhaustive list in Annex II).

Difficulties related to the finalisation of prioritised lists of CIS needs were encountered throughout the process. Despite the elaboration by the CIS-SPI activity of a unique questionnaire approach, the approaches used and the time needed by the various CIS groups for the validation varied greatly. Whilst this variability is a positive asset of the exercise (since it provides a much broader framework for analysis regarding practices), the delays in responding made it difficult for the CIS-SPI activity to finalise the outputs and deliver them to programme funders and implementers in a timely manner. Moreover, the prioritised research needs proved to be evolving during the process, making it difficult to produce a stable list.

UPTAKE BY EUROPEAN FUNDING ORGANISATIONS AND MECHANISMS

The list of research needs was given to the European Commission to serve as an input in its elaboration of future research programmes. It is worth pointing out that several of the needs identified within the CIS-SPI activity were taken up in subsequent FP7 calls under the environment theme (including climate change). Identified needs also served as an additional input to DG Environment at the time when the blueprint to safeguard Europe's water resources was being developed.

By being part of the Stakeholder Advisory Group of the joint programming initiative (JPI) 'Water challenges for a changing world', the CIS-SPI activity had the opportunity to give the list of identified research needs to this initiative and feed into the JPI's process for the elaboration of its strategic research agenda.

The second CIS-SPI event focused on the ecosystem services approach (ESA) (see Result 5 below). One of the recommendations that emerged from this event was that the possibility to set up a CIS activity related to the implementation of the ESA for the WFD in line with the blueprint should be explored.

The CIS-SPI has also contributed to the European innovation partnership for water (EIP water), facilitated by DG Environment. The intention here is to make the link between the innovation agenda and the need for new technical knowledge of the WFD implementers and pass on the priority research needs arising from the CIS-SPI work to the EIP water.

MAIN LESSONS LEARNT

The exercise of prioritising research needs by the CIS groups can constitute a reliable source of information for research-funding organisations to make European research more policy sensitive and orient it towards the implementation needs of the WFD. To do so, the CIS groups must be in a position to allocate adequate resources to it

and address it as a core issue of their mandate. This does not seem to be the case currently, despite the good will and eagerness of the CIS groups' members, who were obliged to carry out the SPI-related tasks on a best-effort basis and on top of their existing workload. As a result, the timing and quality aspects of the prioritisation exercise were somewhat hampered.

The fact that research needs will evolve along with the implementation of the WFD and as new knowledge comes through implies that the exercise of prioritising the CIS groups' research needs to be repeated at regular intervals to allow for a proper updating and dissemination.

Furthermore, it is recommended that cross-cutting themes, such as climate change, should be examined jointly by the various CIS thematic groups since its impacts bear consequences for the work of these groups. The development of a structured approach to identify, classify and prioritise research needs would allow better information sharing, to the benefit of the future needs of end-users.

Future activities should comprise a continuous survey, an information system for gathering and sharing information and mechanisms for the dissemination of results and outputs. This structured approach requires implementing SPI methods within each CIS group which are supported by a CIS-SPI transversal coordination activity.

Although the method of prioritising research needs via standard questionnaires proved useful in some WGs and enabled a good identification and dissemination of knowledge and needs among the CIS groups, it has to be improved for efficiency and timeliness, especially if conducted and updated on a more regular basis.

Result 3: Mapping of existing research knowledge and initiatives of relevance to the CIS

Based on this prioritised list of research needs, a systematic overview of existing EU and, to a lesser extent, nationally funded research projects has been undertaken to identify research gaps. For each priority research need, an inventory and an analysis of the past or ongoing EU or nationally funded research was undertaken to identify whether the needs are, at least partially, covered.

SOURCES OF INFORMATION AND GENERAL METHODOLOGY

Various sources of information and research undertaken in different contexts were used for the analysis. The types of projects considered in the analysis were the following:

- FP6 and FP7 water-related projects;
- some projects identified by the CIS groups;
- a tentative mapping undertaken by the Euraqua network comprising national projects likely to cover CIS groups' research needs;
- a partial mapping ([5]) of European research and development in the field of water carried out by the International Office for Water and used for this exercise.

In addition, the documents produced through the surveys undertaken by some CIS groups were used for this investigation, together with data from CORDIS and a partial mapping of research and development in the field of water in Europe undertaken by the International Office for Water in the context of the development of the joint programming initiative (JPI) in the field of water.

Contributions to the mapping of existing projects were also made by the following.

- The WaterDiss2.0 project consortium used the research needs collected during the first CIS-SPI event to classify the 60 most CIS-relevant water-related projects funded by FP6 or FP7. During the following phase, a selection of 40 coordinators identified in

5 The context of the research was analysed in seven Member States (Germany, Spain, France, the Netherlands, Portugal, Sweden and the United Kingdom).

close relation with DG Research and Innovation project officers were contacted through a questionnaire in order to check the relevance of their project to the prioritised list of topics and to get their feedback about the availability of relevant knowledge and research outputs. On the dashboard used to combine all information for each of the 60 projects, at least one research output is identified and its main characteristics described.

- A 10-year mapping of EU-funded water projects according to the topics of each CIS working group covering all FP6/FP7 themes and types of instruments (from collaborative projects (CPs) to specific international collaboration actions (SICAs) and supporting actions (SAs), from environment to infrastructure, European Research Council (ERC) and mobility of researchers) conducted by DG Research and Innovation (available from http://ec.europa.eu/research/environment/index_en.cfm?pg=publications).

WG A AND WG E METHODS

The mapping exercise was also undertaken specifically by two CIS groups using their own methods, developed on the basis of the working principles chosen by the group and its SPI correspondent.

That led to two separate and comprehensive reports that can be found on CIRCABC in the group of interest 'Implementing the water framework directive', SPI folder in the working group and expert group folder, here.

- WG A studied the level of knowledge for each of the 10 priority topics. It produced an extensive synthesis report showing the available literature and level of knowledge for 10 top priorities.
- WG E noted that most of the topics with the highest research needs also have good knowledge availability. The group managed to compile available knowledge which will be made accessible on CIRCABC (see https://circabc.europa.eu/w/browse/5bf63ff3-b24b-4365-8a57-38e4d56b941c).

OUTCOMES AND LESSONS LEARNT

The detailed results of this mapping exercise are presented in Annex III through tables gathering the available literature and projects for each issue identified by the CIS groups.

The exercise demonstrated a need to improve the identification of ongoing and past research projects and results, and associated documentation, including where possible the identification of tools and other outputs useful for end-users.

The 'mismatches' identified from this analysis clearly point to the fact that a substantial amount of existing and state-of-the-art research knowledge is not finding its way through to the policy implementation and is not being adequately appropriated by the CIS groups.

This underlines again to stress that a better use of the available knowledge would:

- prevent duplication and redundancy in research, therefore allowing for cost savings in the future;
- focus research resources and expertise more on unresolved issues and real needs.

It is also important that the wording of research needs expressed by policymakers is precisely stated to allow for a more precise guidance to the relevant research outputs.

Therefore, to improve the situation it is worth investigating three tracks in the future:

- to promote a continuous survey of research results and outputs and the sharing and transfer of related outputs to CIS groups to enable them to take these results on board in drafting their guidance documents, as well as to enable the groups to fast-track them to the appropriate policy implementation level at the national level (national, river basin, etc.);
- to better translate policy needs expressed by CIS groups into more precise research questions to be taken up by the research community, and also allow for a better definition of research gaps;

- to involve policymakers and regulators directly in the project and the research prioritisation process with a view to steering the projects towards addressing policy needs and rendering research programmes more policy relevant; this will also facilitate a continuous information exchange between involved stakeholders, regulators and scientists.

These three actions require the information to be presented in an appropriate way following specific templates defined according to the targeted audience (see Result 6 — Recommendation from the CIS–SPI on the policy briefs' template).

In addition, an SPI activity may support the organisation of efficient knowledge exchanges and stimulate needs-oriented information generation.

Result 4: Prioritised research gaps

The analysis of research gaps was based on the mapping of existing research projects and the material provided sometimes by the groups.

METHOD

Assessing whether the priority research needs are fully covered would require a specific investigation by research expert(s) for each issue. However, based on the available information (issue-specific comments, literature and projects), the following assumptions were used to identify the level of coverage of research issues identified by each CIS group against the backdrop of available knowledge.

- The absence of cited projects or literature demonstrates a research gap: additional research is probably necessary.
- The presence of projects or literature shows that the issue is at least partially covered: further investigation on this research issue would benefit from the existing projects and literature.

Some gaps are identified when a specific priority research need is not at all covered by the collected information. It remains, however, possible that some of the identified research gaps may be covered by national or regional projects not identified in the mapping exercise at that stage.

RESULTS AND LESSONS LEARNT

An outline of the level of coverage of research needs by available knowledge and the resulting research gaps is presented in Annex IV.

This exercise shows that most priority research needs identified by the CIS groups are already covered to a certain degree by one or several existing research projects. They can be covered by publications, showing an appropriate level of maturity, or by projects elaborating new relevant knowledge. During this exercise, some research issues were also deemed too vague to allow for a precise identification of relevant projects or research results addressing them.

If continued, the CIS-SPI activity could reinforce a cross-thematic approach throughout the research needs prioritised by each of the CIS groups. This could stimulate exchanges between the CIS groups on transversal approaches such as climate change.

The results of this exercise consist of identified research gaps that can then be communicated to various research-funding organisations for their consideration in drafting and finalising their future research programmes (e.g. DG Research and Innovation and the JPI on water).

Result 5: A series of SPI events to improve dialogue between the science and policy communities

In order to improve the transfer and usability of research outputs, three CIS-SPI events entitled 'Water science meets policy' have been organised on a yearly basis.

The first event, organised in 2010, mainly helped to identify the research needs as described and addressed in previous parts of this report. The second event was more focused on the specific issue of the ecosystem services approach in the context of the WFD implementation, while the third event aimed at addressing the mechanisms identifying the factors and facilitators for improving the knowledge transfer

and the interfacing between science and policy themselves.

In addition, the CIS-SPI activity contributed to some other events or experiences of knowledge transfer organised to enhance the usability of research outputs.

FIRST CIS-SPI EVENT: IDENTIFICATION OF RESEARCH NEEDS ASSOCIATED WITH THE IMPLEMENTATION OF THE WFD

Besides identifying research needs, the first CIS-SPI event (report: http://www.onema.fr/IMG/EV/EV/plus/wsmp_report.pdf), held in 2010, focused on the analysis of research result dissemination and proposed improved ways to ensure an effective transfer of scientific knowledge towards WFD end-users.

A great number of recommendations were made towards a better transfer of research results. They included, amongst others, the development of a topic- and audience-specific dissemination network, the more systematic use of the CIS-SPI format for policy briefs, the promotion of WISE-RTD and the support of networks of demonstration projects to share experiences and case studies on practical applications.

Conclusions drawn on this occasion highlighted the need to move away from a sectoral vision to a more holistic approach and recognised that the inadequate dissemination of available research outputs is the major barrier to a better identification of research gaps.

It was recommended that this type of be repeated.

SECOND CIS-SPI EVENT: WFD IMPLEMENTATION WHEN THE ECOSYSTEM SERVICES APPROACH COMES INTO PLAY

Since the first CIS-SPI event had identified the role of ecosystem services as an outstanding cross-cutting issue for the implementation of the WFD, their operationalisation in the implementation of the WFD ecosystem services approach was decided as the focus of the second CIS-SPI event (29–30 September 2011) (report: http://www.onema.fr/IMG/EV/meetings/ecosystem-services.pdf).

This second CIS-SPI event gathered policy-makers and scientists in order to exchange views about the links between the ecosystem services concept and the WFD. The plenary session dealt with the concept of the ESA, while the round tables discussed specific case studies where the ESA had been tested in relation to water quantity and quality management, and hydromorphology.

The round tables made three recommendations in the field of improving the transfer and usability of research outputs.

1. In order to develop operational tools for better planning and operational frameworks which break out from silos, practical methods for valuation should be provided, conditions for increased public participation, awareness and decision-making should be created and more diverse ESA case studies are needed.
2. Further knowledge management efforts are necessary to compile existing experiences and generate lessons learned on water-related ecosystem services gained from the numerous Interreg and LIFE projects.
3. The planning of environmental education programmes and awareness-raising tools on aquatic ecosystem services and their importance for human well-being seem to be essential to raise awareness.

Feedback provided by the workshop participants clearly indicated a need to develop guidelines on ecosystem services application to the WFD implementation. A way to achieve this could be by setting up a temporary activity within the common implementation strategy (CIS) to develop operational guidelines for the ESA and to promote their implementation in the second river basin management plans (RBMPs). This work could be linked to the blueprint to safeguard Europe's water resources in a timely manner, as

well as to the work of the EU biodiversity strategy common implementation framework (CIF) which is tasked with developing tools for ecosystem services mapping and assessment.

THIRD CIS-SPI EVENT: HOW TO STREAMLINE KNOWLEDGE TO ADDRESS WFD CHALLENGES

The third CIS-SPI event (14–15 November 2012) focused on how to improve the transfer and usability of the research outputs and promote knowledge-brokering practices and operational structures to streamline their implementation. Based on 'SPI success stories' in the water sector, worldwide and at European, national and river basin levels, and their strengths and weaknesses, the workshop had three main objectives:

1. to demonstrate the added value of a science–policy interface: success stories in the water sector regarding SPI activities worldwide and at European, national and river basin levels;
2. to elaborate on structures, mechanisms and actors to ensure an active, continuous, dynamic and sustainable science–policy interface in the CIS context;
3. to investigate methods and tools for knowledge brokering and 'customisation' of the information to address the users' needs at the various levels (EU, national, river basin), including cross-scaling issues, and realistic ways of addressing them within the current CIS structure.

The parallel round table sessions allowed elaboration of those objectives.

The report is expected to be finalised by September 2013. The following recommendations can be drawn from the workshop about what should be done to improve the SPI in the CIS framework in terms of operational modalities:

- **enhance involvement of stakeholders at different levels**, including national and river basin levels and at different steps in the projects; associate decision-makers and policymakers from the beginning of the projects, thus also allowing identification of the lack of knowledge; run collaborative research actions with clearly defined priorities; and improve dialogue and communication between all the communities in a multi-disciplinary perspective with the help of knowledge brokers and associated tools;
- at the EU level, **three main actors are relevant for the SPI: the river basin district authorities, the national/Member State level together with the CIS groups and the European Commission** (DG Environment and DG Research and Innovation in this context); the river basin district authorities provide a good framework to keep the windows of opportunities open and allow for continuity in the process and long-term planning;
- ensure close connection between European projects and the CIS groups, and between projects and policymakers, and rely on **dedicated tools and mechanisms to provide scientific information to policymakers** and get feedback from them; the uptake of research outputs at the river basin level should be enhanced; the development of demonstration sites would also help to convince end-users and policymakers of the added value of research results produced by projects.

As for the structure or working principles and actors, the workshop highlighted the following points.

- The most important factor to enhance the SPI in the CIS context is to make it a **permanent activity** based on committed people instead of an ad hoc activity: to be successful, such a move towards a more systematic activity needs to rely on **sustained, dedicated, appropriately resourced and trained people acting as knowledge brokers** (such as SPI correspondents) and having this activity in their roadmaps; knowledge brokering has to be recognised and rewarded to promote the emergence of skilled experts.
- **The SPI should be a CIS working principle** spread across all levels of the CIS supported by an SPI network involving SPI correspond-

ents closely connected to the works of the CIS groups and the overall CIS structure; it would be useful to give a clear mandate to CIS groups and their SPI correspondents to engage in a continuous and systematic appropriation of SPI-related activities and have the SPI as a regular point in their meeting agendas as well as cross-CIS group meetings to share SPI practices.

Useful mechanisms and tools were also identified.

- **Knowledge exchange has to be a continuous process** and its usefulness shared by all involved actors; closer contacts between CIS groups and research projects should be encouraged; the transfer and sharing of knowledge should be enhanced through tools, methods, guidance and repository; there should be elaboration on the most promising ways to disseminate scientific information such as thematic syntheses, policy briefs and 'benefits briefs' for the implementers.
- Effort (including time and funding) **to assess existing research and raise awareness on existing tools and research outputs** and prioritisation of research issues should be continuous as they are all key activities with a clear added value for both the research and the policy communities.
- A set of **tools to access research, policy needs and accessible abstracts** would greatly facilitate this process; information must be easily accessible; **tools to deliver information** should be defined jointly by the research community and the end-users.
- A methodology for the **regular mapping of research and the prioritisation of gaps** should be developed to regularly feed research call programming at EU and national/regional levels.
- A better integration of the scales of relevance to the policy and management within the SPI process will allow the impacts of the SPI on them to be increased and better account to be taken of the interactions between them; it can be enhanced by **implementing a knowledge brokering process at all levels**.
- Consideration should be given to the organisation of **thematic workshops focused on specific scientific questions** which should be organised on a regular basis; this will also ensure the maintenance of contacts between policy and science.

ADDITIONAL EVENT: A NEW APPROACH TO A JOINT CIS-SPI/SCG WORKSHOP

A new approach to a joint CIS-SPI/SCG workshop was tried to directly inform CIS representatives about ongoing research activities with relevance to the CIS topics. Following a brainstorming meeting on 7 November 2011 among representatives from EU-funded research projects with relevance to the five areas of the CIS, an overview of the research results of these projects was presented to the SCG on 8 November.

Copies of the presentations relating to the information session on the SPI can be found on CIRCABC in the folder related to the presentations given at this SCG meeting or here.

The outcomes of the meeting highlighted the following.

- Regarding the research projects: WGs and EGs are asked to provide specifications of the policy questions to be addressed which can be taken on board by the researchers. Practical suggestions made by the SCG included circulation of a one-page e-mail to policymakers with concise project summary and contact details.
- Regarding the policymakers: there is a request that the expected outcomes and results should be made known from the start of the project. Close interactions between researchers and policymakers based on a constant feedback loop would improve results. Information and results of relevant research projects should be displayed in one location so as not to be lost and to remain accessible even after the project websites are disabled after completion of the work.

Although there is still scope to improve events of this nature in the future in order to enhance their usefulness, this exercise was highly appre-

ciated by both the research participants and the SCG members. However, further reflection will be necessary to come up with the most appropriate format for events of this kind that would best fit the needs of the SCG.

THEMATIC CIS GROUP WORKSHOP

A 2–day conference of the Expert Group on Water Scarcity and Drought (WS & D) took place in Venice (Italy) on 13–14 October 2011. It was also attended by some members of the two working groups of the World Meteorological Organisation on hydrology and on climate. It gathered policymakers and Italian and other European researchers participating in European projects focusing on recurrent water scarcity and drought events, or climate change.

During the conference, the main ongoing research projects dealing with themes related to the challenge of conserving water resources and mitigating the impacts of climate change on water availability were presented.

The intention of this workshop was to gather scientists and policymakers to encourage them to exchange knowledge and needs.

As an introduction to this workshop, the CIS-SPI activity was presented by one of the co-leaders.

This EG WS & D thematic workshop was a concrete exercise of science–policy interfacing.

Its value was appreciated by all the participants. Drawing from this very positive experience, through a communication made at one SCG meeting, the CIS-SPI activity recommended that the other CIS groups organise similar events in their areas of interest.

Events focusing on science and policy organised by European projects to facilitate the dissemination of project outcomes are very efficient for the purpose of knowledge dissemination and the gathering of scientists and policymakers to address a particular implementation question.

Result 6: Policy briefs and other pilots for improving the transfer and usability of research outputs

THE SYSTEMATIC COMPILATION OF POLICY BRIEFS RELATED TO RESEARCH PROJECTS AND THEIR PUBLICATION ON CIRCABC

Policy briefs are often used by research projects to present, most of the time, their projects as a whole. To better inform CIS groups of existing knowledge, at the beginning of the activity the CIS-SPI spent a year gathering policy briefs from existing projects and making them available to policymakers through CIRCA/CIRCABC.

Links to these policy briefs can be found here on CIRCABC: public library, framework_directive > thematic_documents > relevant_research > science-policy_briefs.

Research consortia spend time producing these policy briefs and make them as policy-friendly as possible. However, they never receive any feedback on the use, if any, that policymakers or the CIS groups make of these briefs. Such feedback to the research community is absolutely essential, first of all to maintain the momentum of these groups, but also to improve the format and content of these briefs and make them more beneficial for policymakers.

There is no formal evidence that policy briefs collected and published on CIRCABC have been used by policymakers or even by the CIS groups' members.

Another related question is to assess whether or not CIRCABC is the best platform for this kind of exchange. The opinions are diverse among the SPI correspondents. And it was mentioned at the CIS-SPI internal meeting held in February 2012 that CIRCABC may not be the most appropriate website for river basin actors to access the information.

RECOMMENDATION FROM THE CIS-SPI ON THE POLICY BRIEFS' TEMPLATE

Based on a review undertaken by the CIS-SPI activity, it appears that the policy briefs established by the projects can range from a brief description to a full article. In both cases, information is rarely of direct use to policymakers or implementers as results are too scientific and not operational enough to be directly exploited.

The distinction between a policy brief and a project fact sheet is often very fine. Sometimes a fact sheet could be seen as a policy brief, and vice versa. But they share similar project information (coordinator, duration, consortium, funding) and in both cases they present one of the following:

- the project as a whole;
- the project as a whole in relation to the WFD;
- project outputs;
- project outputs related to one WFD article.

To address these shortcomings, the CIS-SPI activity has reflected on the appropriate format of the policy brief to improve the knowledge base of policymakers and practitioners. Based on the existing practices and expression of needs, a policy brief format has been elaborated by the CIS-SPI. It can be recommended and promoted as a unique policy brief format for EU-funded projects which should be asked to use it in the early as well as final phases to promote awareness about the project's objectives and to disseminate the final results.

The content of the policy brief should be adapted to the targeted audience. The guidelines proposed are adapted to the CIS groups' purposes (see Annex V for a full example).

The CIS-SPI policy brief should:

- not exceed four pages;
- be translated into all the languages of the project with special attention given to translation of the different fields;
- give keywords to facilitate searching for information in databases and search engines;
- have a specific field for the theme of the CIS group;
- clearly state the availability of the research outcomes;
- be stored in a specific area of a well-maintained database (not necessarily on CIRCABC as it is not the easiest way for regional water stakeholders to get the information).

For each research outcome which addresses an article of the WFD or related directive, a policy brief should be written.

At the third CIS-SPI event, the need for policy briefs combining results from different research projects was also clearly highlighted.

Management report

SPI correspondents in the CIS groups

As explained in the section 'Main results and deliverables', the CIS-SPI activity has relied on a CIS-SPI network to achieve its tasks.

The SPI correspondents in the CIS groups were intended to establish a bidirectional link between the CIS-SPI ad hoc activity and the CIS groups. They mainly had to ensure that, on the one hand, the policy-relevant research needs were transmitted effectively to the SPI activity and, on the other hand, that important results from relevant research projects were presented and made available to the CIS groups.

The main work of the SPI correspondents took place in the related CIS WGs and EGs, including questionnaire activities, documentation and involvement in an active knowledge exchange. They worked actively on options to fulfil the three main tasks of the CIS-SPI.

After several reminders addressed to the SCG and the water and marine directors, at the end of 2011 the SPI correspondents were as presented in Table 1.

Group	SPI correspondent (end 2011)
WG A — Ecological status	Yorick Reyjol (ONEMA, France)
WG C — Groundwater	Dr Robert Ward (British Geological Survey, United Kingdom)
WG E — Chemical aspects	Dr Robert Kase (Swiss Centre for Applied Ecotoxicology — Eawag, Switzerland)
WG F — Floods	Wouter Vanneuville (ERA-Net CRUE)
EG Water and climate change	Magdalena Mrkvickova (VUV, Czech Republic)
EG Water scarcity and droughts	Giuseppina Monacelli (Ispra, Italy)
EG Water and agriculture	Ville Keskisarja (DG Environment)

Table 1: SPI correspondents in 2011

Over time, several correspondents moved and not all of them were replaced. In mid-2012, the CIS-SPI correspondents in the CIS groups were as presented in Table 2.

Group	SPI correspondent (mid-2012)
WG A — Ecological status	Yorick Reyjol (ONEMA, France)
WG C — Groundwater	Dr Robert Ward (British Geological Survey, United Kingdom)
WG E — Chemical aspects	Dr Robert Kase (Swiss Centre for Applied Ecotoxicology — Eawag, Switzerland)
WG F — Floods	Giuseppina Monacelli (Ispra, Italy)
EG Climate change	No formal SPI correspondent. Jacques Delsalle (DG Environment) is the contact point.
EG Water scarcity and droughts	Giuseppina Monacelli (Ispra, Italy)
EG Water and agriculture	Nicolas Rouyer (DG Environment)

Table 2: SPI correspondents in 2012

In the 3-year activity, it took more than a year to get most of the nominations for SPI correspondents and these nominations were not stable, leading to new nominations and delayed contributions.

For the future, it may be more efficient to set up the activity around a stable, recognised and dynamic SPI nucleus across/within the CIS groups.

SPI network working principles

The SPI correspondents were involved in the CIS-SPI activity mainly by e-mail with no additional costs. They were gathered in a face-to-face meeting only once (in February 2012) during the entire period.

Yearly SPI events were the main occasions to gather the SPI correspondents and involve them more formally in organising the events and actively taking part in them.

The general work overload of the CIS groups' members who work on SPI aspects on a best-effort basis hampered significantly the timing and quality aspects of the research needs prioritisation exercise and, more generally, the involvement of SPI correspondents in the activity.

The CIS groups also contributed to the identification of the existing knowledge matching their needs.

The method used for that varied from one group to another, depending on the working principles chosen by the group and its SPI correspondent. CIS-SPI co-leaders chose not to give too strict a framework to the CIS groups for this exercise.

Finally, during the research gaps assessment exercise, each SPI correspondent was contacted systematically by the CIS-SPI team to try and find an answer to some questions that may have been raised in studying the CIS groups' material. The level and timing of answers were again very diverse.

The diversity of practices followed by the different groups hampered the overall quality of the outputs.

There is a need for more coordination of the work undertaken by CIS groups in connection with the SPI activity.

Identity of a CIS-SPI activity

The SPI correspondents' viewpoints regarding the identity and visibility of the CIS-SPI may be summarised as follows.

- There is a need to give a real identity and visibility to the SPI activity (graphical identity, website, newsletter) and to foster the right format and right channel for the communication of knowledge.
- Specific tools for the SPI activity (web-conference, e-learning in different languages when necessary) are needed, and CIS groups should be provided with examples of clear messages based on objectives (to be more visible and operational) and methods (presenting tools to support internal communication as well as visibility from the outside).
- It is recommended to favour the continuation of face-to-face exchanges of information with tools allowing virtual exchanges (the discussion started during the meeting should be continued on an electronic platform when needed).
- In order to fight the time pressure and ensure the participation of members in common activities, the CIS-SPI group/activity should be confirmed and made sustainable.

In addition, a CIS-SPI activity should:

- combine different approaches to conducting surveys (questionnaires, specific meetings, encouraging SPI correspondents to participate in other groups' meetings);
- adapt the format of these actions (documents, meetings) to the time constraints of responders;

- highlight the CIS-SPI objectives to facilitate the exchange of information among working and expert groups.

Reports to the Strategic Coordination Group and the Water and Marine Directors' Group meetings

Established by the European water and marine directors (WMD) in 2009, the CIS-SPI ad hoc activity regularly reported to the SCG meetings and the European water and marine directors' meetings since its start.

All the progress reports are available on CIRCABC.

Outlook and perspective

Decision-makers are increasingly calling for scientific evidence to support them in policy-making. Practitioners are asking for science-based guidance for the formulation of cost-effective management measures in compliance with legislation.

To favour the good implementation of legislation, avoiding costly corrective measures, it is evident that science matters a lot for the establishment and implementation of effective water policies.

As demonstrated by the CIS-SPI activity 2010–12, a sustainable science–policy interface within the common implementation strategy of the water framework directive could, if properly implemented, secure the uptake of research outcomes and therefore better knowledge-based decisions throughout the policy cycle (from policy design to implementation, monitoring and review).

This interface would provide a platform for a more integrated and participatory process in which researchers, policymakers and practitioners interact and jointly agree and set priorities about the most pressing policy challenges, the research needed to address them and ways to improve the transfer of accrued knowledge towards policy implementation.

The CIS-SPI activity trialled in the period 2010–12 has notably triggered a research needs identification and prioritisation exercise and attempted to set up operational ways of transferring research outcomes and knowledge to support the implementation of the water framework directive.

A methodology essentially based on standard questionnaires and annual workshops has been progressively implemented with the help of SPI correspondents belonging to the various CIS expert groups and working groups.

Those CIS groups have developed a range of approaches bringing together scientists and policy implementers to identify needs, draft policy briefs and prioritise research questions.

This activity ultimately led to the consolidation of a list of research needs which will be communicated to organisations in Europe that finance European, national or regional research and innovation programmes.

To ensure that research needs are continuously updated and take account of the policy evolution and scientific achievements, the cycle of activities described above will have to be repeated on a regular basis.

Such prioritisation would find a unique window of opportunity at a time when the EU is deciding on Horizon 2020 — the next EU framework programme for research and technological development for the period 2014–20 — and at a time when the joint programming initiative on water is progressively being implemented by the owners and managers of the water-related national research programmes from 16 Member States (http://www.waterjpi.eu).

In addition, an improved uptake of knowledge by CIS groups is still needed and several new approaches or tools are worth being tested and implemented within the CIS structure.

Although still of an experimental nature, this CIS-SPI activity 2010–12 has brought to the surface the rich diversity of SPI approaches within the CIS, some of which could be further benchmarked, fine-tuned and upscaled in the future to strengthen and promote a more sustainable SPI activity at the EU level.

The SPI community of practice, including a network of SPI correspondents, can with some adjustments play a pivotal role in the future in ensuring a continuous communication of research results to the appropriate policy implementation level.

Overall, there is no doubt that the CIS-SPI activity, once further strengthened and operationalised, will be called on to play a significant role in defining water research agendas in the current context of increased European coordination at EU and national levels and at a time when the blueprint for safeguarding Europe's water resources should be followed by implementation.

Main recommendations for the future

Based on the experience gained during this 3-year mandate of an ad hoc experimental CIS-SPI activity, several recommendations may be made for the future if a continuous science–policy interface is to be carried out in the context of the CIS.

Recommendation 1

Move from an ad hoc experience of the SPI activity towards a more sustainable and systematic one; this needs to rely on sustained, dedicated, appropriately resourced and trained people acting as SPI correspondents (such as knowledge brokers) having this activity in their agendas and mandates and thus avoiding potential conflicts of interest in time management with other tasks. Knowledge brokering has to be recognised and rewarded to promote the emergence of skilled experts; the availability of budget/resources for knowledge brokering may help. By adopting these new approaches, one can expect a significant improvement in the current situation which is based on the best efforts of a very few people already overloaded with other tasks; this would add significantly to the effectiveness of the process.

Recommendation 2

Adopt the SPI as a pervasive CIS working principle and mainstream the SPI objectives and methodologies across all levels of the CIS in order to improve efficiency and consolidate today's very diverse SPI approaches by the CIS groups. Improve the active knowledge exchange directly within the CIS groups by making an efficient use of internal and external expertise on a needs-oriented basis. These could include formalising the requirement for CIS-SPI activities in each CIS group by requiring the mandates to specify this. A successful trust-building in a continuous SPI activity could significantly improve participation at all levels as well as increase SPI involvement from all Member States.

Recommendation 3

Enhance the transfer and sharing of knowledge and experience focusing on CIS themes, in particular at the river basin level, test various tools and methods to facilitate this transfer in close connection with experts of CIS, develop and promote guidance for the concrete transfer of knowledge resulting from EU and national R & D projects, and agree on repositories and invent alert systems to reach policymakers and implementers from the EU to the catchment scale.

Recommendation 4

Consolidate and implement a methodology for a regular and more frequent mapping of research and the prioritisation of research gaps to regularly feed into research call programming at EU and national or regional levels.

Recommendation 5

Develop an 'archive' of successful past projects, by making information included on specialised project websites available even after the termination of the project.

Recommendation 6

Internationalise the CIS-SPI experience in connection with the SPI elements of the ministerial declaration resulting from WWF6.

Recommendation 7

Explore the possibility for a new follow-up CIS activity on guidance for applying an ecosystem services approach (ESA) in support of the implementation of the WFD.

ANNEXES

Annex I — Prioritisation exercise: questionnaire and methods

Questionnaire proposed to the CIS groups — example from WG C

WG C Groundwater

Update and prioritisation of the research and implementation needs in support of the WFD

Ad hoc activity on water science–policy interface (SPI-CIS)

Recipients: WG C Member States' representatives and stakeholder associations

Actions: Completion of questionnaire (see below for instructions) by 15 November 2011 and return to Rob Ward (rswa@bgs.ac.uk) and Marie-Perrine Durot (marie-perrine.durot@onema.fr)

CONTEXT AND PURPOSE OF THE UPDATE

In December 2009, the water directors of the European Union established an ad hoc activity on water science–policy interface (SPI-CIS) under the common implementation strategy (CIS) of the water framework directive. The SPI-CIS activity aims to establish working relationships among research projects and WFD implementers. In this perspective, the mandate of the CIS-SPI activity includes three tasks for the period 2010–12:

— Task 1: establish an inventory of research and implementation needs from CIS groups;

— Task 2: identify available relevant research outputs and research gaps;

— Task 3: improve transfer/communication and usability of research outputs.

In 2010, a questionnaire was sent to CIS groups to identify research needs and technical requirements to enable WFD implementation. The results of this work were presented and discussed in the '1st SPI event' organised by EC DG Research and Innovation and ONEMA on 30 September 2010. The full report can be downloaded from:

http://circa.europa.eu/Members/irc/env/wfd/library?l=/framework_directive/thematic_documents/relevant_research/cis-spi_2011

The identification of research needs has been a successful process, but there was not sufficient time to discuss research priorities and links to policy milestones associated with the different research issues. Most importantly, concern was expressed because it was not possible to provide a prioritised and final list of research needs and gaps due to an incomplete overview of the inventory of existing knowledge from completed research (results from recent R & D projects from EU and national programmes). It was agreed that more time and attention should be dedicated to these issues in future steps.

Therefore, the main objectives of this consultation are to:

1) **update and specify research needs on the basis of the '1st SPI event' outcomes (Task 1);**

2) **collect information on available knowledge in order to prioritise research gaps (Task 2);**

3) **identify priority topics for dissemination and knowledge transfer (Task 3).**

With the comparison of the needs and the available knowledge it should be possible to prioritise research gaps and to select issues that require dedicated efforts for transfer and dissemination. Results collected will be analysed and sent to the CIS-SPI ad hoc activity team who will compile results from all CIS groups.

We look forward to receiving yours contributions by 15/11/2011 by e-mail (SPI correspondent rswa@bgs.ac.uk and frederique.martini@onema.fr).

UPDATE AND SPECIFICATION OF THE RESEARCH AND IMPLEMENTATION NEEDS

The update exercise is based on a draft table of research needs identified at the SPI event 'Water science meets policy', common implementation strategy (CIS) of the water framework directive (WFD) held on 30 September 2010. An extract and summary of the research needs is provided in the annex to this questionnaire.

Please update and amend the table in the annex according to the following guidelines:

1. **Update the list of research areas/issues**

- Add any research area(s) or issue(s) that were not identified in 2010. You can add new research topics within a research area or new research areas. Please add a short description of any new research issue/area in the column labelled 'comment'. Please, highlight any added line(s) in the grey part of the project list (see below).
- Identify any research area or issue that is no longer relevant (already covered, deadline for WFD implementation passed, etc.). Please highlight the concerned cell(s)/line in blue colour and justify it with a specific comment.

2. Specify the list of research areas/issues

a) Priority of the given research for the WFD (or other related/sister directive, e.g. groundwater directive)

Please specify (or review if this is already filled in) for each research issue the 'criticality' or importance of the research issue for a given step/deadline associated with the WFD (or other related/sister directive):

- High (3 points): These would be research issues that are essential to achieve implementation of a WFD (or sister directive) milestone or process identified by WG C.
- Medium (2 points): This would include research issues which would provide significant support to implementation of a WFD (or sister directive) milestone or process identified by WG C.
- Low (1 point): This would include research issues which are not directly required to achieve a WFD (or sister directive) milestones or process identified by WG C.

b) 'Urgency' for receiving usable results

Please specify (or review if this is already filled in) for each research issue a target period for receiving usable research outputs linked to WFD milestones or WFD processes (1st RBMP, implementation, 1st programmes of measures, review of a particular provision of the WFD or sister Directive, 2nd RBMP elaboration, etc.):

- High: 1 to 2 years (3 points): This would include where every research result/output is needed for a policy milestone or process before the end of 2013.
- Medium: 3 to 5 years (2 points): This would include where every research result/output is needed for a policy milestone or process between 2014 and 2016.
- Low: 5 years and above (1 point): This would include where every research result/output is needed for a policy milestone or process after 2016.

c) Knowledge importance

Please specify the scientific need for new knowledge in this field in comparison to the available knowledge

- High (3 points): This would include research topics that are not sufficiently covered by existing research projects at the EU or national level.
- Medium (2 points): This would include research topics which are partially covered by existing research projects at the EU level or national level.
- Low (1 point): This would include research topics that are already covered by existing research projects at the EU level or national level.

d) Literature

Compilation of recent research outcomes, reports and literature, and current research numerically related to the available research topics (see Point 3 below).

Please note that available knowledge could be shared within WG C and on CIRCA: by sending all relevant documents to your SPI correspondent Rob Ward by 15 November 2011.

SUMMARY

Only three steps to identify your research needs:

1) **Please insert a score** between 1–3 in the research issues list (see below) for the following criteria: priority, urgency, knowledge importance.

2) **Please add any additional new research topics** into the grey marked rows **in the working list** below which are currently not covered by the listed issues but are very important from your point of view. Please use the criteria system like for the existing research topics and add a short description of this topic and a justification for prioritisation.

3) **Please send any related literature (or links)** attached to the e-mail return from ongoing projects and recent research outcomes (reports, literature) and identify it with the numerical system which is proposed in the attached list (e.g. 2.1/2.2/3.2, Report on pesticide use 2010). Each classification will have the same value and counted as one literature point. Please use not more than three classifications, but you are allowed to use one classification several times to weight your literature. **Please fill in the name and chosen classification of the available literature in the related rows in the working list below.** This helps us to know where recent knowledge is available and to compare it with the needs.

We expect that you will need less than 1 hour work for the whole query. Please return only one questionnaire response per Member State or stakeholder association with your comments and the related literature to (rswa@bgs.ac.uk and frederique.martini@onema.fr) by 15 November 2011.

A short overview of the received comments will be available at the following WG C meeting (spring 2012) and more detailed information will also be available on CIRCA afterwards.

Thank you for your contribution to identify the research needs of the WG C, and please do not hesitate to contact us for remaining questions.

Sincerely yours
Rob Ward
rswa@bgs.ac.uk
phone: +441491692411
British Geological Survey

Frederique Martini
frederique.martini@onema.fr
European Affairs

ANNEX: WORKING LIST OF RESEARCH AREAS — ISSUES FOR WG C GROUNDWATER

A more detailed description of the presented research topics is available in the attached round table document 'Water science meets policy' event common implementation strategy (CIS) of the water framework directive (WFD), 30 September 2010 — Brussels.

	Research issue	Specification				
		Priority score	Urgency score	Knowledge score	Available literature	Comment
1.	**CLIMATE CHANGE IMPACTS**					
1.1.	Effects on groundwater level by demand (abstraction).	3	1			
1.2.	Surface water — groundwater changes in interaction	3	1			
1.3.	Production of biofuels and effects on groundwater	3	1			
1.4.	Changes in groundwater —chemistry/ quality due to climate change	3	1			
1.5.	Changes in groundwater quantity/ availability	3	1			
1.6.	Changes in groundwater —temperature and resulting effects	3	1			
1.7.	Groundwater and energy production (e.g. thermal energy)	3	1			
1.8.	Extreme rainfall events and groundwater, e.g. microbiological pollution and impacts on drinking water supply	3	1			
1.9.	Potential impact of CO_2 storage (quality and quantity)	3	1			
1.10.	Methodology to assess groundwater vulnerability to climate change (primary and secondary effects), visualisation tools	3	1			

2.	**Groundwater dependent ecosystems**		
2.1.	Ecosystem requirements — classification system	3	2
2.2.	Classification of GW fluctuation/hydrology	3	2
2.3.	Criteria for environmental quality objectives	3	2
2.4.	Ecosystems in the unsaturated and hyporheic zones (and relevance for processes for surface water–groundwater interaction)	2	2
3.	**Groundwater ecosystems**		
3.1.	Recital 20 of the GW directive	3	
3.2.	Typology	3	
3.3.	Elements for status classification	3	
4.	**Urban areas**		
4.1.	Effects of urban areas on groundwater (quantity and quality)	2	
4.2.	Assessment tools	2	
5.	**Pollutants**		
5.1.	Pollutants fate and behaviour (transfer times, processes and sources)	2	
5.2.	Emerging pollutants	3	
5.3.	Good understanding of the process involved in the degradation of emerging pollutants needed (soil, unsaturated zone, degradation products, etc.)	3	
5.4.	Assessment criteria, environmental objectives		

6.	**Programmes of measures**		
6.1.	Managed aquifer recharge	3	1
6.2.	Interactions between policy options	2	
6.3.	Assessing the efficiency of measures in agriculture	3	
Additional research issues			

DETAILS AND ANALYSIS OF METHODS OF PRIORITISATION CHOSEN BY THE CIS GROUPS

The diverse prioritisation methods used by the CIS working groups during the exercise are summarised in Table 3.

Group	Prioritisation exercise
Ecological status (WG A)	A discussion was organised within the WG to reach a validated list of 10 priority research issues. Several scientific experts and scientific officers contributed to investigate these issues and bring the available knowledge in summer 2012.
Groundwater (WG C)	Five principal topic areas were identified by WG C and during the 1st SPI event in 2010. These formed the basis of the questionnaire which received 20 responses (17 from Member States and three from NGOs). Some new needs for knowledge were added at this stage with 30 additional topics identified. The SPI correspondent analysed the results to draw out the key priorities in July 2012 and the findings were presented, discussed and agreed at the WG C meeting in October 2012.
Chemical aspects (WG E)	Twenty-three topics relevant for WG E were identified at the 1st SPI event. This list was evaluated by 13 nations represented in the WG E from October 2011 to January 2012. Then the 'needs' were ranked according to the criteria: priority, urgency and scientifically knowledge needs with an easy scoring system (High 3 / Medium 2 / Low 1). The results were presented at the 15th WG E meeting on 14 March 2012. Sixteen additional prioritised topics for further research need from WG E members were included to a final prioritisation list.
Floods (WG F)	Some discussions were conducted on this topic during WG F workshops in Norway, Austria/Slovenia, Scotland, Belgium and Italy and led to the prioritisation of needs and identification of available knowledge. A further discussion with the WG on available knowledge was conducted at its meeting in October 2012.
EG Water scarcity and droughts	The questionnaire was circulated within the EG. Few answers were received. Some feedback was given to the EG at the meeting in September 2012 with a view to consolidating the existing knowledge review and hence determining the research gaps.
EG Water and agriculture	The EG identified research needs in the area of water protection in agriculture at the occasion of one of its meetings. The exercise of identification of existing knowledge was undertaken in August 2012 but provided no feedback from the EG members. No further prioritisation.
EG Water and climate change	The SPI correspondent achieved identifying research needs with the EG. After her changing of position in January 2012 CIS-SPI had no more effective contact with the EG. No further prioritisation.

Table 3: Methods used for prioritisation of research needs in each CIS group

Annex II — Priority list of research needs: CIS groups

		Priority	Topic
WG A	**Ecological status**	1.	To overcome knowledge gaps for transitional and coastal waters
		2.	To overcome knowledge gaps for lakes
		3.	To analyse more carefully the links between ecotoxicological tools and biological assessment tools based on the structure of biological communities
		4.	To overcome difficulties in assessing ecological status in temporary streams
		5.	To reinforce the knowledge concerning uncertainties
		6.	To build pressure–impact models for a better spatial extrapolation of the ecological status
		7.	To clarify links between hydromorphological pressures and biological responses
		8.	To develop functional assessment tools based on trophic networks to complement tools based on community structure attributes — assess the links with resilience and stability
		9.	To clarify the links between global changes (climate, fragmentation, exotics) and ecosystem functioning and assessment tools
		10.	To reinforce the knowledge on relationships between good ecological status (GES), biodiversity and ecosystem services
WG C	**Groundwater**	1.	Evaluation of the efficiency of measures implemented to deal with agricultural sources of diffuse pollution that are causing failure of objectives and/or putting groundwater bodies at risk
		2.	Better understanding of the impacts on surface water–groundwater interaction arising from climate change
		3.	Identifying and assessing the impacts of new/emerging pressures on groundwater, e.g. the exploitation for unconventional hydrocarbons (shale gas) and the associated environmental impacts
		4.	Emerging pollutant fate and behaviour. This includes understanding the processes involved in the degradation of emerging pollutants within the sub-surface (soil and unsaturated zone) and degradation/transformation products
		5.	Establishment of a classification system (status) for groundwater-dependent ecosystems and their associated environmental objectives/standards/threshold values
		6.	The effects of climate change on long-term water resource availability and sustainability of supply (abstraction)
		7.	The impacts of climate change and associated environmental change factors on groundwater quality
		8.	Development of tools, techniques and methodologies to assess the sensitivity and vulnerability of groundwater to climate change
		9.	Development of assessment criteria and environmental objectives related to emerging pollutants, including establishment of pan-European consistent approach to classifying hazardous and non-hazardous pollutants

		Priority	Topic
		10.	Establishment of an effective research programme that specifically addresses recital 20 of the groundwater directive
WG E	**Chemical aspects**	1.	Development and improvement of suitable harmonised analytical procedures for new priority substances
		2.	Harmonisation of knowledge basis and strategic approaches for chemicals in European policies
		3.	Relationships between ecological, chemical and biological status needs to be studied
		4.	Development and improvement of sampling procedures and techniques for existing and new priority substances
		5.	Non-target analysis and screening
		6.	Review and testing of EQS
		7.	Relationship and interactions between concentrations of priority substances in the three matrixes: water, sediment and biota
		8.	Development of bio-indicators/bio-assays for groups of substances
		9.	Use of ecotoxicology tools to link chemical and ecological status
		10.	Identification of possible future priority substances
		11.	Investigation of the behaviour/effects of mixtures of hazardous substances in the water environment, including synergistic effects
WG F	**Floods**	1.	How to define an 'acceptable level' of flood risk and how to deal with the residual risk?
		2.	The ability to quantify the hydrological or other effects of combinations of different actions across a catchment and, in particular, the effect of more natural approaches
		3.	What are the most appropriate methods for mapping social and environmental risk and risk to cultural heritage?
		4.	Groundwater flooding
		5.	Mapping potential for lake, tsunamis and landslip
		6.	Communication tools, training/education programmes and feedback mechanisms related to the use of flood maps
		7.	Understanding, calculating and presenting uncertainty, including the influence of DTM accuracy
		8.	How to coordinate elaboration of objectives in national and international settings?
		9.	Integrated risk management combining protection, prevention and preparedness
		10.	Risk management should take into account the quality of the water bodies. Some river-dependent ecosystems require a minimum flooding
		11.	Coastal: more investigation needed on: storm winds, air pressure, tide dynamics

		Priority	Topic
EG AGRI	**Water and agriculture**	1.	Designing farmers' incentives to support WFD implementation
		2.	Address questions related to the effect of WFD implementation measures
		3.	Assessing the interaction between surface and groundwater in agricultural catchments
EG CC & W	**Water and climate**	1.	Methodological tools for eco-design for various industries
			Forecasting climate change scenarios
		2.	Energy efficiency of all the water supply chain
			Desalination using renewable energy
		3.	Effective adaptation measures
			Harnessing energy — recovery
		4.	Nutrient removal in concentrated streams, recovery and reuse
			Climate change challenges, storm water and energy
		5.	Cope with the impacts of climate change with more rainfall especially during winter and more extreme weather events, e.g. increased risk of faecal pollution and increase of NOM in raw for drinking water supply
			How to plan and favour measures that are robust and flexible to uncertainty in future climate?
EG WS & D	**Water scarcity and droughts**	1.	Application of common indicators in EU river basins
		2.	Development of prolonged drought indicators
		3.	Impacts on water availability resources
		4.	Assessing available surface and groundwater water resources and estimating water demands under the current situation and under predicted climate change conditions (water supply, water demand balance at basin level)
		5.	Impacts on ecosystems
		6.	Intensification of the water cycle. Extreme events
		7.	Interactions between climate change and agricultural, social and demographic changes
		8.	Regional climate models (RCMs)
		9.	Methodologies to assess WS & D economical impacts

Annex III — Available knowledge from research projects

Expert Group on Water and Climate Change

Research area	Research issue	Research issue description	Partially covered by
4. Assessing available surface and groundwater water resources and estimating water demands under the current situation and under predicted climate change conditions at basin level, and look forward to seeing the results of the ongoing projects	4.4. Methodological tools for eco-design for various industries		*TRUST (FP7)* TRansitions to the Urban Water Services of Tomorrow http://www.trust-i.net/ *INNOVATECH (FP6)* Innovative and integrated technologies for the treatment of industrial wastewater http://cordis.europa.eu/search/index.cfm?fuseaction=proj.document&PJ_RCN=9548404
1. Mainstreaming the climate change issue within other research areas	1.1. Forecasting climate change scenarios	Climate impacts on river flows and groundwaters (floods, water scarcity and droughts), water quality (water temperature, sediments, nutrients, etc.), secondary impacts such as changes in catchment vegetation and land-use on water bodies, and the wildlife and ecosystem response to these changes. Impacts should be assessed for integrating climate projections into assessments of WFD pressures assessments.	*ACQWA (FP7)* Assessing Climate impacts on the Quantity and quality of WAter http://www.acqwa.ch/ *AQUASTRESS (FP6)* Mitigation of water stress through new approaches to integrating management, technical, economic and institutional instruments http://www.aquastress.net/ *XEROCHORE (FP7)* An exercise to assess research needs and policy choices in areas of drought http://www.feem-project.net/xerochore/ *NORMAN (FP6)* Network of reference for monitoring of emerging environmental pollutants http://www.norman-network.net Other references: CLIMB, CLIMWATADAPT, EPI-WATER, HIGHNOON, MIRAGE, WASSERMED, CIRCE, BIOFRESH, EUROLIMPACS, EFI+, REFRESH, CORFU, FLOODSITE, HYDRATE, RISKBASE, CRUE ERANET, AQEM, STAR, EUROLIMPACS (WP2, WP7), MIRAGE (WP4),WATCH

Expert Group on Water and Climate Change

Research area	Research issue	Research issue description	Partially covered by
4. Assessing available surface and groundwater water resources and estimating water demands under the current situation and under predicted climate change conditions at basin level, and look forward to seeing the results of the ongoing projects	4.7. Energy efficiency of the whole water supply chain		***ACQWA (FP7)*** Scenarios to explore particular vulnerabilities of high mountain areas and competitive aspects of water use among different sectors and regions. This includes the study of the impact of different revenue streams arising from different uses of the available land, e.g. if much more revenue can be generated from tourism more agricultural and herding land will be used for it; the same reasoning can be applied to other economic sectors. http://www.acqwa.ch/ ***ECOWATER (FP7)*** Meso-level eco-efficiency indicators to assess technologies and their uptake in water use sectors http://environ.chemeng.ntua.gr/ecowater/UserFiles/files/EcoWater_Factsheet.pdf ***E4WATER (FP7)*** Economically and Ecologically Efficient Water Management in the European Chemical Industry http://www.e4water.eu/
4. Assessing available surface and groundwater water resources and estimating water demands under the current situation and under predicted climate change conditions at basin level, and look forward to seeing the results of the ongoing projects	4.8. Desalination using renewable energy		***REDDES (FP6)*** Renewable Energy Driven Desalination Systems. ***MEDESOL (FP6)*** Seawater desalination by innovative solar-powered membrane-distillation system ***MEDINA (FP6)*** Membrane-based Desalination: an Integrated Approach http://www.medinaproject.eu/puplic/home.php ***AQUASOL (FP6)*** Enhanced zero discharge seawater desalination using hybrid solar technology http://www.idaea.csic.es/innova-med/agadir %20lectures/malato2.pdf ***DESOL (FP6)*** Low-cost, low-energy technology to desalinate water into potable water http://cordis.europa.eu/search/index.cfm?fuseaction=lib.document&DOC_LANG_ID=EN&DOC_ID=121625111&q=

Expert Group on Water and Climate Change

Research area	Research issue	Research issue description	Partially covered by
	6.2. Effective adaptation measures		***WASSERMED (FP7)*** Water Availability and Security in Southern EuRope and the Mediterranean http://www.wassermed.eu/ ***REFRESH (FP7)*** Adaptive strategies to mitigate the impacts of climate change on European freshwater ecosystems http://www.refresh.ucl.ac.uk/ ***CLIMATEWATER (FP7)*** Bridging the gap between adaptation strategies of climate change impacts and European water policies http://www.climatewater.org/wp.php
5. Understanding scenarios for growth in hydropower as a climate change response and the level of conflict with WFD objectives	5.7. Harnessing energy — recovery		***INNERS*** INNovative Energy Recovery Strategies in the urban water cycle http://www.inners.eu/
	6.3. Nutrient removal in concentrated streams, recovery and reuse		***INNOVA-MED (FP7)*** Innovative processes and practices for wastewater treatment and reuse in the Mediterranean region ***WATEREUS-MED (FP7)*** Water reuse in Mediterranean countries http://cordis.europa.eu/projects/rcn/104485_en.html
	6.1. Climate change challenges, storm water and energy		***RISK BASE (FP7)*** Towards risk-based management of European river basins: key findings and recommendations of the RISK BASE project http://cordis.europa.eu/search/index.cfm?fuseaction=proj.document&PJ_LANG=EN&PJ_RCN=8824836&pid=5&q=DE71E453E1BDD0453F7311E03F7EE86B&type=sim Other references: http://www.waterplan.water.ca.gov/cwpu2009/index.cfm

Expert Group on Water and Climate Change

Research area	Research issue	Research issue description	Partially covered by
	6.5. Cope with the impacts of climate change with more rainfall especially during winter and more extreme weather events, e.g. increased risk of faecal pollution and increase of NOM in raw for drinking water supply		***SCENES (FP6)*** Water Scenarios for Europe and for Neighbouring States http://www.environment.fi/default.asp?contentid=379147&lan=EN ***RISK BASE (FP7)*** Towards risk-based management of European river basins: Key findings and recommendations of the RISK BASE project http://cordis.europa.eu/search/index.cfm?fuseaction=proj.document&PJ_LANG=EN&PJ_RCN=8824836&pid=5&q=DE71E453E1BDD0453F7311E03F7EE86B&type=sim ***VIROCLIME (FP7)*** Impact of climate change on the transport, fate and risk management of viral pathogens in water http://www.viroclime.org/ Other references: NVE, Contact: Hege Hisdal, NVE
2. Better understanding if water monitoring networks in Europe (e.g. those for WFD) are set up in a way that will best allow identification and attribution of climate change impacts	2.1. How to plan and favour measures that are robust and flexible to uncertainty in future climate?	In this instance tools for assessment and/or a library of effective adaptation measures would be very useful to river basin management planners. Evaluating options that will be effective in adapting to climate change and minimise contribution to future climate change. The identification of adaptation and catchment management options that remain effective as the climate changes. Choosing options to cope with an uncertain climate. Particular focus on: climate change challenges, storm water and energy; nutrient removal in concentrated streams, recovery and reuse; waste water advanced treatments for direct reuse (agriculture, industry); cope with the impacts of climate change with more rainfall especially during winter and more extreme weather events, e.g. increased risk of fecal pollution and increase of NOM in raw for drinking water supply	***ACQWA*** Assessing Climate impacts on the Quantity and quality of Water http://www.acqwa.ch/ ***CLIMWATADAPT*** Climate adaptation — modelling water scenarios and sectoral impacts http://www.climwatadapt.eu/ ***BIOFRESH (FP7)*** Biodiversity of freshwater ecosystems: status, trends, pressures and conservation priorities http://www.freshwaterbiodiversity.eu/ ***CIRCE (FP6)*** Climate change and impact research: the Mediterranean environment http://cordis.europa.eu/search/index.cfm?fuseaction=proj.document&PJ_LANG=EN&PJ_RCN=9776097&pid=2&q=1AC5F03B534B08478CB3DABC7478F776&type=sim Other references: CLIMB, EUROLIMPACS, EPI-WATER, HIGHNOON, MIRAGE, WASSERMED, WARCH, NORMAN (FP6), CIRCE, AQUASTRESS, XEROCHORE, EFI+, REFRESH, CORFU, FLOODSITE, HYDRATE, RISKBASE, CRUE ERANET, AQEM, STAR, COST 869, LIFE08 ENV/IT/000413 INHABIT

Expert Group on Water and Agriculture

Research issue	Research issue description	Partially covered by
1.1. Designing farmers' incentives to support WFD implementation	The research question is: 'How to design effective incentives for farmers to be more proactive in the implementation of the WFD and to assure a sustainable implementation of tools and instruments?'	***CROPWAT (FP6)*** Centre for Sustainable Crop -Water management http://www.cropwat.agrif.bg.ac.rs/ 1. The level of farmers' incentives to support WFD implementation in many countries, including Serbia, is very low with the vast majority of farmers not having informed about this issue. Farmers should be first provided with the information in a form that maximises their understanding of the WFD (popular brochures, leaflets, public and media presentations). 2. No project results concerning the socioeconomical aspects of WFD implementation. ***FLOW-AID (FP6)*** Farm Level Optimal Water management: Assistant for Irrigation under Deficit www.flow-aid.eu Showed that water use efficiency can be enhanced, and that even sometimes more production is possible. Reduction of costs may be a good incentive to invest in the technology to manage this. FLOW-AID brochure and outcome available through ***EFFIDRIP (FP7)*** Enabling next generation commercial service-oriented, automatic irrigation management systems for high-efficient use of water, fertilisers and energy in drip irrigated tree crops www.effidrip.eu/effidrip-system/ ***ENORASIS (FP7)*** ENvironmental Optimisation of IRrigAtion Management with the Combined uSe and Integration of High PrecisIon Satellite Data, Advanced Modelling, Process Control and Business Innovation www.enorasis.eu/ Impacts of renewable energy on European farmers (European Commission, DG Agriculture and Rural Development) ***Lead Contractor: Alterra Wageningen UR, in cooperation with Ecologic Institute, EC*** ***BREC IEO, SORIACTIVA, ECN and Wageningen University report, 2011*** www.eurosfaire.prd.fr/7pc/documents/1348128374_exec_sum_en.pdf Other references: AQUANET, CROPWAT (FP6), WATERWEB, SAFIR, COST 869 ***CEMAGREF*** Economic analysis of uses: calculation of cost recovery (from an economic approach to the accounting and financial available tools). How to help the decision on the building of substitutions reserves? An approach through a microeconomic modelling of farmers' behaviour. ***INRA*** Summary of water policy economic analysis linked with a proposal for socioeconomics training — Year 2 ***CEMAGREF*** Synthesis report on the effectiveness of economic instruments and proposal for the implementation of withdrawals market for water management — Year 2 Summary of the European seminar on economic and market instruments to support water policy

Expert Group on Water and Agriculture

Research issue	Research issue description	Partially covered by
4.2. Address questions related to the effect of WFD implementation measures		CROPWAT (FP6) Centre for Sustainable Crop -Water management http://www.cropwat.agrif.bg.ac.rs/ For improving the environmental protection actions against agricultural contamination, there is an urgent need for the development of novel methods and techniques that could reduce, remove or immobilise different chemical contaminants (especially N, P and heavy metals) and microbiological contaminants (especially E.coli) and their contamination effects on water, plants and produced food. Constant monitoring of environmental quality of water is also essential but new methods should be cost-effective and simple to allow farmer involvement in water monitoring. Two published brochures about the chemical and microbiological contaminants in water, use of contaminated water for crop irrigation and potential health risks to the food consumers with the technical advices for decontamination of water and information about EU standards for water and food and suggestions for the implementation of these standards Action in course in France (action INRA/ONEMA) to help the water agencies to develop relevant programmes of measurement adapted to the different contexts (weather, soils, hydrology, economy, etc.). 'Factsheets done with the RBN'(citation: Nicolas Rouyer, EC). QUALIWATER (FP6): Diagnosis and control of salinity and nitrate pollution in Mediterranean irrigated agriculture (INCO) www.stream-project.eu/sites/default/files/QUALIWATER.pdf Other references: EUROLIMPACS SEWING, WATERWEB, WARMER, SAFIR, AQEM, STAR, (WP2, WP7), MIRAGE (WP4), LIFE08 ENV/IT/000413 INHABIT, COST 869, MIRAGE (FP7). CEMAGREF Analysis of feedback on development of scenarios for measures programmes CEMAGREF Implementation of the water framework directive in France: analysis of the situation and application to the agriculture (Parts I and II)

Expert Group on Water and Agriculture

Research issue	Research issue description	Partially covered by
6.1. Assessing the interaction between surface and groundwater in agricultural catchments	Agriculture contributes to water pollution from pesticides and nutrients. Understanding the interrelationship between ground water and surface water is essential to achieve good status of water bodies and to protect the ecosystems depending on water. This is also essential to set up the appropriate set of measures in agricultural catchments. Interrelationship between ground and surface water should be investigated through modelling and monitoring in experimental sites. User-friendly tools should be developed for the authorities in charge of controls.	***CROPWAT (FP6)*** Centre for Sustainable Crop -Water management http://www.cropwat.agrif.bg.ac.rs/ The interaction of groundwater and surface water is currently in the focus of the research in agricultural catchments. However, there is not enough information in this area. The special emphases should on the potential impacts of agricultural pollutants on groundwater quality and quality of 3/5 water for irrigation. Malta is currently investigating the potential groundwater–surface water linkages in those agricultural catchments linked to areas of ecological importance. The findings from such a study will be available in mid-2013. ***AQUASTRESS (FP6)*** Mitigation of water stress through new approaches to integrating management, technical, economic and institutional instruments http://www.aquastress.net/ Other references: CIRCE (FP6), WATERWEB, MIRAGE (FP7). ***BRGM*** Evaluation of the benefits from groundwater good status — Year 2 ***CEMAGREF*** Delineation and vulnerability to pesticides of areas of supply for groundwater catchment (diffuse agricultural pollution) ***BRGM*** Delimitation of areas of supply for groundwater catchment

Expert Group Water Scarcity and Drought

Research area	Research issue	Research issue description	Partially covered by
Issue 1: Water scarcity and droughts indicators	1.1. Application of common indicators in EU river basins		'Impacts of Europe's changing climate — 2008 indicator-based assessment', EEA Rep. 4/2008; Technical reports of the WS & D EG Palmer,McKee,Wilhite http://drought.unl.edu *XEROCHORE (FP7)* An exercise to assess research needs and policy choices in areas of drought http://www.feem-project.net/xerochore/ *DROUGHT-R&SPI (FP7)* Fostering European drought research and science–policy interfacing http://www.eu-drought.org/ *AQUASTRESS (FP6)* Mitigation of water stress through new approaches to integrating management, technical, economic and institutional instruments http://www.aquastress.net/ *WASSERMED (FP7)* Water Availability and Security in Southern EuRope and the Mediterranean http://www.wassermed.eu/ *WATCH* Technical Report No 24 http://www.eu-watch.org/nl/25222760-Technical_Reports.html) Other references: EUROLIMPACS, MIRAGE, AdaptAlp, Ecconet (FP7), KliWas, LIFE08 (National project) ENV/IT/000413 INHABIT, DP Fresh Water, Water Scarcity, AQEM, STAR (FP5) http://www.eu-star.at/frameset.htm, AQUASTRESS (FP6 — IP)

Expert Group Water Scarcity and Drought

Research area	Research issue	Research issue description	Partially covered by
Issue 1: Water scarcity and droughts indicators	1.4. Development of prolonged drought indicators	Early warning systems and indicators are interconnected. Short-term drought forecast is issued for the next 1–3 months, seasonal forecast. Beyond this horizon the forecast is very difficult. An early warning system is a prerequisite of adaptation. Water scarcity should be distinguished from the drought situation. Scarcity has to do with mismanagement. The scale of the forecast plays a role. It is easier to forecast water demand, and model the (e.g. environmental) consequences of meeting that water demand. Indicators should refer to the priority actions identified in the WS&D communication.	*Po water balance plan* www.adbpo.it/on-multi/ADBPO/Home/PianodiBilancioIdrico.html *GLOWASIS (FP7)* A collaborative project aimed at pre-validation of a GMES global water scarcity information service http://glowasis.eu/ *AQUASTRESS (FP6)* Mitigation of water stress through new approaches to integrating management, technical, economic and institutional instruments http://www.aquastress.net/ Definition and application of water stress index. *XEROCHORE (FP7)* An exercise to assess research needs and policy choices in areas of drought http://www.feem-project.net/xerochore/ The XEROCHORE project has produced a set of five science–policy briefs in support of policymaking in the field of drought management. The science–policy briefs address Articles 5, 8, 9, 11 and 13 of the water framework directive and briefly describe limitations identified with regard to drought management, and recommendations for improving drought preparedness and mitigation. These science–policy briefs are available in five languages, see http://ec.europa.eu/environment/water/quantity/good_practices.htm#spi. Other references: EUROLIMPACS, STAR (FP5), AQEM, LIFE08 (national project) ENV/IT/000413 INHABIT, MIRAGE (FP7), AdaptAlp, Ecconet (FP7), KliWas, 25 WSD Fiches, DP Fresh Water.

Expert Group Water Scarcity and Drought

Research area	Research issue	Research issue description	Partially covered by
Issue 2: Climate change effects related to water scarcity and droughts	2.1. Impacts on water availability resources		***ACQWA (FP7)*** Assessing Climate impacts on the Quantity and quality of Water http://www.acqwa.ch/ ***WASSERMED (FP7)*** Water Availability and Security in Southern EuRope and the Mediterranean http://www.wassermed.eu/ ***AQUASTRESS (FP6)*** Mitigation of water stress through new approaches to integrating management, technical, economic and institutional instruments http://www.aquastress.net/ ***CIRCE (FP6)*** Climate change and impact research: the Mediterranean environment http://cordis.europa.eu/search/index.cfm?fuseaction=proj.document&PJ_LANG=EN&PJ_RCN=9776097&pid=2&q=1AC5F03B534B08478CB3DABC7478F776&type=sim Other references: AdaptAlp, Ecconet, KliWas, DP Fresh Water, PRIN07, Water Scarcity, PRIN07 (Anno 2007 — prot. 20075WFE7P_003), PROTEZIONE CIVILE (FP7) — WP4 (Years 2007–11), SECLI.

Expert Group Water Scarcity and Drought

Research area	Research issue	Research issue description	Partially covered by
Issue 2: Climate change effects related to water scarcity and droughts	2.2. Assessing available surface and groundwater water resources and estimating water demands under the current situation and under predicted climate change conditions (water supply, water demand balance at basin level)	Need to adopt new hydrological and hydro-geological models and estimation methods, taking into account available technological innovations, new tools and measures for water demand management.	***Water protection plans*** www.adbpo.it/on-multi/ADBPO/Home/PianodiGestioneepartecipazionepubblica/PianidiTuteladelleAcquedelleRegioni.html ***AQUASTRESS (FP6)*** Mitigation of water stress through new approaches to integrating management, technical, economic and institutional instruments http://www.aquastress.net/ ***WASSERMED (FP7)*** Water Availability and Security in Southern EuRope and the Mediterranean http://www.wassermed.eu/ ***IDOR (FP7)*** Water resource data integration and model development for management and sustainability of river-basin resources. ***SCENES (FP6)*** Water Scenarios for Europe and for Neighbouring States http://www.environment.fi/default.asp?contentid=379147&lan=EN ***CIRCE (FP6)*** Climate change and impact research: the Mediterranean environment http://cordis.europa.eu/search/index.cfm?fuseaction=proj.document&PJ_LANG=EN&PJ_RCN=9776097&pid=2&q=1AC5F03B534B08478CB3DABC7478F776&type=sim Other references: AdaptAlp, Ecconet, KliWas, DP Fresh Water, Water Scarcity, PROTEZIONE CIVILE (FP7) — WP4 (Years 2007—11), SECLI.

Expert Group Water Scarcity and Drought

Research area	Research issue	Research issue description	Partially covered by
Issue 2: Climate change effects related to water scarcity and droughts	2.4. Impacts on ecosystems	The main focus is generally put on the impacts of large floods on ecosystems. Too little attention is given to small floods that need to be 'protected' and maintained.	***ACQWA (FP7)*** Assessing Climate impacts on the Quantity and quality of Water http://www.acqwa.ch/ ***WASSERMED (FP7)*** Water Availability and Security in Southern EuRope and the Mediterranean http://www.wassermed.eu/ ***CIRCE (FP6)*** Climate change and impact research: the Mediterranean environment http://www.circeproject.eu/ ***INNOVATECH (FP6)*** Innovative and integrated technologies for the treatment of industrial wastewater http://cordis.europa.eu/search/index.cfm?fuseaction=proj.document&PJ_RCN=9548404 Other references: AQEM, EUROLIMPACS, STAR (FP5), AdaptAlp, Ecconet; KliWas, DP Fresh Water, LIFE08 ENV/IT/000413 INHABIT

Expert Group Water Scarcity and Drought

Research area	Research issue	Research issue description	Partially covered by
Issue 2: Climate change effects related to water scarcity and droughts	2.5. Intensification of the water cycle. Extreme events		*WATCH?* *XEROCHORE (FP7)* An exercise to assess research needs and policy choices in areas of drought http://www.feem-project.net/xerochore/ *ACQWA (FP7)* Assessing Climate impacts on the Quantity and quality of Water http://www.acqwa.ch/ *WASSERMED (FP7)* Water Availability and Security in Southern EuRope and the Mediterranean http://www.wassermed.eu/ *AQUASTRESS (FP6)* Mitigation of water stress through new approaches to integrating management, technical, economic and institutional instruments http://www.aquastress.net/ Huijgevoort, M.H.J. van et al. (2010), Drought assessment using local and large-scale forcing data in small catchments, IAHS Publ. No 340, pp. 77–85. Loon, A.F. van et al. (2010), Understanding hydrological winter drought in Europe, IAHS Publ. No 340, pp. 189–197. Stahl, K. & Tallaksen, L.M. (2010), RCM simulated and observed hydrological drought: a comparison of the 1976 and 2003 events in Europe (2010). In: Global Change: Facing Risks and Threats to Water Resources (Proc. of the Sixth World FRIEND Conference, Fez, Morocco, October 2010), IAHS Publ. 340, 150–156. Gudmundsson et al. (2010), Spatial cross-correlation patterns of European low, mean and high flows. Hydrological Processes, 24. DOI: 10.1002/hyp.7807. Corzo et al. (2011), On the spatio-temporal analysis of hydrological droughts from global hydrological models, Hydrol. Earth Syst. Sci. Discuss. 8, 619–652, doi:10.5194/hessd-8-619-2011. Hannaford et al. (2010), Examining the large-scale spatial coherence of European drought using regional indicators of precipitation and streamflow deficit, Hydrol. Process. DOI: 10.1002/hyp.7725. Stahl et al. (2010), Streamflow trends in Europe: evidence from a dataset of near-natural catchments. Hydrol. Earth Syst. Sci. 14: 2376-2382, doi:10.5194/hess-14-2367-2010. Fleig et al. (2010), Inter-comparison of weather and circulation type classifications for hydrological drought development. Physics and Chemistry of the Earth 35, 507-515. doi:10.1016/j.pce.2009.11.005. Fleig, A. K. et al. (2010), Regional hydrological drought in north-western Europe: linking a new Regional Drought Area Index with weather types (2010). Hydrological Processes, 24 (in press). DOI: 10.1002/hyp.7644. Dieker et al. (2010) Comparison of Three Drought Monitoring Tools in the USA. WATCH Technical Report No 25, 86 pp. Other references: INHABIT (LIFE08 ENV/IT/000413), AdaptAlp, Ecconet, KliWas, DP Fresh Water; CIRCE (FP6 — IP), SECLI.

Expert Group Water Scarcity and Drought

Research area	Research issue	Research issue description	Partially covered by
Issue 2: Climate change effects related to water scarcity and droughts	2.6. Interactions between climate change and agricultural, social and demographic changes	Long-term studies are required with long enough data series to address global environmental change(s) (climate change, demographic evolution, technological development) and project the impacts of changes in the water cycle and on water availability. One should distinguish between permanent and temporary water scarcity.	***ACQWA (FP7)*** Assessing Climate impacts on the Quantity and quality of Water http://www.acqwa.ch/ ***WASSERMED (FP7)*** Water Availability and Security in Southern EuRope and the Mediterranean http://www.wassermed.eu/ Other references: DP Fresh Water, Water Scarcity, CIRCE (FP6 — IP), PRIN07 (Anno 2007 — prot. 20075WFE7P_003), PROTEZIONE CIVILE (FP7) — WP4 (Years 2007–11), SECLI, KliWas.
Issue 5: Technological tools	5.3.Regional climate models (RCMs)		***WASSERMED (FP7)*** Water Availability and Security in Southern EuRope and the Mediterranean http://www.wassermed.eu/ ***ACQWA (FP7)*** Assessing Climate impacts on the Quantity and quality of Water http://www.acqwa.ch/ ***CECILIA (FP7)*** Central and eastern Europe climate change impact and vulnerability assessment Other references: AdaptAlp; Ecconet; KliWas; SECLI

Expert Group Water Scarcity and Drought

Research area	Research issue	Research issue description	Partially covered by
Issue 6: Economics and Law	6.1. Methodologies to assess WS&D economical impacts	Social impacts should be added. Understanding of economic impacts is a prerequisite for an efficient risk management. 'Economic' value should not be restricted to 'monetary' or 'exchange' value, e.g. ecosystem has a value per se.	'Studio di fattibilità concernente lo sviluppo dell'analisi economica dell'utilizzo idrico a scala di bacino del fiume Po così come prevista dalla Direttiva 2000/60/CE' — Allegato 6.2 all'elaborato 6 del Piano di gestione. www.adbpo.it/download/PdGPo_24febbraio2010/PDGPo_ELABORATO_06_SintesiAnalisiEconomica/Allegati/PDGPo_ELABORATO_6_All6_2_090630.pdf ***ACQWA (FP7)*** Assessing Climate impacts on the Quantity and quality of Water http://www.acqwa.ch/ ***AGROSCENARI (Italian Ministry of Agriculture)*** Project adaptation scenarios of Italian agriculture to climate change http://www.agroscenari.it ***EPI WATER Project (FP7)*** Evaluating economic policy instruments for sustainable water management in Europe www.epi-water.eu ***AQUASTRESS (FP6)*** Mitigation of water stress through new approaches to integrating management, technical, economic and institutional instruments http://www.aquastress.net/ ***WASSERMED (FP7)*** Water Availability and Security in Southern EuRope and the Mediterranean http://www.wassermed.eu/ ***Considering the economy as a system, going beyond partial equilibrium and local models*** ***AQUAMONEY (FP6)*** Development and testing of practical guidelines for the assessment of environmental and resource costs and benefits in the WFD http://cordis.europa.eu/search/index.cfm?fuseaction=proj.document&PJ_LANG=EN&PJ_RCN=8327663&pid=0&q=88A1857A2D011CBF257B23DB102D8E5A&type=sim http://www.iwrm-net.eu/sites/default/files/AquaMoney%20Policy%20Brief%20(2nd%20release).pdf ***POLICYMIX (FP7)*** Assessing the role of economic instruments in policy mixes for biodiversity conservation and ecosystem services provision http://policymix.nina.no Other references: PRIN07, PRIN07 (Anno 2007 — prot. 20075WFE7P_003), Ecconet, KliWas, DP Fresh Water.

Working Group A on Ecological Status

Research issue	Research need	Research issue description	Partially covered by
1. Developing and validating new bioassessment tools	1. To overcome knowledge gaps for transitional and coastal waters	The intercalibration exercise has highlighted the lack of relevant metrics and compliant assessment tools for the WFD implementation. More fundamentally the participants consider that the taxonomy — and especially the taxonomist formation — should be enhanced to sustain the development of new relevant metrics and to strengthen the expertise capacity of water managers.	***QWATER (FP7)*** Bioassay integration under the European water framework directive: A step towards an ecological approach (source: CORDIS) ***AQUAREHAB (FP7)*** Development of rehabilitation technologies and approaches for multipressured degraded waters and the integration of their impact on river basin management https://aquarehab.vito.be/ (source: CORDIS) ***WETwin (FP7)*** To enhance the role of wetlands in basin-scale integrated water resources management (IWRM), with the aim of improving the community service functions while conserving good ecological status — tools related to wetlands (transitional waters) are being used/developed. ***WISER (FP7)*** Water bodies in Europe: Integrative systems to assess ecological status and recovery — Deliverables 4.1-1 to 4.4-5, (www.wiser.eu)
1. Developing and validating new bioassessment tools	2. To overcome knowledge gaps for lakes	The intercalibration exercise has highlighted the lack of metrics and compliant assessment tools to cover all the WFD requirements in particular for Mediterranean areas. Once again, the participants consider that the taxonomy — and especially the taxonomist formation — should be enhanced to sustain the development of new relevant metrics and to strengthen the expertise capacity of water managers.	***ENVICAT (FP7)*** ENVIronmental control of CyAnoToxins production (source: CORDIS) ***CONTRASTRESS (FP7)*** Contradicting responses to multiple stressors reduce the resilience of zooplankton community (source: CORDIS) ***WISER (FP7)*** Deliverables 3.1-1 to 3.4-4 (www.wiser.eu) ***AQEM (FP5)*** The development and testing of an integrated assessment system for the ecological quality of streams and rivers throughout Europe using benthic macroinvertebrates (2000–02) ***STAR (FP5)*** Standardisation of river classifications: Framework method for calibrating different biological survey results against ecological quality classifications to be developed for the water framework directive ***EUROLIMPACS (FP6)*** The project sought to understand the effects on these vulnerable ecosystems of the interactions between changing climate and other potentially damaging processes caused by changes in the physical characteristics of rivers, nutrient pollution, acidification and the deposition of toxic metals and organic pollutants (WP2, WP7). ***MIRAGE (FP7)*** Mediterranean intermittent river management ***LIFE08 ENV/IT/000413 INHABIT;*** Local hydro-morphology, habitat and RBMPs: new measures to improve ecological quality in south European rivers and lakes www.life-inhabit.it

Working Group A on Ecological Status

Research issue	Research need	Research issue description	Partially covered by
1. Developing and validating new bioassessment tools	3. To analyse more carefully the links between ecotoxicological tools and biological assessment tools based on the structure of biological communities	Currently, substances are included in bioassessment mainly by using results of short-term bioassays on individuals of target species. The links between concentrations of these substances should be connected with population and communities dynamics using both mesocosms and in situ experiments, in order to provide rules for substance concentration interpretation that would be more ecologically relevant at the scale of the system investigated.	***REBECCA (FP6)*** Relationships between ecological and chemical status of surface waters Rebecca_en.htm (CORDIS) ***PARAWARM (FP7)*** From communities to individuals: Development of an early warning system to assess the relationship between climate warming and pollution in European freshwater ecosystems ***CONTRASTRESS (FP7)*** Contradicting responses to multiple stressors reduce the resilience of zooplankton community CONTRASTRESS — CORDIS
1.Developing and validating new bioassessment tools	4. To overcome difficulties in assessing ecological status in temporary streams	There is a need to have a better understanding of the ecological functioning of temporary streams and how their ecological status can be assessed when there is no water during (large) parts of the year. This topic increases in importance as climate change takes its toll on the availability of increasing water scarcity and droughts in large parts of Europe.	***HOLRIVERMED (FP7)*** Environmental river management: An innovative holistic approach for Mediterranean streams ***MIRAGE (FP7)*** Mediterranean intermittent river management This is a central topic in MIRAGE. MIRAGE developed a provisional classification of temporary streams into three main types: intermittent pools, when ecological status can be assessed as done for permanent streams but paying attention to the calendar for sampling following the stream regime; intermittent dry, when ecological status can be determined from aquatic biological communities but using protocols and standards especially developed; and ephemeral, when other methods than the study of aquatic communities are needed to assess the ecological status. The main challenge is to operationally define the limits between these types on the basis of the coupled ecological and hydrological studies. A step underway in MIRAGE is the development and testing of graphs and metrics to link the hydrological information with the temporal occurrence of the diverse aquatic habitats. Regarding the ecological status, MIRAGE has developed a protocol that links the sampling period for studying the ecological status with the hydro period, therefore the sampling has to be done in strong relation with the hydrogram. Using this approach and the MIRAGE protocol (available from the MIRAGE website, http://cordis.europa.eu/search/index.cfm?fuseaction=proj.document&PJ_LANG=EN&PJ_RCN=10375332&pid=0&q=326626F2C8C4918F301877C190703C3A&type=sim) data of ecological status for macroinvertebrates can be taken and the same metrics and tools as in permanent streams may be used. For summer and when the river is dry a specific protocol to sample and calculate the ecological status is now under construction. An integrated tool is the main product to be delivered to managers for the MIRAGE project to establish the ecological status in temporary rivers (source: EURAQUA) ***WISER (FP7)*** — Water bodies in Europe: integrative systems to assess ecological status and recovery ***AQEM (FP5)*** ***STAR (FP5)*** ***EUROLIMPACS (FP6) (WP2, WP7)*** ***LIFE08 ENV/IT/000413 INHABIT***

Working Group A on Ecological Status

Research issue	Research need	Research issue description	Partially covered by
1. Developing and validating new bioassessment tools	5. To reinforce the knowledge concerning uncertainties.	The WFD classifies the ecological status into five bands. The good/moderate limit is of major importance to consider if the ecological status is achieved or not. The attribution of an ecological quality class has to be associated with an uncertainty assessment, taking into account the different types of uncertainties associated to each method. Research programmes aiming to determine variability and uncertainties associated with each bioassessment method are in this context important to stimulate, since it could strongly affect the objectives of the management plans. It is also important that guidance is given to Member States to ensure that the level of confidence in classification they require is compatible with their own monitoring network. This is vital in order to identify pressures and measures within the required WFD timescale. In this context, developing bioassessment methods which take into account the natural inter-annual variability of communities is an important point to address (communities are likely to change naturally from one year to another one without significant changes in the pressures, and bioassessment tools have to integrate this aspect so that the ecological status remains stable in that case).	***RISK BASE (FP7)*** Towards risk-based management of European river basins: Key findings and recommendations of the RISK BASE project http://cordis.europa.eu/search/index.cfm?fuseaction=proj.document&PJ_LANG=EN&PJ_RCN=8824836&pid=5&q=DE71E453E1BDD0453F7311E03F7EE86B&type=sim ***WISER (FP7)*** Software WISERBugs available on www.wiser.eu several deliverables under construction + we are determining the uncertainty associated to the method. ***MIRAGE (FP7)*** WP4 is addressing this issue comparing in the same year two different situations, the dry and the wet period. In addition for some basin two consecutive years are studied. Also a large data base including temporary rivers from Spain, Greece and Italy developed by different research groups and institutes is being built up in order to try to understand the differences between years. ***REFRESH (FP7)*** ***AQEM (FP5)*** ***STAR (FP5)*** ***EUROLIMPACS (FP6) (WP2, WP7)*** ***LIFE08 ENV/IT/000413 INHABIT***

Working Group A on Ecological Status

Research issue	Research need	Research issue description	Partially covered by
1. Developing and validating new bioassessment tools	6. To build pressure–impact models for a better spatial extrapolation of the ecological status	Considering that all water bodies are not monitored through surveillance programmes, we should develop a critical analysis of the results of bioassessment and modulate this assessment based on risks assessment information. In addition, research programmes specifically aiming to build pressure–impacts models to allow understanding of potential impacts where monitoring for the quality element is absent on a water body, exploring whether this could be based on the information collected at surveyed sites is a crucial issue, as it will allow a spatial extrapolation of the ecological status. In this context, considering pressures at a local and regional (e.g. land uses) levels are of major interest.	***WETwin:*** The project applies the DPSIR (driver–state–impact–response) methodology for revealing the causes of the problems of wetlands. ***WISER (FP7)*** We are investigating the response of methods and metrics to pressure gradients. ***MIRAGE(FP7)*** The main contribution of MIRAGE is to focus on the pressure hydrology. Specific methods to calculate the hydrological status are being developed by MIRAGE. ***LIFE08 ENV/IT/000413 INHABIT*** ***AQEM, (FP5)*** ***STAR, (FP5)*** ***EUROLIMPACS (FP6) (WP2, WP7)***
2. Refining the knowledge about pressure–impacts relationships	7. To clarify links between hydromorphological pressures and biological responses	Further understanding is needed about the effects of hydromorphological pressures on biological populations and communities, notably in the cases where socioeconomical issues are important constraints (heavily modified water bodies (HMWB)). Water policies will have to manage hydromorphological elements taking into account the role they play on the structure and on the functioning of aquatic communities so as to identify the most cost-effective measure to restore the good ecological status and/or ensure the non-degradation objective. Part of this work must be to clarify the extent of hydromorphological impacts.	***EFI (FP7)*** Improvement and spatial extension of the European fish index; http://efi-plus.boku.ac.at/ ***WETwin (FP7)*** During the DPSIR analyses we investigate how hydromorphological pressures like erosion, sedimentation, floods, droughts are influencing the ecosystems of the wetlands. ***WISER(FP7)*** Deliverable 5.1-1 and upcoming paper on Advances in Ecological Research + it is expected in some of the deliverables; www.wiser.eu ***MIRAGE (FP7)*** The data of MIRAGE includes also hydromorphological alterations measured with specific indexes (RHS, IHF, QBR, etc.). The relationships between these indexes and the biological community will be explored. ***REFRESH (FP7)*** ***AQEM (FP5)*** ***STAR (FP5)*** ***EUROLIMPACS (FP6) (WP2, WP7)*** ***LIFE08 ENV/IT/000413 INHABIT***

Working Group A on Ecological Status

Research issue	Research need	Research issue description	Partially covered by
3. Evolving toward a more functional and holistic approach of aquatic ecosystems	8. To develop functional assessment tools based on trophic networks to complement tools based on community structure attributes — assess the links with resilience and sustainability	The current bioassessment tools are based on the structure of the biological communities and give only a static view of the ecological status ('snapshots'). A more functional approach should now be initiated: more holistic indicators based on ecosystem properties and functioning and considering trophic networks are needed. It would help the interpretation of the survey results by overcoming the natural variability of communities through time. This functional approach would consider the resilience of the systems, which is a crucial issue when carrying out restoration measures. At the moment this functional aspect lays upon the use of functional metrics in the bioassessment tools, which is not sufficient for a functional interpretation of ecosystem's health.	*WETwin (FP7)* We use trophic network-based vegetation models in order to assess the ecosystem functions of wetlands. For example: a N circulation model has been developed for the papyrus wetlands of Uganda with the aim of assessing the nutrient retention function of the papyrus stands. *AQEM (FP5)* *STAR (FP5)* *EUROLIMPACS (FP6) (WP2, WP7)* *MIRAGE (WP4)*

Working Group A on Ecological Status

Research issue	Research need	Research issue description	Partially covered by
3. Evolving toward a more functional and holistic approach of aquatic ecosystems	9. To clarify the links between global changes (climate, fragmentation, exotics) and ecosystem functioning and assessment tools	Global change may have consequences on climate, habitat fragmentation (notably for rivers), historical distribution area of the native species and spread of exotics. The effects of climate change (thermal regime, hydrology) on the biological indicators used in ecological status monitoring have to be analysed, in order to avoid bias in the ecological status assessment. It would be important to define indicators only slightly sensitive to the likely evolution of the species distribution on a European or ecoregional level, or conversely to define metrics which are specifically related to these changes. The question related to invasive alien species (impact on existing indicators, usefulness as potential metrics for tracking impacts of specific pressures) as well as relationships between climate change and the area of distribution of these species also need to be addressed.	*REFRESH (FP7)* Adaptive strategies to mitigate the impacts of climate change on European freshwater ecosystems www.refresh.ucl.ac.uk *FRESHCLIM (FP7)* Freshwater biodiversity and community composition in a changing climate: from ecosystem manipulation to biogeographical patterns *WETwin (FP7)* We are investigating the impacts of global changes on wetlands ecosystems with the help of assessment tools. WISER: Rivers: Deliverables 5.5-2 to 5.5-4 (August 2011 and January 2012)

Working Group A on Ecological Status

Research issue	Research need	Research issue description	Partially covered by
4. Reconnecting the socioeconomical and biological issues	10. To reinforce the knowledge on relationships between good ecological status (GES), biodiversity and ecosystem's services	An underlying assumption of WFD is that restoring or maintaining the good status will benefit to biodiversity. This hypothesis has not been explicitly tested. It is urgent to examine what the links between good ecological status and biodiversity really are, for the different facets of biodiversity (taxonomy, functionalities, genetic aspects). A better understanding of these links have strong implications for governance at a European level and socioeconomical issues related to biodiversity conservation ('millenium ecosystem assessment'). Moreover, the scientific understanding of relations between society and aquatic system policies shall be improved. Interdisciplinary programs with biologists, economists and sociologists need to be developed because ecosystem's health provides society with multiple ecological services, among which economical assets and social well-being. This approach would then provide a broader understanding of the GES in particular how it could be ensured with regards to socioeconomical benefits.	***NEWATER (FP6)*** New approaches to adaptive water management under uncertainty http://www.newater.uni-osnabrueck.de/ ***WETwin (FP7)*** Ecosystem services approach. We are investigating the relationship between ecological status and ecosystem services in case of wetlands. ***AQEM (FP5)*** ***STAR (FP5)*** ***EUROLIMPACS (FP6) (WP2, WP7)*** ***LIFE08 ENV/IT/000413 INHABIT*** ***MIRAGE (FP7)***

Working Group C on Groundwater

Research issue	Research need	Research issue description	Partially covered by
6. Programmes of measures	6.3. Assessing the efficiency of measures in agriculture	Implementing effective measures in agriculture to protect groundwater quality and levels is one the most challenging issue for the WFD. But understanding the links between the measures and their effect on groundwater bodies status is not easy and water managers will need tools to assess the efficiency of the measures	*STRIVE 'Pathways' EPA Ireland* (Hinsby et al., 2012b Queens University Belfast, Trinity College Dublin, University College Dublin) will assist in identifying and apportioning pollutant loads to different pathways *Agricultural Catchments Programme (TEAGASC Ireland)* considering the pathways and the agricultural practices, towards achieving better agricultural practice *COST 869* *MIRAGE (FP7)* *AQUASTRESS (FP6 — IP)*

Working Group C on Groundwater

Research issue	Research need	Research issue description	Partially covered by
1. Climate change impacts	1.2. Surface water — groundwater changes in interaction	The hyporheic zone is a critical interface between groundwater and surface water environments and is shown to be a dynamic zone of interaction characterised by steep chemical and biological gradients. Its ecology is an important component on the food web and has a vital role in the cycling and processing of energy, carbon and nutrients. The geochemical and microbial properties of the hyporheic zone are such that it presents significant, but currently little investigated, opportunities for pollutant attenuation that may reduce the impacts of polluted groundwater on a dependent river ecosystem, or vice versa. (Source Environment Agency (England and Wales)) As development of land and water resources increases, it is apparent that development of either of these resources affects the quantity and quality of the other. Nearly all surface-water features (streams, lakes, reservoirs, wetlands, and estuaries) interact with groundwater. These interactions take many forms. In many situations, surface-water bodies gain water and solutes from groundwater systems and in others the surface-water body is a source of groundwater recharge and causes changes in groundwater quality. As a result, withdrawal of water from streams can deplete groundwater or conversely, pumpage of groundwater can deplete water in streams, lakes or wetlands. Pollution of surface water can cause degradation of groundwater quality and conversely pollution of groundwater can degrade surface water. Thus, effective land and water management requires a clear understanding of the linkages between groundwater and surface water as it applies to any given hydrologic setting. — Robert M. Hirsch, Chief Hydrologist, USGS From USGS Circular 1139: Ground Water And Surface Water: A Single Resource	*RexHySS project* (www.gip-ecofor.org); Climate change impacts on the Seine and Somme rivers (France) *GENESIS (FP7)* Groundwater and dependent ecosystems: New scientific and technological basis for assessing climate change and land-use impacts on groundwater http://www.bioforsk.no/ikbViewer/page/prosjekt/ *PREPARED (FP7)* Environmental concern-based rehabilitation and investment programmes for water supply and sanitation systems (including storm water) http://www.prepared-fp7.eu *AQUAREHAB (FP7)* Innovative rehabilitation technologies for soil, groundwater and surface water to cope with a number of different priority contaminants (nitrates, pesticides, chlorinated compounds, aromatic compounds, mixed pollutions, etc.) within heavily degraded water systems. Two remediation technologies at the interface are being considered, being wetlands and stimulated interphases. Numerical models are being constructed to estimate the influx of pollutants from groundwater/run-off in the surface water, and the impact of the technologies on this influx; PREPARED: expected result of Work Area 5: Planning for resilient water supply and sanitation systems, in especially northern Europe https://aquarehab.vito.be/home/Pages/home.aspx

Working Group C on Groundwater

Research issue	Research need	Research issue description	Partially covered by
5. Pollutants	5.2. Emerging pollutants	Research is needed to better understand the input, the time and space distribution and the fate of emerging substances from the soil to the groundwaters. Studies into the transfer of pharmaceutical pollutants (for example) to the groundwater. Analytical development to ensure detection and quantification of emerging substances and their metabolites and degradation products in different matrix is also necessary.	***NORMAN project*** Joint JRC and NORMAN project ongoing http://www.norman-network.net/index_php.php; FP6 — Network of reference laboratories and related organisations for monitoring and bio-monitoring of emerging environmental pollutants ***BGS research work*** http://www.bgs.ac.uk/research/groundwater/ http://nora.nerc.ac.uk/14557/1/OR11013.pdf ***AQUATERRA*** The novel measurement and analyse techniques developed in AQUATERRA allow to detect more and more compounds (incl. newly emitted compounds) today. Analytical protocols developed in AQUATERRA subproject MONITOR enable to quantify emerging compounds (pesticides, pharmaceuticals, illicit drugs, polar pesticides and new brominated flame retardants) and some of their derivatives. MONITOR recommends inclusion of main transformation products of selected pollutants on the list of monitored compounds. MONITOR recommends development of risk-assessment methodologies and advanced measuring systems for different stages of wastewater treatment plants (WWTP) and to use them in existing and new WWTPs to ensure good performance of WWT technologies for urban, industrial and agricultural purposes. MONITOR recommends the use of passive samplers in combination with scaling techniques as a tool for monitoring of organic pollutants in river catchments. ***AQUAREHAB (FP7)*** focuses on typical groundwater pollutants (volatile chlorinated compounds, nitrates, etc.) Other references: DEET, PFOS

Working Group C on Groundwater

Research issue	Research need	Research issue description	Partially covered by
5. Pollutants	5.3. Good understanding of the process involved in the degradation of emerging pollutants needed (soil, unsaturated zone, degradation products, etc.)	Pollutants that have been recently discovered in the environment (emerging pollutants) such as endocrinial disruptors resulting from degradation of some organic compounds or introduction of pharmaceuticals into the environment. Previously these were unknown or unrecognised pollutants. Emerging pollutants are generally not included in the legislation (non-priority pollutants) emerging chemical risks, emerging issues and short-circuiting risks, long-established, widely recognised risks, as POPs (persistent organic pollutants) or PBT (persistent bioaccumulative toxicants); risks to groundwater and the wider environment are increasing due to increasing use. Hidden, latent risks (previously unrecognised risk existing for some time, now recognised, as PPCPs); future risks, currently not-existing risks (new generation of chemicals/drugs subjected to approval) (source: EUGRIS)	*AQUATERRA* Microbiological work revealed functional activities and composition of microbial communities in the Brévilles, Danube, Ebro and Elbe. Details of the Ebro river sediment show that bacterial communities change seasonally and spatially. This implies that turnover of pollutants varies locally, depending on temperature, pH and other key environmental parameters. *AQUAREHAB (FP7)* focusses on pollutant removal processes in the saturated zone. *Innovatech (FP6)*
2. Groundwater dependent ecosystems	2.1. Ecosystem requirements — classification system	The WFD criteria for groundwater good chemical and quantitative status include the potential damage caused by groundwaters on dependent ecosystems. But very little information is available today to ascertain the linkages and sensitivities of groundwater dependent ecosystems to changing levels and flows, or pollutants as a basis for setting threshold values and/or standards. Research results in this area will contribute to the revision of the risk assessment required by the WFD in 2013, to the revision of monitoring programmes from 2015 and to establishing criteria for achieving good status (chemical and quantitative).	Hinsby et al., 2012b Turloughs research project nearing completion (Trinity College Dublin); Work being done (Trinity College Dublin) on classifying GWDTE and establishing GWDTE TVs http://www.forum-marais-atl.com UK Wetland Task Team approach for establishing wetland TVs; UK-TAG papers (Mark Whiteman, etc.) on assessing GWDTE *GENESIS (FP7)*

Working Group C on Groundwater

Research issue	Research need	Research issue description	Partially covered by
2. Groundwater dependent ecosystems	2.3. Criteria for environmental quality objectives	As 2.1. The WFD criteria for groundwater good chemical and quantitative status include the potential damage caused by groundwaters on dependent ecosystems. But very little information is available to ascertain the linkages and sensitivities of groundwater dependent ecosystems to changing levels and flows, or pollutants as a basis for setting threshold values and/or standards. Research results in this area will contribute to the revision of the risk assessment required by the WFD in 2013, to the revision of monitoring programmes from 2015 and to establishing criteria for achieving good status (chemical and quantitative).	Hinsby et al., 2012b Work being done (Trinity College Dublin) on classifying GWDTE and establishing GWDTE TVs *UK Wetland Task Team approach for establishing wetland TVs* *GENESIS (FP7)* *AQUAREHAB (FP7)* does not focus on fixed values but rather on identifying where available money for quality improvements can be invested the best, and results with the highest cost/effect ratio Other references: Innovatech (FP6), MIRAGE (FP7)
1. Climate change impacts	1.4. Changes in groundwater chemistry due to climate change	Results in this area are expected for the 2nd and the 3rd river basin management plans (starting respectively in 2015 and 2021) in which Member States will have to present measures on adaptation to climate change effects.	*BRIDGE (FP7)* 'Guidance on groundwater status and trends', common implementation strategy for the WFD, Guidance document No 18. November 2009. Modelling of Nitrate pollution (Armines) Hinsby et al., 2008, 2012a, b; Sonnenborg et al., 2011; Sulzbacher et al., 2012; Vandenbohede et al., 2011. *AQUATERRA (FP6)* In AQUATERRA subproject BIOGEOCHEM it was found that shifts from oxic to anoxic conditions after floods cause release of organic colloids and in turn persistent organic pollutants and redox sensitive inorganic compounds. Such effects will become even more pronounced in areas of more frequent flooding as colloid-facilitated transport affects the speciation, distribution and bioavailability of contaminants within the floodplain ecosystem. After long droughts preferential flow will enhance vertical transport of pollutants to groundwater. http://eu-aquaterra.de/5.0.html

Working Group C on Groundwater

Research issue	Research need	Research issue description	Partially covered by
1. Climate change impacts	1.10. Methodology to assess groundwater vulnerability to climate change (primary and secondary effects), visualisation tools	Because Member States and water managers will have to include adaptation to climate change effects in the future programme of measures required by the WFD and because they are not specialist of climate change effects, methodologies and visualisations tools should be developed to help them assessing groundwater vulnerability to climate change. Results in this area are expected for the 2nd and the 3rd river basin management plans (starting respectively in 2015 and 2021) in which Member States will have to present measures on adaptation to climate change effects.	ONEMA-BRGM action 2010-2011; Explore 2070 (ongoing research project) Hinsby et al., 2008, 2012a, b; Rasmussen et al., 2012; Sonnenborg et al., 2011. *EURO-LIMPACS-FP6* Integrated project to evaluate the impacts of global change on European freshwater ecosystems http://www.refresh.ucl.ac.uk *IMVUL* Towards improved groundwater vulnerability assessment http://www.see.leeds.ac.uk/imvul/index.htm *PREPARED (FP7)* expected result of Work Area 2: Risk assessment and risk management *CIRCE (FP6 — IP)*
2. Groundwater-dependent ecosystems	2.2. Classification of GW fluctuation/ hydrology	Knowledge of the conditions causing ecological damage in GWDTEs, and of GWDTE interactions with groundwater, remains a developing field. Assessments of confidence will always be site-specific involving a subjective evaluation of overlapping hydrogeological and ecological lines of evidence (source: UKTAG 2012)	*GENESIS(FP7)* *AQUAREHAB (FP7)* GW hydrology is needed to get an idea of the dynamics of the groundwater and the impact of pollutions and remediation technologies at a larger scale. *MIRAGE (FP7)* Other references: State of the environment RMC, NAPROM Turloughs research project nearing completion (Trinity College Dublin), UKTAG papers (Mark Whiteman, etc.) on assessing GWDTE

Working Group E on Chemical Aspects

Research area	Research issue	Research issue description	Partially covered by
2. Priority substances in surface waters	2.1. Development and improvement of suitable harmonised analytical procedures for new priority substances	Depending on the final list of substances it has to be checked whether methods exist which are suitable to produce reliable and comparable results for 'whole waters'. Methods have to be suitable to work with water samples with a solid particulate matter (SPM) content of at least 0.5 g/l. In addition they have to be sensitive enough to allow a monitoring below the future environmental quality standards (EQS) and have to be properly validated and harmonised	***SOCOPSE (FP6)*** Source control of priority substances in Europe http://www.socopse.se/ ***EAQC-WISE (FP6)*** European analytical quality control in support of the water framework directive via the water information system for Europe http://www.eaqc-wise.net/ ***Euraqua, full coverage: PFAS*** ***PT: Project SCARCE*** www.idaea.csic.es/scarceconsolider
1. Integrated strategy and holistic R & D approaches	1.2. Harmonisation of knowledge basis and strategic approaches for chemicals in European policies	Different policies dealing with chemicals — notably REACH, but also IPPC and EU directives on waste, products and electronics as well as international conventions on air and marine pollution — need to be integrated in terms of a common knowledge base for sources, fate, transport, ecological impacts, abatement options and their efficiency and socioeconomic impacts. Highest priority should be given to source identification, control measures and modelling tools to describe environmental fate and ecological status. Transparency and availability of information should be assessed and proposals for harmonisation and integration should be developed.	***AQUAREHAB (FP7)*** https://aquarehab.vito.be/home/Pages/home.aspx ***Euraqua, partial coverage: PFAS*** PT: European marine strategy framework directive (MSFD) PT: Soil thematic strategy COM(2006) 231 PT: REACH PT: PPP- 2009/128/CE DE: Interactions REACH and other chemical legislation (RIVM Report 601375001): http://www.reach-helpdesk.info/fileadmin/reach/dokumente/REACh-EEE/Interactions_REACH_Bodar_et_al_2010.pdf DE: Effective control of substances of very high concern: http://www.reach-info.de/dokumente/pbt_kontrolle-engl.pdf
	New: Relationships between ecological, chemical and biological status needs to be studied.	See/linked to 2.8	

Working Group E on Chemical Aspects

Research area	Research issue	Research issue description	Partially covered by
2. Priority substances in surface waters	2.2. Development and improvement of sampling procedures and techniques for existing and new priority substances	For surveillance/compliance monitoring a suitable set of methods exists (most of the methods are standardised on ISO level (ISO 5667 series, i.e. ISO 5667 series)). Nevertheless, for the R & D cluster 'visions' passive sampling and automated sampling techniques are promising approaches to overcome existing problems — there is an urgent need for development of environmental sampling methods that provide representative data with a reduced level of uncertainty — recently used approach using grab/spot samples provides only a snapshot picture at the time of sampling and is often not sensitive enough to detect trace levels of substances — potential of passive samplers: integrative passive sampling provides samples that are representative for long time periods (up to several weeks); homogeneous samples are produced with a reduced level of matrix uncertainty with improved method sensitivity that allows quantification of contaminants at trace levels (down to pg/L levels)	*SWIFT WFD — (FP6)* Deliverable D44 Report on laboratory and field validations of screening tools based on performance criteria evaluation. The main objective of this report is to evaluate the performances of some selected alternative/screening methods (physico-chemical, biosensors, bioassays, etc.) in laboratory and in field conditions and to compare to the specifications mentioned by the manufacture. (FP5) STAMPS, (FP6) SWIFT-WFD, ICES- ICES Passive Sampling Trial Survey and intercalibration, AQUAREF — interlaboratory calibration study 2010, NORMAN (FP6) — interlaboratory study under preparation for 2011 Euraqua, full coverage: PFAS PT: ISO 5667 part 23 PT: Project NORMAN (FP6) (FP5) STAMPS, (FP6) SWIFT-WFD, ICES- ICES Passive Sampling Trial Survey and intercalibration, AQUAREF — interlaboratory calibration study 2010, NORMAN (FP6) — interlaboratory study under preparation for 2011 (Not discussed during the meeting)

Working Group E on Chemical Aspects

Research area	Research issue	Research issue description	Partially covered by
2. Priority substances in surface waters	2.9. Non-target analysis and screening	Non-target analysis/screening is a suitable supplement or counterpart for the bio-assays necessary for establishment of the lists of river basin specific pollutants and their prioritisation	*SWIFT WFD — (FP6)* Deliverable D44 Report on laboratory and field validations of screening tools based on performance criteria evaluation. The main objective of this report is to evaluate the performances of some selected alternative/screening methods (physico-chemical, biosensors, bioassays, etc.) in laboratory and in field conditions and to compare to the specifications mentioned by the manufacture. *MODELKEY (FP6), NORMAN (FP6)* BE 1: http://www.pharmas-eu.org/ BE 1: http://www.knappe-eu.org/ BE 1: http://www.pills-project.eu/index.php?id=126 BE 1: Newsletter NORMAN (FP6): http://www.norman-network.net/index_php.php BE 2: (FP6) SWIFT-WFD Project: Screening methods for Water data InFormaTion in support of the implementation of the Water Framework Directive — the 2006 deliverables (public access) are available on http://cordis.europa.eu/search/index.cfm?fuseaction=proj.document&PJ_LANG=EN&PJ_RCN=7493414&pid=1&q=CCD17D141716541F094289B684086248&type=sim (+ 2006–07 presentations available on 'Events and Workshops' page). LT: http://www3.ivl.se/rapporter/pdf/B1874.pdf PT: Project NORMAN (FP6) FR: CHEMSCREEN (FP 7)
4. Development of environmental quality standards (EQS)	4.1. Review and testing of EQS	There is a clear opportunity for a greater use to be made of existing monitoring data for many of the priority substances in order to test the (environmental) relevance of EQSs established on the basis of laboratory toxicity data. Widespread non-compliance at the Community level (as it is the case for Hg) should initiate a review of the EQS.	LT: http://www.helcom.fi/projects/on_going/en_GB/coreset/ FR: CHEEM (FP7) LT: http://www.bonusportal.org/BEAST LT: http://www.beep.u-bordeaux1.fr/

Working Group E on Chemical Aspects

Research area	Research issue	Research issue description	Partially covered by
2. Priority substances in surface waters	2.5. Relationship and interactions between concentrations of priority substances in the three matrixes: water, sediment and biota	Investigations needed on the comparability and consistency between chemical status assessments as determined from measurements in water, sediment or biota. The monitoring should discriminate between the optimal matrices for hazardous substances analysis, i.e. water for hydrophilic and suspended matter, sediment and biotic tissues for hydrophobic compounds.	***MODELKEY (FP6)*** ***Euraqua, partial coverage: AquaStress (FP6 — IP)*** ***Euraqua, full coverage: MIRAGE (FP7); PFAS*** PT: http://cordis.europa.eu/search/index.cfm?fuseaction=proj.document&PJ_LANG=EN&PJ_RCN=10375332&pid=0&q=326626F2C8C4918F301877C190703C3A&type=sim PT: ISO 17402 PT: Project SCARCE
2. Priority substances in surface waters	2.6. Development of bio-indicators/ bio-assays for groups of substances	For emerging pollutants of high priority, including those from the groups of hormones and pharmaceuticals, new biomarkers and bioassays should be developed. The development of approaches to analyse combined effects of chemicals (i.e. chemical mixtures) is also a major research need. The starting point for the development of these bioassays is the understanding of the mode of action of contaminants. Bio-indicators/bio-assays could provide an early warning signal of deleterious biological effects. Furthermore, a pre-screening with bio-assessment tools such as *in vitro* tests helps to identify pollutants responsible for the observed effects. Integrative bio-assessment tools have the advantage of taking into account the bioavailability of contaminants, and allow the inclusion of health-related information and data to the set of information.	***SWIFT WFD — (FP6)*** Deliverable D44 Report on laboratory and field validations of screening tools based on performance criteria evaluation. The main objective of this report is to evaluate the performances of some selected alternative/screening methods (physico-chemical, biosensors, bioassays, etc.) in laboratory and in field conditions and to compare to the specifications mentioned by the manufacture. ***AQUAREHAB*** ***PT: Project NORMAN (FP6)*** LT: http://www.bonusportal.org/BEAST LT: http://www.beep.u-bordeaux1.fr/
	New: Use of eco-toxicology tools to link chemical and ecological status	See/linked to 2.8	

Working Group E on Chemical Aspects

Research area	Research issue	Research issue description	Partially covered by
6. Identification of possible future priority substances	6.1. Identification of possible future priority substances	Idea of a pan-European campaign to collect multi-sites in-depth contamination profiles of river sediments (chronograms), using target and non-target analytical screenings, to reveal those adsorbed persistent contaminants which do exhibit upward trends; idea of exploring the capability of passive samplers (submerged into the water column or by the sediment bed) to screen and reveal the presence of some potentially bio accumulative new substances of significance at the EU scale, and whose importance would not have been identified from conventional water samples measurements; alternative approaches to derive candidate substances for consideration as priority pollutants in monitoring programmes need to be developed based on the effect directed analysis (EDA) studies.	***MODELKEY (FP6)*** Euraqua, partial coverage: PFAS PT: Project NORMAN (FP6) PT: ISO 5667 part 23 PT: AQUAREF PT: Project SCARCE BE 2: (FP6) NORMAN Project (Network of Reference Laboratories for Monitoring of Emerging Substances), and NORMAN network since 2009: http://www.norman-network.net/index_php.php?menu2=public/about_us/about_us&module=public/about_us/home BE 2: (FP6) NORMAN Project (Network of Reference Laboratories for Monitoring of Emerging Substances), and NORMAN (FP6) network since 2009: http://www.norman-network.net/index_php.php?menu2=public/about_us/about_us&module=public/about_us/home Wide, systematic and harmonised collection of monitoring data on less-investigated compounds in a common EU database (results issued from EU-funded research projects, ad hoc monitoring campaigns in EU, etc.) would be required
2. Priority substances in surface waters	2.7. Validation of existing bio-test systems	There is a lack of knowledge whether existing tools are really applicable and lead to comparable results. Interpretation of the results and evaluation of the ecological relevance of the tools are crucial for their application — research needed.	***MODELKEY (FP6)***
2. Priority substances in surface waters	2.8. Investigation of the behaviour/effects of mixtures of hazardous substances in the water environment, including synergistic effects	Establish methodology to identify substances/interactions most responsible for the observed effects. Derivation of universal criteria of inhibition. Research on additive and synergistic effects and ecological functioning of systems with a focus on multiple-stressors is needed. But, this issue is not related to the current WFD surveillance/compliance monitoring. It belongs to R & D cluster (2) 'visions'.	***NORMAN (FP6)*** ***Euraqua, partial coverage: Innovatech (FP6)*** DE: http://www.modelkey.org/ PT: REACh FR: BEAM (FP5) FR: NOMIRACLE (FP6) FR: OUTREACH (FP7)

The information provided by WG E and the comments from the members are very rich. They have been aggregated in the dedicated WG E report ('Science–policy interface (SPI) activity on prioritisation of research needs, knowledge availability and dissemination for the Working Group E (Chemical Aspects) 2010–12', R. Kase, 10/10/2012). The table above is therefore adapted to cover on the one hand the projects identified and on the other hand the literature and articles.

Working Group F on Floods

Research area	Research issue	Research issue description	Partially covered by
	1.2. How to define an 'acceptable level' of flood risk and how to deal with the residual risk?	In the local level there are problems with defining the measures because the level of the acceptance is not defined. This issue is primarily concern for public dialogue and policy setting. It is an issue of value to which the science has no specific answer (apart of designing the democratic processes which may lead to such answer). In social sciences, this question may be legitimate as it is linked to perception, amplification/attenuation of risk, but to this end the research issue should be reframed.	***FLOODSITE (FP6)*** Integrated flood risk analysis and management methodologies www.floodsite.net ***FLOOD AWARE (Interreg IVA 2 Seas project)*** www.flood-aware.com Other references: WaterAdap, GreenClimeAdapt, AdaptAlp, KliWas, Commission on Climate and Vulnerability
	1.5. The ability to quantify the hydrological or other effects of combinations of different actions across a catchment, and in particular, the effect of more natural approaches	Participants pointed out the necessity to consider flood management together with drought management in order to avoid contradictions between the respective policies. The water needed to overcome periods of deficient precipitation may come from the water abundant periods as a last resort.	***FLOODSITE (FP6)*** Integrated flood risk analysis and management methodologies www.floodsite.net ***FLOOD AWARE (Interreg IVA 2 Seas project)*** www.flood-aware.com ***WASSERMED (FP7)*** Water Availability and Security in Southern EuRope and the Mediterranean http://www.wassermed.eu/ ***NEWATER (FP6)*** New approaches to adaptative water management under uncertainty www.newater.uni-osnabrueck.de Other references: Label, WaterAdapt, GreenClimeAdapt, AdaptAlp, Ecconet, KliWas

Working Group F on Floods

Research area	Research issue	Research issue description	Partially covered by
	3.1. What are the most appropriate methods for mapping social and environmental risk and risk to cultural heritage?	What are the most appropriate methods for mapping social and environmental risk and risk to cultural heritage; aspects of risk that are generally less well understood than economic risk? (sub-issues: How can social and environmental risks, and risks to cultural heritage be measured (i.e., what indicators of risk might be appropriate)? Can, or should, social and environmental risks, and risks to cultural heritage be monetised, and if so, what would be the benefits of doing so?)	*RISK BASE (FP7)* Towards risk-based management of European river basins: Key findings and recommendations of the RISK BASE project http://cordis.europa.eu/search/index.cfm?fuseaction=proj.document&PJ_LANG=EN&PJ_RCN=8824836&pid=5&q=DE71E453E1BDD0453F7311E03F7EE86B&type=sim *Work done by the International Risk Governance Council* www.irgc.org *FLOODSITE (FP6)* Integrated flood risk analysis and management methodologies www.floodsite.net *RISK MAP* The central objective of RISK MAP was to improve the content and visualisation of flood maps through a participatory process *CONHAZ (FP7)* Costs of natural hazards http://conhaz.org
	3.4. Groundwater flooding		*WADE (FP6)* Floodwater recharge of alluvial aquifers in dryland environments To assess long-term (decades to centuries) water resources in semi-arid and hyper-arid ephemeral river basins by determining long-term transmission losses from floods and quantifying floodwater recharge into alluvial aquifer. Other references: GreenClimeAdapt, KliWas, WaterAdapt, Commission on Climate and Vulnerability
	3.5. Mapping potential for lake tsunamis and landslip		References: AdaptAlp, WaterAdapt, Commission on Climate and Vulnerability

Working Group F on Floods

Research area	Research issue	Research issue description	Partially covered by
	3.11. Communication tools, training/education programmes and feedback mechanisms related to the use of flood maps		***URflood (ERA-Net CRUE)*** Understanding uncertainty and risk in communicating about floods www.macaulay.ac.uk/urflood/index.php How different audiences understand and use flood communications? How to implement good practice flood communications? How to respond to differences and how information is interpreted and utilised? ***WaterDiss2.0 (FP7)*** Dissemination and uptake of FP water research results www.waterdiss.eu Summer school on flood risk management www.waterdiss.eu/node/57 ***CORFU (FP7)*** Collaborative research on flood resilience in urban areas www.corfu-fp7.eu/ ***FLOODPROBE (FP7)*** Technologies for the cost-effective flood protection of the built environment www.floodprobe.eu/
	3.12. Understanding, calculating and presenting uncertainty, including the influence of DTM accuracy	Understanding, calculating and presenting uncertainty are different topics and extremely important ones. In the last 20 years the calculation of uncertainty has made significant advances in all areas, hydrology, meteorology, etc. Need to develop a culture in using uncertainty	***REFORM (FP7)*** REstoring rivers FOR effective catchment Management www.reformrivers.eu/start Other reference: AdaptAlp
	4.5. How to coordinate elaboration of objectives in national and international setting?	How to coordinate the selection of appropriate measures in international river basins ('solidarity')?	***RISK BASE (FP7)*** Towards risk-based management of European river basins: Key findings and recommendations of the RISK BASE project http://cordis.europa.eu/search/index.cfm?fuseaction=proj.document&PJ_LANG=EN&PJ_RCN=8824836&pid=5&q=DE71E453E1BDD0453F7311E03F7EE86B&type=sim Other references: Make better use of the international river basin commissions, WaterAdapt, KliWas

Working Group F on Floods

Research area	Research issue	Research issue description	Partially covered by
	4.7. Integrated risk management combining protection, prevention and preparedness		*RISK BASE (FP7)* Towards risk-based management of European river basins: Key findings and recommendations of the RISK BASE project http://cordis.europa.eu/search/index.cfm?fuseaction=proj.document&PJ_LANG=EN&PJ_RCN=8824836&pid=5&q=DE71E453E1BDD0453F7311E03F7EE86B&type=sim *NEWATER (FP6)* New approaches to adaptative water management under uncertainty www.newater.uni-osnabrueck.de NEWATER identified key elements of current water management regimes and investigates their interdependence. Research was focused on transformation processes of these elements in the transition to adaptive integrated water resources management. Other references: WaterAdapt, GreenClimeAdapt, COST 869, KliWas
	4.13. Risk management should take into account the quality of the water bodies. Some river-dependent ecosystems require a minimum flooding		***Sustainable development of flood plains (INTERREG IIIB)*** www.ecrr.org/sdfproject/sdfproject.htm ***FLOODPLAINs*** Demonstration and evaluation of the floodplain enlargement as a contribution to achieve a 'good ecological status' Other references: Label, AdaptAlp, Ecconet, KliWas, WaterAdapt
	5.1. Coastal: more investigation needed on: storm winds, air pressure, tide dynamics		References: KliWas, WaterAdapt, Commission on Climate and Vulnerability

Annex IV — Snapshot of research gaps

Expert Group on Water and Climate Change

Research area	Research issue	Status
4. Assessing available surface and groundwater water resources and estimating water demands under the current situation and under predicted climate change conditions at basin level, and look forward to seeing the results of the ongoing projects	4.4. Methodological tools for eco-design for various industries	Partially covered
1. Mainstreaming the climate change issue within other research areas	1.1. Forecasting climate change scenarios	Partially covered
4. Assessing available surface and groundwater water resources and estimating water demands under the current situation and under predicted climate change conditions at basin level, and look forward to seeing the results of the ongoing projects	4.7. Energy efficiency of all the water supply chain	Partially covered
4. Assessing available surface and groundwater water resources and estimating water demands under the current situation and under predicted climate change conditions at basin level, and look forward to seeing the results of the ongoing projects	4.8. Desalination using renewable energy	Partially covered
	6.2. Effective adaptation measures	Partially covered
5. Understanding scenarios for growth in hydropower as a climate change response and the level of conflict with WFD objectives	5.7. Harnessing energy — recovery	Partially covered
	6.3. Nutrient removal in concentrated streams, recovery and reuse	Partially covered
	6.1. Climate change challenges, storm water and energy	Partially covered
	6.5. Cope with the impacts of climate change with more rainfall especially during winter and more extreme weather events, e.g. increased risk of faecal pollution and increase of NOM in raw for drinking water supply	Partially covered
2. Better understanding if water monitoring networks in Europe (e.g. those for WFD) are set up in a way that will best allow identification and attribution of climate change impacts	2.1. How to plan and favour measures that are robust and flexible to uncertainty in future climate?	Partially covered

Expert Group on Water and Agriculture

Research issue	Status
1.1. Designing farmers' incentives to support WFD implementation	Partially covered
4.2. Address questions related to the effect of WFD implementation measures	Partially covered
6.1. Assessing the interaction between surface and groundwater in agricultural catchments	Partially covered

Expert Group on Water Scarcity and Drought

Research area	Research issue	Status
Issue 1: Water scarcity and droughts indicators	1.1. Application of common indicators in EU river basins	Partially covered
Issue 1: Water scarcity and droughts indicators	1.4. Development of prolonged drought indicators	Partially covered
Issue 2: Climate change effects related to water scarcity and droughts	2.1. Impacts on water availability resources	Gap
Issue 2: Climate change effects related to water scarcity and droughts	2.2. Assessing available surface and groundwater water resources and estimating water demands under the current situation and under predicted climate change conditions (water supply, water demand balance at basin level)	Partially covered
Issue 2: Climate change effects related to water scarcity and droughts	2.4. Impacts on ecosystems	Partially covered
Issue 2: Climate change effects related to water scarcity and droughts	2.5. Intensification of the water cycle. Extreme events	Partially covered
Issue 2: Climate change effects related to water scarcity and droughts	2.6. Interactions between climate change and agricultural, social and demographic changes	Partially covered
Issue 5: Technological tools	5.3. Regional climate models (RCMs)	Partially covered
Theme 6: Economics and law	6.1. Methodologies to assess WS&D economical impacts	Partially covered

Working Group A — Ecological Status

Research issue	Research need	Status ([1])
1. Developing and validating new bioassessment tools	1. To overcome knowledge gaps for transitional and coastal waters	Partially covered
1. Developing and validating new bioassessment tools	2. To overcome knowledge gaps for lakes	Partially covered
1. Developing and validating new bioassessment tools	3. To analyse more carefully the links between ecotoxicological tools and biological assessment tools based on the structure of biological communities	Partially covered
1. Developing and validating new bioassessment tools	4. To overcome difficulties in assessing ecological status in temporary streams	Partially covered
1. Developing and validating new bioassessment tools	5. To reinforce the knowledge concerning uncertainties	Partially covered
1. Developing and validating new bioassessment tools	6. To build pressure–impact models for a better spatial extrapolation of the ecological status	Partially covered
2. Refining the knowledge about pressure–impacts relationships	7. To clarify links between hydromorphological pressures and biological responses	Partially covered
3. Evolving toward a more functional and holistic approach of aquatic ecosystems	8. To develop functional assessment tools based on trophic networks to complement tools based on community structure attributes — assess the links with resilience and sustainability	Partially covered
3. Evolving toward a more functional and holistic approach of aquatic ecosystem	9. To clarify the links between global changes (climate, fragmentation, exotics) and ecosystem functioning and assessment tools	Partially covered
4. Reconnecting the socioeconomical and biological issues	10. To reinforce the knowledge on relationships between good ecological status (GES), biodiversity and ecosystem's services	Partially covered

Working Group C — Groundwater

Research area	Research issue	Status ([2])
6. Programmes of measures	6.3. Assessing the efficiency of measures in agriculture	Partially covered
1. Climate change impacts	1.2. Surface water–groundwater changes in interaction	Partially covered
5. Pollutants	5.2. Emerging pollutants	Partially covered
5. Pollutants	5.3. Good understanding of the process involved in the degradation of emerging pollutants needed (soil, un-saturated zone, degradation products, etc.)	Gap

Working Group C — Groundwater

Research area	Research issue	Status ([2])
2. Groundwater-dependent ecosystems	2.1. Ecosystem requirements — classification system	Partially covered
2. Groundwater-dependent ecosystems	2.3. Criteria for environmental quality objectives	Partially covered
1. Climate change impacts	1.4. Changes in groundwater chemistry due to climate change	Partially covered
1. Climate change impacts	1.10. Methodology to assess groundwater vulnerability to climate change (primary and secondary effects), visualisation tools	Partially covered
2. Groundwater-dependent ecosystems	2.2. Classification of GW fluctuation/hydrology	Partially covered

[1] The status refers to the available information revealed by OIEau (FP6/FP7/Life projects and complementary information gathered by the CIS SPI groups experts, EURAQUA network). 'Partially covered' means the analysis identified projects dealing with the topics and 'gap' means no information has been identified.

[2] The status refers to the available information revealed by OIEau (FP6/FP7/Life projects and complementary information gathered by the CIS SPI groups experts, EURAQUA network). 'Partially covered' means the analysis identified projects dealing with the topics and 'gap' means no information has been identified.

Working Group E on Chemical Aspects

Research area	Research issue	Status
2. Priority substances in surface waters	2.1. Development and improvement of suitable harmonised analytical procedures for new priority substances	Partially covered
1. Integrated strategy and holistic R & D approaches	1.2. Harmonisation of knowledge basis and strategic approaches for chemicals in European policies	Partially covered
New	Relationships between ecological, chemical and biological status needs to be studied.	Gap, partially covered by 2.8
2. Priority substances in surface waters	2.2. Development and improvement of sampling procedures and techniques for existing and new priority substances	Partially covered
2. Priority substances in surface waters	2.9. Non-target analysis and screening	Partially covered
4. Development of environmental quality standards (EQS)	4.1. Review and testing of EQS	Partially covered
2. Priority substances in surface waters	2.5. Relationship and interactions between concentrations of priority substances in the three matrixes: water, sediment and biota	Partially covered
2. Priority substances in surface waters	2.6. Development of bio-indicators/bio-assays for groups of substances	Partially covered
New	Use of ecotoxicology tools to link chemical and ecological status	Gap, partially covered by 2.8
6. Identification of possible future priority substances	6.1. Identification of possible future priority substances	Partially covered

Working Group E on Chemical Aspects

Research area	Research issue	Status
2. Priority substances in surface waters	2.8. Investigation of the behaviour/effects of mixtures of hazardous substances in the water environment, including synergistic effects	Partially covered

NB: The WG E has developed for the four top priority research issues some key recommendations associated with references or linked to current activities ongoing within the group.

Working Group F on Floods

Research area	Research issue	Status ([3])
1. Land use management (including catchments approach)	1.2. How to define an 'acceptable level' of flood risk and how to deal with the residual risk?	Partially covered
1. Land use management (including catchments approach)	1.5. The ability to quantify the hydrological or other effects of combinations of different actions across a catchment, and in particular, the effect of more natural approaches	Partially covered
3. Flood mapping	3.1. What are the most appropriate methods for mapping social and environmental risk and risk to cultural heritage?	Partially covered
3. Flood mapping	3.4. Groundwater flooding	Partially covered
3. Flood mapping	3.5. Mapping potential for lake tsunamis and landslip	Partially covered
3. Flood mapping	3.11. Communication tools, training/education programmes and feedback mechanisms related to the use of flood maps	Partially covered
3. Flood mapping	3.12. Understanding, calculating and presenting uncertainty, including the influence of DTM accuracy	Partially covered
4. Flood risk management mapping	4.5. How to coordinate elaboration of objectives in national and international setting?	Partially covered
4. Flood risk management mapping	4.7. Integrated risk management combining protection, prevention and preparedness	Partially covered
4. Flood risk management mapping	4.13. Risk management should take into account the quality of the water bodies. Some river-dependent ecosystems require a minimum flooding	Partially covered
5. Climate change	5.1. Coastal: more investigation needed on: storm winds, air pressure, tide dynamics	Partially covered

[3] The status refers to the available information revealed by the CIS SPI groups experts, EURAQUA network and complementary information gathered by OIEau (FP6/FP7/Life projects). 'Partially covered' means the analysis identified projects dealing with the topics and 'gap' means no information has been identified.

Annex V — Policy brief format template

The table hereafter gives the fields to be considered but the format can be totally different and more friendly with the project logo, pictures, etc.

Study area

Objective/theme of the supporting activity

Two–three lines about the theme of the research/demonstration/capacity-building activity with policy relevance

Contribution to … *Reference of the policy* (directive & specific milestones)

Policy focus: *Short description of the policy goals*

CIS group thematic concerned:

Key policy milestones requiring technical/scientific support:

- *Policy technical milestone(s)*
- *Explaining why technical support is needed (and recalling possible previous related decisions)*

Key outputs in support of policy milestones

Short introduction of the policy milestones and

Summary of key inputs provided by supporting activities (including possible implementation and/or validation by users):

1. XXXXXX (specify potential target groups)
2. XXXXXX
3. XXXXXX
4. XXXXXX
5. XXXXXX

Shortcomings

Experiences gained — Recommendations to policymakers — Next steps

Short description about recommendations and perspectives

List of acronyms

CIF	Common implementation framework of the EU biodiversity strategy
CIRCABC	Communication and Information Resource Centre for Administrations, Businesses and Citizens
CIS	Common implementation strategy
CORDIS	Community Research and Development Information Service
EC	European Commission
EDC	European Drought Centre
EG	Expert Group
EG-CCW	Expert Group on Climate Change and Water
EG-WS & D	Expert Group on Water Scarcity and Drought
EIP	European Innovation Partnership
ERA-Net	European Research Area Network
ERC	European Research Council
ESA	Ecosystem services approach
EU	European Union
EWC	European Water Community
FD	Directive 2007/60/EC on the assessment and management of flood risks (flood directive)
FP	Framework programme for research and development of the European Commission
FP7	seventh framework programme
GWD	Directive 2006/118/EC on the protection of groundwater against pollution and deterioration (groundwater directive)
Interreg	Inter Region
JPI	Joint programming initiative
LIFE	L'Instrument Financier pour l'Environnement (financial instrument for the environment)
MS	Member state
NGO	Non-governmental organisation
OIEau	Office International de l'Eau — International Office for Water
ONEMA	Office National de l'Eau et des Milieux Aquatiques — French National Agency for Water and Aquatic Environments
RBD	River basin district
RBMP	River basin management plan
SCG	Strategic Coordination Group for the WFD implementation
SPI	Science – policy interface
UNU-INWEH	United Nations University — Institute for Water, Environment and Health
WD/WMD	European water and marine directors

WFD	Directive 2000/60/EC establishing a framework for Community action in the field of water policy (water framework directive)
WG	Working group
WG A	Working Group on Ecological Status
WG C	Working Group on Groundwater
WG E	Working Group on Chemical Aspects
WG F	Working Group on Floods
WISE-RTD	Water Information System for Europe – Research and Technology Development

European Commission

Science–policy interface in support of the water framework directive — CIS-SPI Activity report 2010–12

Luxembourg: Publications Office of the European Union, 2013

2013 – 92 pp. – 17.6 x 25 cm

ISBN 978-92-79-25181-8

doi:10.2777/35629

HOW TO OBTAIN EU PUBLICATIONS

Free publications:

- one copy:
  via EU Bookshop (http://bookshop.europa.eu);
- more than one copy of posters/maps:
  from the European Union's representations (http://ec.europa.eu/represent_en.htm);
  from the delegations in non-EU countries.(http://eeas.europa.eu/delegations/index_en.htm);
  by contacting the Europe Direct service (http://europa.eu/europedirect/index_en.htm) or
  calling 00 800 6 7 8 9 10 11 (freephone number from anywhere in the EU) (*).

  (*) The information given is free, as are most calls (though some operators, phone boxes or hotels may charge you).

Priced publications:

- via EU Bookshop (http://bookshop.europa.eu).

Priced subscriptions:

- via one of the sales agents of the Publications Office of the European Union
  (http://publications.europa.eu/others/agents/index_en.htm).

KI-31-12-744-EN-C

The need for a sustainable science–policy interface in support of water policies was discussed for some years within the framework of the common implementation strategy (CIS) of the water framework directive (WFD) and related RTD projects. In this context a dedicated science–policy interface ad hoc activity (CIS-SPI) was established by the European water directors for the period 2010–12. This activity has been jointly led by the European Commission (DG Research and innovation) and France (ONEMA — French National Agency for Water and Aquatic Environments).

CIS-SPI established close working relationships among research projects and WFD implementers, and has achieved three main tasks: inventory of research and implementation needs from CIS groups; identification of available research and research gaps; and improvement of transfer and usability of research outputs.

Over its mandate CIS-SPI achieved consistent results regarding these three tasks which are extensively covered in this report.

Studies and reports

Publications Office

ISBN 978-92-79-25181-8

9 789279 251818

doi:10.2777/35629