



WATER RESEARCH STRATEGY 2007-2013

ERTDI Workshop

Date: 11th October 2006

Venue: Talbot Hotel
Carlow Town

Programme & Background Information



ERTDI Workshop

Water Research Strategy 2007-2013

Purpose: To discuss the development of a water research strategy, which addresses fundamental knowledge gaps, supports policy development and implementation, and contributes to the protection of the water environment.

Format: The one-day workshop takes place on the 11th of October at the Talbot Hotel, Carlow Town. The structure of the workshop aims to provide an overview of current national activities on water research as well as an opportunity to consider views on how future research can contribute to addressing issues mentioned above.

The Department of Environment, Heritage and Local Government (DEHLG), the EPA and members of the research community will provide perspectives on these issues and directions for research.

The aim is to have an open discussion and exchange of views on priority issues and will allow all attendees to contribute.

Further written submissions on this area are welcome up to the 27th October.

Cross Cutting Issues: An effective water research strategy will need to link with relevant elements of other research programmes (soils, health, socio-economic, technology, air) and to address cross cutting issues such as climate change, flood management, alien species, transboundary river basin management, conservation and biodiversity.

The workshop should also take account of FP7 funding opportunities, infrastructural needs and well as opportunities arising from the EU Environment Technologies Action Plan (ETAP) and LIFE+ Programmes.

Collaborative partnerships with other funding bodies, government departments and agencies have enhanced the value and application of research. Opportunities for future partnerships should be explored.

Outcomes: Outputs of the discussion sessions and written submissions will feed into the overall EPA ERTDI Strategy 2007-2013.

Prepared by: Garrett Kilroy, October 2006

EPA ERTDI Water Research Strategy Workshop Programme

09.30-10.00:		Coffee/Registration
10.00-10.10:	Opening Remarks	<i>Larry Stapleton (Director, EPA)</i> <i>Colin Byrne (Water Inspectorate, DEHLG)</i>
Morning Session <i>(Chair: Matt Crowe, Programme Manager, EPA)</i>		
10.10-10.30	The EPA ERTDI Programme and Aims of the Workshop	Brian Donlon, ERTDI Manager, EPA
10.30-10.50	Research and River Basin Districts – Case Study of the River Moy Catchment and the Western RBD	Paddy Kavanagh, ESBI, Western River Basin District
10.50-11.10	Harmoni-CA – Harmonised Modelling Tools for Integrated Basin Management. EC FP5 Concerted Action Project	Geo Arnold, RIZA, the Netherlands
11.10-11.30:		Tea/Coffee
11.30-11.50:	The Environmental Enforcement Perspective	John Feehan, Senior Inspector, Office of Environmental Enforcement, EPA
11.50-12.10:	Research and WFD Implementation in Ireland	Garrett Kilroy, EPA Research Fellow, Trinity College Dublin
12.10-12.50:	Discussion Session 1	
12.50-14.00:		Lunch
Afternoon Session <i>(Chair: Jim Bowman, Programme Manager, EPA)</i>		
14.00-14.20:	TRACE – Interreg project on the Blackwater catchment	Phil Jordan, School of Environmental Sciences, University of Ulster
14.20-14.40:	Research Priorities for diffuse pollution	Karen Daly, Research Scientist, Teagasc
14.40-15.00:	The hydrological cycle – measurement and modelling for strategic management	Micheal Bruen, Centre for Water Resources Research, University College Dublin
15.00-15.20:	Ecological water research issues	Ken Irvine, School of Natural Sciences, Trinity College Dublin
15.20-15.40:		Tea/Coffee
15.40-16.25:	Discussion Session 2	
16.25-16.30:	Conclusions and Close	

ERTDI Water Research Strategy Workshop: background information

Introduction

We are fortunate in Ireland to have generally good water quality in our groundwaters and surface waters. The water quality of our rivers in the most recent survey period showed some improvement on the previous period, however, there is no room for complacency. Long-term trends for rivers indicate there has been a sustained loss of our pristine river stretches (EPA Q5 sites).

Efforts will now need to be maintained and expanded if the demanding objectives of the Water Framework Directive (WFD) are to be achieved. The initial characterisation and assessment of our River Basin Districts (RBDs) indicate that up to 30% of our river water bodies are at risk of not meeting the objectives of the WFD by 2015. Similar challenges exist for our groundwaters, lakes, estuarine and coastal waters.

Previous EPA studies have indicated that eutrophication is the main threat facing Ireland's surface waters. Other important water quality issues identified include nitrates in rivers and groundwater, endocrine disrupting chemicals, microbiological contamination in drinking waters, impact of waste water treatment plants (WWTPs), toxic substances in waters, alien species, canal water quality, fish kills, salmonid waters, bathing water quality, acid-sensitive waters, and estuarine/coastal water pollution.

Water quality has been identified as a priority environmental issue requiring research under the EPA ERTDI programme (2000-2006). The purpose of the workshop is to help identify and prioritise research needs in an overall research strategy to protect the water environment. A balance must be sought between a purely policy-driven research and a programme which addresses fundamental knowledge gaps and builds capacity within the Irish research community.

This document provides a brief overview of the policy background and progress being made in developing water research strategies. It does not propose to comprehensively address water research issues but rather aims to stimulate discussion at the workshop and encourage written submissions.

Policy Background

The Water Framework Directive, which came into force in 2000, provides the overarching legislative background for water protection in Europe. Transposed into Irish legislation in 2003 (S.I. No. 722 of 2003), the WFD aims to improve and prevent the deterioration of all waters (groundwater, rivers, lakes, estuarine and coastal waters). Whilst, ecology and specifically good ecological status is main focus of the WFD, the reduction and phasing out of priority substances is also required. The main vehicle for effecting change in the WFD is through the development of River Basin Management

Plans, which will contain programmes of measures to tackle specific pressures on the water environment.

Other existing legislation will continue to play an important role in protecting the water environment. These include requirements under the Nitrates Action Plan, Phosphorus Regulations, Bathing Water Regulations, Urban Wastewater Treatment Regulations and the Drinking Water Regulations. The forthcoming Groundwater Directive will compliment the requirements of the WFD through the protection of groundwater and dependent ecosystems. Reform of the Common Agricultural Policy will result in changes in farming, which although uncertain, will influence the focus of agriculturally related water research. Support to address knowledge gaps is needed in the implementation of these regulations by EPA, local authorities and other government bodies.

Significant progress has been made in the implementation of the WFD in Ireland by various government departments and agencies and the local authorities through the River Basin District projects. Specifically the Directive has been transposed into Irish legislation, the River Basin Districts have been characterised and assessed, and a register of protected areas compiled. Currently the programme to assess the status of water bodies and monitor the efficacy of measures to improve status is being finalised through a national WFD Monitoring Programme. June 2007 will see the publication of Significant Water Management Issues Reports by each RBD to allow for public engagement in the development of the River Basin Management Plans due for publication in draft form by June 2008.

The true success in the implementation of the WFD will not be measured by the meeting of deadlines, but by effecting real change in the achievement of good status and preventing deterioration in our water bodies. Research has a key role to play in addressing the knowledge gaps required for effective river basin management.

EPA funded Water Research in the 2000-2006 ERTDI Programme

In the latest 2000-2006 ERTDI programme EPA has committed approximately €9M under the water research theme. Additional water-related projects have been funded under other themes. This programme of research comprises over 80 projects ranging from medium and large scale integrated projects, to desk studies, PhDs, Fellowships and Small Scale Studies. Some of the research in this programme is focussed on specific issues, e.g. diffuse pollution from agriculture and forestry, ecological assessment. In other cases the research is as a result of an open call for proposals. More recently, calls for proposals have been directed at meeting knowledge gaps to address specific requirements of the WFD, such as typology, classification tools, risk assessment and public participation.

The WFD characterisation process required, inter alia, development of typologies for each water category and the establishment for type-specific reference conditions. For water types where no extant reference conditions, more novel approaches such as paleolimnological studies were required. More recently the focus has shifted to

developing effective measures to improve ecological status, further development of marine classification tools, examining policy linkages between WFD and other policy drivers (e.g. SEA, Natura 2000 sites), and development of advanced sensor technologies for monitoring ecosystem change.

Several of the larger projects are the result of successful co-funding partnerships with other funding bodies such as the Marine Institute, Teagasc and COFORD. Many peer-reviewed publications, assessment tools and other products have arisen from the programme thus far. The EPA wishes to build on this progress in the next programme of research for 2007-2013.

Some Key Issues and Research Needs for the Water Environment

The identification of key research issues and needs requires an examination of the policy agenda, one of the main drivers of research. In addition, the research community who are closest to the research are often best placed to identify specific knowledge gaps. It has been identified that better dialogue is required between the policy-making and research communities to ensure that outputs from existing and future research readily flow into the policy-making arena (Quevauviller et al., 2005). This requires mechanisms to provide better understanding between research and policy-makers on their respective needs. Initiatives such as the Harmoni-CA FP5 project (www.harmoni-ca.info) are aimed at better linking these two communities. Policy is usually driven by broad issues rather than specific ones, hence many policy questions are usually of a general nature. In contrast scientists are more used to addressing specific questions. Sutherland et al. (2006) suggest that for researchers to be more policy focused, the specific questions which underpin broad policy questions need to be extracted.

Listed below under broad thematic headings are some examples of how these issues have been assessed for the water environment. They are based on published findings, grey literature reports and website information. The headings do not purport to be comprehensive, but rather a primer for discussion.

Fundamental Ecological Knowledge Gaps

Sutherland et al. (2006) identify 100 ecological questions of high policy relevance in the UK, covering the broad issues of agriculture, marine fisheries, climate change, ecosystem function and land management. For the water environment the following (annotated) key questions were identified:

- What are the effects of hydro-morphological pressures on biodiversity in river ecosystems?
- What are the implications of floodplain restoration versus traditional hard flood defences?
- How does changes in water quality and sedimentation in rivers affect biodiversity?
- What methods most accurately measure ecological status for the WFD?

- How can flood control be assisted by appropriate habitat management and restoration, and what are the impacts on biodiversity?

Additional water-related questions are also identified under the topic headings of Marine Fisheries, Pollution and Climate Change.

Policy Driven Issues – Water Framework Directive

During 2005 the European Water Directors initiated a questionnaire-based review of the key issues and research needs under the WFD (EC, 2005). The authors identified the main driving forces as: Pressures and impacts from agriculture; Hydro-morphological pressures; Pressures and impacts from wastewater (both WWTP and septic tanks); Industrial pollution; Other pollution sources (including aerial deposition, transport networks, historic contamination and new priority substances); Abstraction pressures; and Climate change.

Several knowledge gaps and research needs were also identified and these included:

- Improving our understanding of groundwater-surface water interactions
- Improving our understanding of surface water-sediment interactions
- Improving models to predict the effects (including combined effects) of pressures
- Developing methodologies to assess the effect of proposed new measures to improve water status
- Developing methodologies for stakeholder involvement and engagement

Overall the authors conclude that improved dialogue between policy and research is required to ensure existing, available research outputs are made available to policy implementers and to ensure that research is more policy focused. The authors propose greater interaction between researchers with the Common Implementation Strategy Working Groups.

The Scottish Northern Ireland Forum For Environmental Research (SNIFFER) has developed a comprehensive water research theme based on building consensus between member organisations and other stakeholders (www.sniffer.org.uk). For the WFD research programme UKTAG members have played a key role in identifying research needs. Research areas for WFD include: Characterisation, Monitoring and classification, Groundwater, Diffuse pollution, Economics, Hydro-morphology, Wetlands, Environmental Standards, Mitigation Measures and River Basin Planning

In Ireland, some research gaps were identified as a result of WFD implementation for the characterisation and risk assessment of the RBDs. These include:

- improving our understanding of how different pressures impact on the ecological status of water bodies
- developing monitoring and assessment methods for complex ecosystems such as wetlands
- developing monitoring and assessment methods for hydro-morphological pressures

- improving our understanding of the efficacy of existing measures to improve water quality
- development of hydrological model(s) at different scales for different applications, including flood management and nutrient management
- improving our understanding of contaminant pathways between the land surface and receptors such as river/lake ecosystems and groundwater dependent ecosystems

Environmental Technologies for Water Management

Environmental technologies are emerging as fundamental to the suite of tools required for effective water management. A separate workshop under this heading has been hosted by EPA and will be assessed for overlapping areas in the water environment. Based on previous research in this area examples of topics which are emerging as water research needs in the technology area include:

- Development of sensors for nutrients, general physical parameters (DO, Temp, EC), microbiological parameters (E.Coli, Cryptosporidium) and mixed contaminant samples, which are rugged, low-cost and easily deployed
- Development of platforms for deployment of monitoring sensors and trialling of communications technologies for management responses such as flood alarms, pollutant thresholds, etc.
- Development of sensor deployment and networking strategies for river basin-wide assessment from stream head-waters to estuaries and coastal waters

Under the European Commission's ETAP Programme (European Environmental Technology Action Plan) the Water Supply and Sanitation Technology Platform (WSSTP, 2006) is preparing series of research priorities. The "Water in Industry" working group of WSSTP has published their research priorities which include:

- Sustainable water supply and consumption
- Improving product quality, process stability and cost effectiveness
- Reduction of environmental impact of water supply, use and discharge
- Improvement of health and safety consequences
- Removal of non-technological barriers for implementation of technologies

Research Links with the River Basin Districts

Much of the early EPA-funded research on WFD focused on elements of the characterisation of our RBDs (EPA and RBDs, 2005). The RBDs' current work activities include a series of Programmes of Measures and Standards (POMS) studies, which are focusing on different issues arising from the risk assessments required for Article 5 of WFD.

The POMS studies and corresponding lead RBD are listed in the Table 1 below. Further information on these studies can be obtained by contacting the relevant RBD directly.

Table 1 River Basin District Programmes of Measures and Standards Studies.

Leading RBD	Measures & Standards Study Name
WRBD	On-site Waste Water Treatment Systems
ShRBD / SERBD	Forest and Water
	Freshwater Morphology
SWRBD	Setting Chemical Water Quality Standards
	Industrial & Municipal Regulation
	Dangerous Substances
ERBD	Marine Morphology
	Heavily Modified Water Bodies & Artificial Water Bodies
	Abstraction Pressures
	Groundwater Risk from Diffuse Mobile Organics
	Urban Pressures in rivers, transitional and ground waters
	Further Economic Characterisation

The Interreg-funded NS-SHARE project which includes the North Western and Neagh-Bann International River Basin Districts have engaged several research institutions for the development of ecological classification tools. The activities of the River Basin Districts in their implementation of the WFD offer opportunities for collaboration with the research community.

Cross Cutting Issues

The water environment as a research theme is often cross-cutting, involving many disciplines and issues such as climate change, flood management, alien species, transboundary river basin management, conservation and biodiversity.

An effective water research strategy will need to link with relevant elements of other research areas (soils, health, socio-economic, technology, air). Many of these themes are clearly water related. Examples include bacteriological contamination of drinking water (health), development of smart sensors for water monitoring (technology) and soil/subsoil mapping for contaminant transport modelling (soils).

Data management is a key factor in all research projects, both in terms of the delivery of project outputs and dissemination, but also for further assessment an analysis of key environmental datasets of this research. It is a requirement of EPA-funded projects that all products and datasets are made available to the Agency's Environmental Research Centre (ERC), which will provide a key role in facilitating data management and assessment.

European Framework Programmes

Whilst still in its development the 7th Framework Programme of the European Commission is beginning to take shape. There will be opportunities for Irish researchers to become actively involved in this programme but significant efforts will be required by the funding bodies and research community to ensure sufficient capacity and expertise is available to compete for FP7 projects.

LIFE+ programme will also provide opportunities for the research and policy communities. LIFE+ will support in particular the implementation of the 6th Environmental Action Programme (EAP) which aims at combating climate change, halting the decline in nature and bio-diversity, improving environment, health and the quality of life, promoting the sustainable use and management of natural resources and wastes and developing strategic approaches to policy development, implementation and information/awareness raising.

An Ecoregion Approach to Future Research

Many issues in the water environment are catchment-based and benefit from transboundary management approaches. The Ecoregion approach set out in the WFD requires the development of comparable typologies across jurisdictions. For rivers and lakes this has been facilitated through the work of the North-South TAG (Technical Advisory Group) and for estuarine and coastal waters through the UKTAG. Current activities of these organisations include the development of comparable ecological classification schemes and monitoring programmes so that consistent management approaches can be adopted across International RBDs. In Ireland researchers are playing a key role in supporting these activities, for example through the work of the Interreg-funded NS-SHARE project on classification issues for river basins shared between the Republic of Ireland and Northern Ireland. A continued Ecoregion based approach to research will ensure that water issues are managed in a comparable fashion across jurisdictions and benefit from shared expertise.

Written Submissions Identifying Key Research Needs

Submissions are sought either on the day of the workshop or electronically, up to Friday 27th October on key research needs which are of concern to you.

A submission form can be downloaded at the EPA Research website at the link below <http://www.epa.ie/EnvironmentalResearch/EPA-FundedResearchProjects/Events/>.

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