

WATER RESEARCH STRATEGY WORKSHOP OUTCOME REPORT

Introduction

This report provides a summary of the main findings of the water research strategy workshop held in Carlow on 11th October 2006. This report should be read in conjunction with the Background document prepared in advance of the workshop and which was circulated to all attendees.

The purpose of the workshop was 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. This report summarises events on the day and the main research areas captured during the presentations, discussion sessions and written submissions. A detailed summary of issues arising from the written submissions and discussion session are presented in Appendix A.

Overview of the workshop day

The workshop format comprised a morning session of presentations focusing on policy needs and an afternoon session of presentations focusing on research needs. Discussions were held after each session of presentations. In addition, an opportunity was given to all attendees to submit written submissions by Friday 27th October. Twenty-eight written submissions were subsequently received.

Approximately 70 people attended the workshop representing a range of organisations including universities and ITs, state agencies, environmental consultants, government departments, river basin districts and NGOs. About 50% of attendees were from third level institutions. Feedback from the workshop was very positive both on the day and in subsequent emails from attendees. Representatives from DG-Research, who had expressed an interest to attend but were unable, also commented favourably on the workshop background document and presentations in the context of their own FP7 work. All presentations, the background document and submission form were uploaded to the workshop website (<http://www.epa.ie/EnvironmentalResearch/EPA-FundedResearchProjects/Events/>).

Summary of the main water research issues and needs identified by the workshop

Based on the workshop presentation, discussion sessions, written submissions and the workshop background document the following broad areas of research are identified as the main priorities for the ERTDI water research programme for 2007-2013 (see Table 1 below). Some areas will overlap with other thematic areas (e.g. health, soils, technology). These can be further elaborated to develop specific desk studies, large-scale projects, etc.

Table 1 Summary of main water research topics arising from the Water Research Strategy Workshop (key words in bold).

Topic	Description
Improving our understanding of how different pressures impact on the ecological and chemical status of water bodies	Refinement of ecological classification tools so that the status for different water bodies can be adequately described to reflect different pressures, including hydro-morphological pressures and alien species.
Improving our understanding of the efficacy of existing measures to improve water quality	Measures to be assessed include buffer zones, wetlands (natural and constructed), agricultural bye laws, REPS, and other measures listed as “basic” and “supplementary” measures in the WFD. Appropriate Decision Support Systems also need to be developed.
Develop hydrological models at different scales	Applications including flood management and nutrient management. Address issues of scale, uncertainty and application to ungauged catchments.
Improving our understanding of contaminant pathways between the land surface and receptors	Including receptors such as river/lake ecosystems, drinking water supplies and groundwater dependent ecosystems. Particular emphasis on linking soil and water research. Contaminants include less well studied priority substances and pathogens. Pathways to be assessed include natural and urban drainage systems.
Development of sensors which are rugged, low-cost and easily deployed, and appropriate deployment strategies	Including nutrients, general physical parameters, microbiological parameters, mixed contaminant samples and priority substances. Development of sensor deployment and networking strategies for river basin-wide assessment from stream headwaters to estuaries and coastal waters.
Development of assessment, monitoring and management strategies for the protection of sensitive catchments	Particular focus on Q5 sites, rivers supporting Margaritifera Spp and wetlands. Establish key indicators of change in these catchment and restorative measures. Developing monitoring and assessment methods for these complex systems.
Assess the implications of climate change on pressures in the water environment	Effects of changes in recharge, land cover and land use practices on water quality. Improve understanding of the effects of climate change on ecology of water bodies.
Impact of wastewater treatment technologies	Assess the long term impact of septic tanks. Develop strategies for the optimisation of UWWT.
Methods for stakeholder involvement	Development of robust methodologies for effect stakeholder involvement.
Support the development of environmental quality standard for the WFD	Provide scientific studies to support the development of EQS for priority substances and specific pollutants for the WFD and Groundwater Directive.
Economic analysis for the WFD	Develop a strategy for assessing the cost effectiveness of measures designed to improve status and a framework carrying out disproportionate cost analysis.

Issues raised at workshop concerning ERTDI infrastructure / operations

In addition to key research priorities the attendees at the workshop also identified areas of an infrastructural and operational nature for consideration in the next research programme for 2007-2013. The proposals for long-term monitoring observatories and the linking of the WFD monitoring programme with research objectives are worth developing. The point on the need to cover basic research and not just pure EPA needs may be covered by the PhD programme.

Table 2 Operational/Infrastructure issues for EPA Water ERTDI Programme

Source	Organisation	Operational / Infrastructure Issue
Rory Harrington	DEHLG	How will outputs from WRS workshop be used? Advocates an ecosystem approach to research
David Taylor	TCD	Need to ensure basic research is not neglected
Simon Harrison	UCC	Coordination required for fish research?
Louise Brennan	MI	Gap between environmental enforcement and research outputs
Geo Arnold	RIZA	Are research / policy community accessing outputs from EU FP projects
Simon Harrison	UCC	Consider a similar workshop on an annual basis
Joe McElwee	IFA-Aquac.	Agencies need to cooperate better. IFA aquaculture have a lot of data that could be accessed.
Eamon Moore	SWAN	Research outputs needs to be better disseminated
David Taylor	TCD	Open call for PhDs (rather than EPA-specific issues) also needed to ensure best students are attracted
Ger Kiely	UCC	Capability building projects essential
Ger Morgan	UCC	Demonstration projects needed to trial WFD measures
Micheal Bruen	UCD	Long term observatories (e.g. Mace head) need to be developed for water environment. Would attract EU funds/researchers
Karl Richards	Teagasc	Long term research programmes could be linked to the WFD monitoring programme
Larry Stapleton	EPA	EPA keen to see better links between WFD monitoring and research
Mike Hartnett	NUIG	Coastal observatory systems required
Eleanor Jennings	TCD	Better awareness between Irish researchers on their respective activities required, e.g. twice-yearly mailing.
Karen Daly	Teagasc	Need more interdisciplinary research
Ken Irvine	TCD	4 year Graduate Education Programmes will require funding agencies support. Greater accessibility to research outputs required. Higher-impact publications rather than "Irish interest". Review & assess research outputs/recommendations Better collaboration between funding agencies. Continued development of research managers.

APPENDIX A – SUMMARY OF SUBMISSIONS

A.1 Processing of water research topics raised on day of workshop

A synthesis of the main water research issues arising from the workshop discussions and presentations are presented in Table A.1 below. These points are based on rapporteur notes captured by Garrett Kilroy during the workshop.

Table A.3 Research topics arising from the workshop discussions and presentations

Source	Organisation	Topic
Declan Ryan	Teagasc	More field and farm-scale research is needed
Shirley Gallagher	ESAI	E.Coli in private drinking water supplies
Karl Richards	Teagasc	Improving knowledge of microbiological pathways
Colin Byrne	DEHLG	Measures needed to protect freshwater pearl mussel
Simon Harrison	UCC	Statutory controls needed for riparian zone
Simon Harrison	UCC	Role of uncultivated land on mitigating pollution
Fran Igoe	Shannon RFB	Effectiveness of different types of buffer strips along riparian zones
John Joyce	Consultant Economist	Research required into disproportionate cost studies for WFD implementation
Paul Bolger	UCC	Impacts from septic tanks. Alternative approaches – reed beds, composting
Micheal Bruen	UCD	WFD is an opportunity to focus on long term issues
James Golden	Moy Valley Resources	Capacity building with NGOs to engage in WFD
Colin Byrne	DEHLG	Research community needs to link with RBD outputs
Conor Murphy	NUIM	Impacts of Climate Change on WFD objectives
Fran Igoe	Shannon RFB	Research needs into rare fish species, such as Pollan, lamprey and char Effects of drainage maintenance programmes
John Joyce	Consultant Economist	Cost-effectiveness of restorative measures
Ken Irvine	TCD	Assess cross-compliance approaches
Sinead O'Brien	SWAN	Engagement of public needs on water issues needs robust research. Environmental economics was a major deficit of Art 5
Aine O'Connor	NPWS	Research need to provide strong ecological basis for setting standards in WFD
Karen Daly	Teagasc	Need to develop a conceptual framework for describing pollutant transport across scales. Need to demonstrate the effect of changes in soil management. Need to be able to identify Critical Source Areas. Develop understanding of in-stream processes.
Ken Irvine	TCD	Improve understanding of the key mechanisms for anthropogenic impacts on waters

A.2 Processing of water research issues raised in written submissions

Table A.2 below identifies the main research topics annotated from the written submissions received after the workshop. Written submissions were received from twenty-eight individuals or organisations.

Table A.4 Research topics arising from written submissions

Source	Organisation	Topics
Fiona Regan	DCU	<ol style="list-style-type: none"> 1. Develop long term continuous monitoring capability 2. Technologies to remove Endocrine Disrupting Chemicals and personal care products from WWTPs 3. Develop rapid screening tests for halogenated compounds 4. Develop passive samplers for priority pollutants
Colin Byrne	DEHLG	<ol style="list-style-type: none"> 1. Improve and refine ecological classification tools 2. Research to support water quality standards 3. New technologies for monitoring (continuous, priority substances and specific pollutants) 4. Effectiveness of basic measures 5. Demonstration projects for sensitive catchments where supplementary measures are required
Rory Harrington	DEHLG	<ol style="list-style-type: none"> 1. Impacts of land use on water quality 2. Biogeochemical function of wetlands 3. Advocates an interdisciplinary approach to water research
Joe Ferry	Donegal Co.Co.	<ol style="list-style-type: none"> 1. Development of a Remotely Operated Vehicle (ROV) to monitor inaccessible WFD sites 2.
John Joyce	Economist	<ol style="list-style-type: none"> 1. Develop a database on types of measures & related costs 2. Cost effectiveness analysis of measures 3. Develop a framework for disproportionate cost analysis 4. Develop strategy for prioritising selection of measures
John Feehan (on behalf WET-OEE)	EPA	<ol style="list-style-type: none"> 1. Optimising performance of WWTP 2. Impacts of domestic/commercial macerators 3. Source of faecal pollution in private supplies 4. Mass-balance approach for managing phosphate loads to water 5. Optimising monitoring frequency 6. Electronic sensors for water quality/quantity monitoring 7. Implementation of the Water Safety Plan for managing drinking water supplies 8. Health impacts of faecal contaminated private wells 9. Use of wetlands as WWTP, ecological issues 10. Effectiveness of LA bye laws on water quality 11. Assess the licensing of golf clubs, caravan parks, stud farms, pubs, hotels, hostels 12. Impacts of stormwater overflows on water quality 13. Impact of REPS, NO3 AP, cross-compliance 14. Impact of overgrazing measures 15. Assessment and mitigation measures of forestry-impacted sites 16. Efficacy of measures for sensitive sites e.g. FW pearl mussel 17. Assess reasons for loss of Q5 sites and propose remediation strategies.

Source	Organisation	Topics
Ann-Marie Donlon	EPA	1. Address knowledge gaps for priority pollutants (background levels, degradation rates, toxicity levels)
Mike Faram	Hydro International	1. Development of technologies to assess and treat contamination from stormwater suspended sediments
Joe McElwee	IFA Aquaculture	1. Assessment of shellfish producing bays (impacts and environmental controls) 2. Improve cooperation and data-exchange between agencies/organisation collecting data, including aquaculture industry
Rick Boelens	Lough Derg Science Group	1. Impact of natural an climate change induced variability on WFD monitoring programmes 2. Impact of climate change on lake ecology 3. Impact of invasive species on lake ecology 4. Management tools for nuisance macrophyte and algae
James Golden	Moy Valley Resources	1. Research to enhance stakeholder involvement 2. Improve better cooperation between state agencies and interest groups
Micheal Hartnett	NUIG	1. Review and develop a pilot Coastal Observation System for Ireland 2. Develop an integrated riverine-estuarine predictive model 3. Use models to help develop monitoring strategies 4. Develop models to forecast bathing water quality
John Sweeney	NUIM	1. Impact of climate change on water supply 2. Flood/drought risk assessment in RBDs 3. Impacts of changes in rainfall intensity on water availability due to climate change
Gerry Baker	OCM	1. Improve existing knowledge of SW-GW interactions using existing data, models and field investigations
RPS Consulting Engineers	RPS	1. Pilot demonstration project to improve compliance of UWWT plants using existing infrastructure
Fran Igoe	Shannon RFB	1. Effectiveness of buffer zones 2. Effectiveness of SUDS 3. Impact of abstraction on littoral/benthic ecology 4. Impact of culverts on aquatic biodiversity 5. CBA of water conservation methods 6. Impact of siltation from peat mining and forestry 7. Land management in upland areas 8. assessment of historical trends in angling returns 9. Ecology of threatened fish species (croneen, pollan, European smelt and Artic char)
Sinead O'Brien	SWAN	1. Methodologies for stakeholder engagement 2. WFD economic analysis (CBA, CEA, DCA) 3. Impact of forestry on FW pearl mussel 4. Assess effectiveness of measures 5. Continued development and refinement of ecological classification tools
Paul Johnston	TCD	1. Improving our understanding of flow partitioning between SW and GW 2. Linking both quality and quantity issues for SW and GW
Teagasc (via Karl Richards)	Teagasc	1. Pollution source identification 2. Basic and supplementary measures 3. Climate change and land use change 4. Mitigation measures: buffers, wetlands & novel technologies

Source	Organisation	Topics
Deborah Chapman	UCC	<ol style="list-style-type: none"> 1. Pathogen transfer mechanisms 2. Health risks with recreational use of waters 3. Impacts of uncontrolled fish introductions
Dimitri Papkovsky	UCC	<ol style="list-style-type: none"> 1. Develop new biological screening and risk assessment methodologies 2. Develop a directory of available monitoring and risk assessment methods
Gavin Burnell	UCC	<ol style="list-style-type: none"> 1. Culture of FW pearl mussel for conservation and restoration 2. Reparation of degraded habitats 3. Bio-indicators for stressed marine ecosystems 4. Control measures for alien invasive species
John Hanrahan	UCC	<ol style="list-style-type: none"> 1. Impacts of nano-materials and products on human health and the environment 2. Assessment of indoor air allergens 3. Assessment of the impact of Triclosan on human health 4. Development of novel technologies for domestic water supply
Paul Bolger	UCC	<ol style="list-style-type: none"> 1. Impact of failing septic tanks 2. Review of wastewater generation in households
Mary Kelly-Quinn	UCD	<ol style="list-style-type: none"> 1. Develop understanding of the responses of biological indicators to anthropogenic stress 2. Extent of nitrogen limitation in freshwaters 3. Impact of cumulative pressures on biology and chemistry of freshwaters 4. Response of aquatic biota to heavy metals 5. Evaluate recovery rates of ecosystems following the introduction of measures
Micheal Bruen	UCD	<ol style="list-style-type: none"> 1. Review of modelling issues (temporal and spatial scale, uncertainty, robustness) 2. Transfer of models to ungauged catchments 3. Development of Decision Support Systems 4. Optimisation of SUDS treatments
Brian Rippey	UU	<ol style="list-style-type: none"> 1. Develop WFD classification tools which include species abundance/biomass and ecosystem structure and functioning 2. Assessment of uncertainty in ecological classification
Joerg Arnscheidt	UU	<ol style="list-style-type: none"> 3. Identification methods for pathogenic organisms 4. Assess uncertainty with conventional monitoring frequencies 5. Develop an accreditation systems for WFD ecological assessment 6. Assess the efficacy of septic tanks in removing nutrients and pathogens 7. Establish the biogeography of groundwater fauna in Ireland