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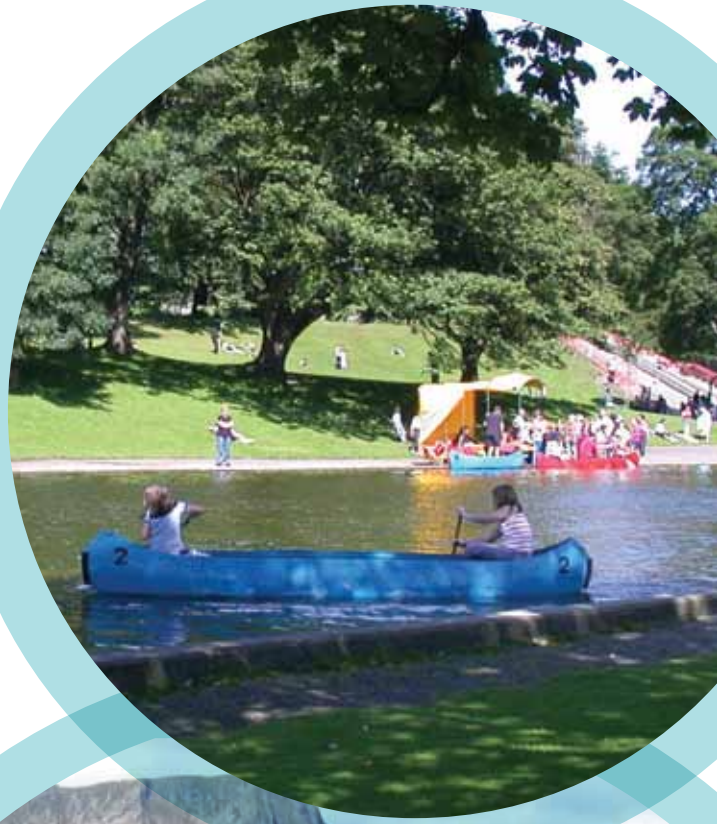
Scotland's centre of expertise for waters

Centre of Expertise for Waters

Annual Report 2013–14



Scotland's centre of expertise for waters

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The James Hutton Institute

The Scottish Government

Contents

1.0 Executive Summary

CREW delivers accessible research and expert opinion to support Scottish Government (SG) and its delivery partners in the development and implementation of water policy in Scotland. The main policy areas are at different phases in their implementation and some examples are given below;

- The Flood Risk Management (Scotland) Act is moving from a phase of establishing partnerships and planning to identifying and prioritising action. To support this, CREW provided expert reviews of flood appraisal and warning methodologies.
- Preparation has started for the second round of river basin management planning under the Water Framework Directive. CREW provided the evidence base on which options should be funded and where they should be targeted to improve water quality via the Scotland Rural Development Programme.
- CREW works on a range of issues relating to drinking and waste water provision. This included a technology scan of wastewater treatment and renewable energy technologies for rural communities and a review of best practice on the management and recovery of fats, oils and greases in support of the water industry.
- CREW has a key role in the Hydro Nation Strategy, supporting its development through relevant projects such as how to value Scotland's water resources. This year saw the launch of the Hydro Nation Scholarship Programme, which CREW manages on behalf of SG.

CREW has supported public engagement in science and has forged links to industry. As a Centre of Expertise, CREW has an important role in wider policy engagement and networking both within the UK and beyond to keep abreast of the key water management challenges and research needs surrounding them. CREW is represented on a range of boards and advisory groups to facilitate this.

Finally, a review of CREW has shown it is working well to connect water research and policy. End-users fully support the CREW concept and believe the work they delivered or requested responded to the needs of science, policy or practice. The findings also show that previous CREW work has contributed to policy impact in a number of ways from evidence and guidance provision to influencing the text of legislation. Clearly CREW is filling an important gap between the science base in Scotland and the needs identified by the users of that science.

2.0 External context

CREW's role is to support staff in SG, SEPA and Scottish Water (our end users) in their work to develop and implement water related policy in Scotland. As policy needs evolve, CREW also continues to evolve.

CREW has supported the implementation of the Flood Risk Management (Scotland) Act as it moves from establishing partnerships and planning to identifying and prioritising action. This was highlighted in the annual report from the Minister on progress in implementing WFD. Preparation started for the second round of river basin management planning and the development of the Scotland Rural Development Programme. This resulted in two major CREW projects, both with direct policy impact. CREW has a key role in the Hydro Nation Strategy following its publication in July, supporting its development through networks and projects. This year saw the launch of the Scholarship Programme, managed by CREW on behalf of SG. The recent call for PhD proposals attracted 123 applications for six potential scholarships. Following interviews, six PhD scholarships have been awarded.

As part of our role in wider policy engagement and networking, CREW meets regularly with end-users and attends relevant groups. A new development for CREW is its role in a Defra and SG project to assess what the key water management questions in the UK are with a view to assessing what available tools can answer them. This will allow CREW to work with a range of policy makers and stakeholders across the UK.

The CREW manager has been invited to join the UK's Global Food Security Program Water and Agriculture Expert Group. Internationally, CREW was represented in Brussels at the European Innovation Partnership conference "Networking & interacting – Innovating water". The CREW Director sits on the Science and Technology Panel of the EU Joint Programme Initiative on 'Water Challenges in a Changing World' and is also involved in preparations for the forthcoming World Water Congress to be hosted by Scottish Government in Edinburgh next year.

These networking activities, at home and abroad, are absolutely vital to CREW being regarded as a global Centre of Expertise on water resources and management.

3.0 Internal context

A review of CREW has shown it is working well to deliver end user needs. Importantly, the concept of CREW is very well received. The findings from the project "Evaluating the Science Policy Practice Interface" showed that participants believed the work they delivered or requested responded to the needs of science or policy. Meeting these needs involved producing an evidence base, developing shared research objectives, and responding directly to the questions posed. Feedback specifically for call down requests showed that over 95% rated the outputs as good or very good and met their expectations. While the evaluation was positive some areas were identified for improvement including profile building, improving the science- policy interface, increasing networks and making more of the body of work CREW has funded. The CREW Facilitation Team has produced an action plan to take these forward, discussed with SG and the CREW steering group. This work is now underway.

A key change to CREW is a move to a more strategic way of working around themes, driven by the main policy drivers in Scotland. This will increase engagement while making more cost-effective use of time and importantly will allow relationships between researchers and end users to deepen. Progress has been made with identifying these themes, bringing the networks together and producing briefing papers to aid discussion of research priorities. This new approach has been received positively, and is partly driven by our end users notably where resources are being tightened within organisations and access to expertise via CREW becomes paramount.

A central role for CREW is fostering linkages with end users. This has involved face-to-face meetings and attendance at groups e.g. the Diffuse Pollution Management Advisory Group and Scotland's Advisory and Implementation Forum on Flooding. This will continue following positive feedback on this way of working. Links have also been made with CXC and Interface, the latter in exploring links with the water industry. This is in part driven by the launch of Horizon 2020 with its focus on sustainable European growth. CREW is developing a work plan to review the resources required to fulfil these evolving needs.

Finally, this year saw a change in management with the previous CREW manager, Wendy Kenyon, leaving to take up a position in the Scottish Parliament. Jannette MacDonald, formerly of SEPA, has been appointed. This change meant the post was vacant for three months, inevitably delaying the number of projects coming from end users, as this is a key role of the CREW manager.

4.0 Outputs and Outcomes

Supporting Policy and Practice

Stakeholder Engagement

1. Scotland Rural Development Programme (SRDP) Workshop
As part of the project "Assessing potential water quality options, their evidence base and potential to deliver multiple benefits", CREW organised a workshop of leading academics, policy makers and operational staff (SNH, RSPB, NFUS, SEPA and SW) to discuss the recommendations from the project. This was an excellent example of synthesising scientific evidence into practical information that our end users could use to develop policy. Subsequently SEPA's recommendations to SG on measures to improve water quality were based on the outcomes of this project.

End user feedback:
"This has been a great project – the Principal Investigator worked his socks off and it was a really good workshop"[1].

2. National Natural Flood Management (NFM) Workshop
CREW organised and ran a one day workshop with the aim to a) share knowledge and experience of the practical aspects of implementing NFM, b) connect researchers and practitioners to enable the provision of better NFM evidence, c) avoid duplication of effort in developing NFM, d) learn about private, public and other sources of funding for NFM implementation and e) identify NFM sticking points and suggest solutions. This event improved the engagement between practitioners, researchers and agency staff and resulted in the identification of research gaps.

End user feedback:
"The workshop format was well organised and run – a very useful and informative day".

3. CREW Environmental Technology Verification Workshop
CREW organised a workshop on behalf of the enterprise agencies. It set out to test the findings and recommendations from a commissioned study into ETV with a number of key stakeholders. The event brought together policy, practice, industry and SMEs, to help inform how SMEs might best be supported through the work of the proposed Hydro Nation Innovation Park/Service. The focus was on barriers to entry for SMEs, including the verification processes that any SME must take new innovations through before they can enter the market.

End user feedback:
"Very many thanks for all your help over the last few weeks. I have received fantastic feedback about the workshop. So just thank you again for helping to deliver a super event".

NB: [1] All feedback from feedback forms and the project 'Evaluating CREW'

4. EPSRC Flood and Coastal Erosion Risk Management Network Support

The EPSRC Flood and Coastal Erosion Risk Management Network has been set up to help co-ordinate work across three research projects on FCERM. CREW is exploring links to supporting and steering this network. The benefit is a first-hand understanding of the research being funded by the EPSRC and how this may be of value to Scottish research users, especially as many of the requests from Scottish policy teams to CREW relate to flood risk management issues.

5. Conference attendance

In order to increase the profile of CREW in the academic and policy community, the facilitation team has attended, presented at and/or organised stands at key conferences. These include the SNIFFER Flood Risk Management Conference, the MASTS annual science meeting, the Institute of Water annual conference, the Scottish Freshwater Group and the European Innovation Partnership conference.

6. Macaulay Development Trust and McGill University Internship

McGill University, Canada and the James Hutton Institute have an internship arrangement and alternate hosting a graduate student. In summer 2013, CREW via the James Hutton Institute hosted McGill University graduate Katina Tam. The institutions are aligned in their research focus enabling students from either establishment to broaden and deepen their skills and knowledge in a range of research areas including in water and soil resources management. Katina contributed to a number of call down requests during her time with CREW, and increased her knowledge of science policy interactions.

7. Continued development of the CREW Website

The CREW website acts as a shop window for CREW and is under continual development to record outputs and services. We continue to populate all areas of the website with all (non-confidential) call down requests and outputs; publications; upcoming events; and updates to the Hydro Nation area of the site, setting out information on the Hydro Nation Strategy, the Water Resources Act, and Hydro Nation Scholars programme. Access has been provided for policy gatekeepers to a password-protected area, so they can review all call down requests submitted and their progress.

8. NERC Water Security Knowledge Exchange Programme

The CREW Director, Professor Bob Ferrier, contributed the Water Security Knowledge Exchange Programme advisory group throughout the year to bring together the NERC-funded research community and build on their strengths and multidisciplinary capabilities to proactively engage current and potential users of NERC-funded research, particularly in business, and among policy-makers, regulators and NGOs.

9. CREW manager policy engagement

The CREW Manager sits on the Flooding Policy Stakeholders Group and the Natural Flood Management Task and Finish Group, the Diffuse Pollution Management Advisory Group, the SG's Scotland Rural Development Programme targeting steering group and has made an input to the CAMERAS Evidence Strategy.

10. CREW Hot desk at Victoria Quay

CREW use this facility on a regular basis to engage with SG policy teams and RESAS.

Policy relevant outputs

1. Briefing on the Implications of UK Reservoir Legislation on Natural Flood Management (NFM)

In 2013 CREW held a NFM practitioner's workshop. Participants noted that legislation surrounding reservoirs was a significant barrier to NFM works in England. As a result, a CREW briefing was requested, informed by a review and consultation with practitioners from the "Slowing the Flow at Pickering" NFM project to elicit their experiences of the legislation and its impact on project implementation. The research aimed to inform policy makers about Pickering, and highlight potential barriers to implementing NFM in Scotland, in light of the Reservoir (Scotland) Act 2011. The reservoir panel engineers in their consideration of guidance also used the briefing. End-user contact: Debi Garft, Scottish Government.

End user feedback:

"Many thanks for the quick turnaround. This looks excellent – just what I needed."

2. Technology Scan report on Wastewater Treatment and Renewable Energy Technologies for Rural Communities in Scotland

This report responded to a call down request submitted by Scottish Water to carry out a review of technologies for treating water and wastewater, and for producing renewable energy from water in rural communities. The report informed an initial Scottish Water workshop on scoping out a vision of sustainable rural communities for water, wastewater and energy. The vision is for it to become an ongoing register of emergent technologies. End-user contact: George Ponton, Scottish Water.

End user feedback:

"My intention is to use this report…for developing a SW sustainable rural communities work stream."

3. Report on the Innovations in Aquatic Monitoring

This report was produced in response to a request from SEPA to highlight examples of monitoring where personal monitors have the potential to be, or currently are, used in aquatic monitoring. The report sets out a review of existing technology for acquiring, processing and reporting on environmental data in the field. The objective was to demonstrate whether or not it is possible to use off-the-shelf technology for water monitoring. The work provided input to a workshop, and informed SEPA's monitoring development. End-user contact: Nathan Critchlow-Watton.

End user feedback:

"Thanks, good, fast turnaround, and useful report."

4. Communicating Flood Risk Advice

This study was designed to test ways of communicating risk of flooding through language and maps. The aim of the research is to advance understanding of effective communication strategies to raise awareness and understanding of flood risk. The findings indicated that: being informed about levels of risk produce more accurate risk perception, and higher rates of willingness to take action to avoid the hazard; and risk perception is influenced by

previous experience of the hazard. The current practice of communicating probability of flooding (1 in 100 year flood) is not widely understood. The current map background employed by SEPA was highly rated in terms of understandability. End-user contact: Judith Tracey, Scottish Government.

5. Diffuse pollution problems in watercourses related to forestry activities

This project reviewed the scientific literature on diffuse pollution problems in watercourses related to forestry activities. It informed a SEPA project" Reducing Pollution from Forestry Related Activities in the Galloway and Eskdalemuir forests" that aimed to determine the extent of pollution from forestry activities and promote awareness and understanding of the problem through training of the forestry sector and SEPA staff and developing best practice End User contact: David McNay, SEPA.

End user feedback:

"The report is of the right length, technical detail and includes worked examples to be useful for forestry practitioners and regulators alike."

6. Recovery of humic and fulvic acids during drinking water treatment

CREW provided expert opinion on the potential opportunity to recover humic and fulvic acids during the water treatment process. As this is so far removed from current thinking on water treatment, the work was required to ascertain whether this is a genuine opportunity. Questions investigated include: Is there a market for humic and fulvic acids in the UK/EU? What are the market opportunities? What is the market value? The output provided advice on what to do to better understand the potential and inform the development of a programme of further R&D to help SW realise the opportunity. End user contact: Graeme Moore, Scottish Water.

7. Trend analysis of nitrate concentrations in the River Ythan

The purpose of this project was to support SEPA's work on monitoring the impacts of policy by using a desk-based, spatially distributed modelling approach to investigate potential drivers of changing nitrate concentrations in the Ythan. The characterisation of statistically and environmentally significant trends in water quality is a specific requirement of the Water Framework Directive and the Groundwater Directive. These Directives require the identification of sustained trends in pollutant concentrations in surface and groundwater bodies to assess if they are at risk. End user contact: Vincent Fitzsimons, SEPA.

8. Scottish Detailed River Network (SDRN)

This project is producing GIS layer of watercourse culvert data for Scotland. This will provide the most accurate and recent culverted watercourse data for inclusion in the beta version of the SDRN. Outputs to date include the development of a suitable methodology, workshops for Tayside, Aberdeen and Lothian areas and the data analysis for each of these. On completion this project will provide: GIS shapefiles for each local authority for which relevant data are obtained; Completed Log files for Ordnance Survey for each local authority area; and Documentation on methodology used. End user contact: Heather McCabe, Scottish Government.

9. Implementation of Source Control SUDS in Scotland

This call down request resulted in the production of three reports for the end user on: a review the background to Source Control including the history, various types, and options; an appraisal of how source control is being delivered, within the UK and Worldwide; and expert opinion on the approach of the various responsible organisations and professional groups in Scotland. Next steps were defined including comment on optimal source control and further considerations and recommendations. The reports are helping to inform the update of SUDS best practice via the next ciria SuDS Manual. End user contact: Drew Hill, Transport Scotland.

10. Optimising WFD delivery of RBMP using an Ecosystem Services Approach

This project developed and described a practical methodology/ decision making framework to implement an ecosystems services approach at the catchment scale to meet requirements of the Water Framework Directive, while maximising the delivery of multiple benefits. The identified approach and methodologies is focused on participation, risk-based (i.e. prioritise action to address pressures that cause most damage to ecosystem services), and functional within the WFD River Basin Management Plan process. As part of this project a workshop was held to help refine recommendations on how best to embed an ecosystem services approach within the river basin planning process. End user contact: Louise Bond, SEPA.

End user feedback:

"The report is concise, easy to read, and does a good job of balancing potential opportunities and risks. It provides some clear practical recommendations."

11. Sustainable catchment management economic models

There is increasing interest in catchment management to address pollutants impacting on water resources used for drinking water supply. Conventional water treatment to remove unwanted chemicals can be expensive in terms of energy and money. Sustainable land management measures in drinking water catchments can minimise the entry of pollutants into water, which has potential to reduce water treatment costs. The output from this work is a review of the economics of sustainable land management measures in drinking water catchments. End user contact: Jon Rathjen, Scottish Government.

End user feedback:

"This report is an extremely worthwhile review. It was unable to directly answer all the questions because of limited data availability but, nevertheless, the recommendations will be useful for helping future progress in this area."

12. Emerging Contaminants of Concern in Waters

A comprehensive review has been undertaken of the sources, impacts, risks and monitoring of water related 'known-unknowns', including potential emerging contaminants of concern within Scottish watercourses; data availability; impact assessment on ground and surface water including WFD compliance (and coastal environments – Bathing Water Directive) and current and future risks. End user contact: Dave Gorman, SEPA.

Impact on Policy

1. Assessing potential water and soil quality options for SRDP
SEPA requested an assessment of the evidence base for potential options to improve water and soil quality to inform its recommendations to SG on what should be funded under the next SRDP, the major source of funding in the Rural Diffuse Pollution Plan for Scotland (a supplement to Scotland's River Basin Management Plans). This project gave SEPA the necessary evidence on which to base its recommendations to SG. The options were consulted on the second stage SRDP consultation and will be part of the second River Basin Management Plan. End-user contact: SEPA Jannette MacDonald (now CREW manager).

2. Targeting water options for the SRDP
SG requested a subsequent project to enable water quality and flooding options to be targeted to where they deliver most benefit. This involves linking each option to the potential benefits and mapping them. Scoring criteria for applications will also be developed. This project involves close working with SEPA and is steered by a small group involving SG and SEPA. The outputs included maps of where the options should be targeted which are now being combined with parallel work streams on biodiversity and climate change (the latter lead by CXC) End User contact: Susie Turpie, SG.

3. Report on the Management and Recovery of Fats, Oils and Greases
There are approximately 200,000 sewer blockages every year: around 75% are caused by fats, oils and greases (FOG). This report outlines best practice for FOG management at UK and international level. Opportunities for reuse of recovered FOG are also explored. End-user contact: Roi Otero, Scottish Water.

Evidence of impact:
"…delivered when they said they would and we were really impressed with the quality…It will inform SW on whether there is a sustainable business case to recover FOG from our network."

4. Expert review of its draft appraisal guidance for Flood Risk Management Planning
The Scottish Government via SEPA requested an expert review of their draft appraisal guidance for Flood Risk Management Planning. The guidance aims to provide overarching guidance to the Scottish Environment Protection Agency (SEPA) and the Responsible Authorities (Scottish Water, Local Authorities) on appraisal for flood risk management planning, to assist with the selection, refinement, and implementation of the most sustainable measures. End user contact: Helen Panter, SEPA.

End user feedback:
"Many thanks for this, and please pass on my thanks to the reviewers for a comprehensive and useful review".

Benefits to other stakeholders

1. CREW Flooding reports informing Stonehaven Community Group
The suite of work produced by CREW experts on flooding and Natural Flood Management was requested by a local community group. The group from Stonehaven, a town in northeast Scotland affected by flooding requested the outputs of the work to help better inform them of the issues surrounding flooding and how these can potentially be alleviated.

2. Hydro Nation Scholars Launch
The Hydro Nation scholars programme is part of the Scottish Government's Hydro Nation Strategy and funds a number of PhD students in relevant topic areas. The programme was launched at Victoria Quay in October with the first four PhDs students giving presentations to policy makers and other stakeholders on their areas of work, which range from international transboundary water cooperation to valuing water in Scotland. Students will benefit from policy and industry events and work experience organised by CREW.

3. CREW attendance at "Making it Clear"
As part of the 'Making it clear' programme organised by Scottish Water, CREW supported attendance at a two day event for Primary 4 to 7 pupils, ran by the Glasgow Science Centre. The event coincided with World Water Day. Schools from all over Scotland attended with 1,094 pupils and 120 teachers from 19 schools. Our expert drop-in session simulated life in a stream and demonstrated why it is important to conserve streams and wetlands and received excellent feedback.

4. Royal Highland Show attendance
Visitors to the 2013 Royal Highland Show had the opportunity to meet scientists and staff from CREW to learn more about our work during the annual agricultural showcase from 20–23 June at Ingliston. A range of information was available to take away for a wide range of readers.

5. CREW's NEWs
The newsletter produced by CREW (CREW's NEWs) provides information about the latest CREW events, projects, and contract opportunities as well as news and events from the wider water sector. The publication is posted on the CREW website as well as to a dedicated mailing list of approximately 300 recipients. The publication attracts a wide readership, with members from Scotland, the UK and overseas. Readers range from interested members of the public to industry and environmental groups.

Collaboration and Multidisciplinary Working

Collaborations

1. CREW/SUDSnet/SUDS Working Party/joint event
This event was a collaboration between experts working on two CREW projects (one call down, one capacity building), SUDSnet and the SUDS Working Party. The event featured presentations on the CREW work undertaken by the University of Abertay: 'Diffuse pollution mitigation with Multiple benefits' and 'Source control SUDS'. It was an opportunity for interested parties to meet the project team, policy, and stakeholder

contacts, including the SUDS Working Party. This is a group of stakeholders who meet to discuss issues relating to SUDS, with representatives from:

- Homes for Scotland
- Landscape Institute Scotland
- Royal Incorporation of Architects in Scotland
- Scottish Enterprise
- Scottish Government
- Heads of Planning Scotland
- Scottish Water
- Society of Chief Officers for Transportation in Scotland
- SEPA

2. Surface Water Flooding project

The aims of this work are to review the state of the art in surface water flood forecasting for urban communities and to develop a methodology for surface water flood forecasting using a pilot study (site of the 2014 Commonwealth Games). The research is a collaboration between the James Hutton Institute, Centre for Ecology and Hydrology, the Met Office and SEPA. This ensures that essential data are available directly, and that the customer is a key part of the team. Project interim outputs are being co-constructed by the team as a whole including the end user. This is reflected in the output authorship.

3. SRDP 2014–20 – assessing potential water and soil quality options, their evidence base and potential to deliver multiple benefits

This project, involved a range of researchers, policy makers and practitioners to get expert opinion on the effectiveness of options selected after a systematic review of the evidence. The results were aggregated and experts attended a workshop to refine the initial long list of options to a shorter list of options. Collaboration involved the James Hutton Institute; ADAS; Aberystwyth University; University of Stirling; SRUC, SEPA, NFUS, SNH, RSPB, Scottish Land and Estates and Scottish Government.

4. Supporting marine spatial planning with local socio-economic data

This project aims to develop new approaches to gather detailed information on local uses of, and values held about, Scottish coastal systems to help underpin marine planning in Scotland. The project lead, Scottish Association for Marine Science, is collaborating with the Moray Firth Local Coastal Partnership and Argyll and Bute Local Authority as well as local sector stakeholders and representatives, using their wealth of local information and contacts to help deliver the work.

5. CREW supporting livestock scenario planning in EPIC

CREW staff are working with the Centre of Expertise on Animal Disease Outbreaks (EPIC) to input into the likely impacts of water resource developments on livestock configurations towards 2040 and the consequential disease implications of water related developments. EPIC is exploring how changes to the livestock industry will impact upon disease risk. Wide ranging future developments covering society, the environment, the political landscape and the economy for Scotland both nationally and on the world scene are being drawn into the scenario development.

6. Evaluating knowledge exchange in interdisciplinary and multi-stakeholder research

As a result of the CREW project, Evaluating Science- Policy – Practice Interfaces, a team have come together to produce a paper on developing principles for the evaluation of knowledge exchange in interdisciplinary, multi-stakeholder, environmental change research. The team brings together a range of disciplines and includes ten researchers from four institutions across the UK, including the University of Birmingham, James Hutton Institute, University of Dundee and one SME. The paper has been accepted for publication and is currently in press, in the journal, Global Environmental Change.

7. NFM and Land Managers' Attitudes

This CREW project is in collaboration with the Strategic Research Programme. It is being managed by staff at the James Hutton Institute and the work is being carried out by University of Dundee. Project management costs are being covered as part of Theme 2 on water and renewable energy. The project aims to undertake a large-scale survey of land managers' attitudes to NFM and investigate the use of potential policy instruments to promote its uptake and delivery; and undertake farm-scale economic analyses of the impact of NFM measures under different scenarios.

8. Collaboration with Business via Interface Scotland

Collaboration with Interface and a number of Universities gave rise to site visits to four businesses within the Edinburgh and Glasgow areas. These companies are looking for solutions to fat and oil problems in their effluent and another for dealing with bacteria in its recycled process water. The latter has resulted in a collaborative proposal between experts from The James Hutton Institute and the University of Edinburgh to test a UV system as a potential solution.

9. Catchment Science Policy Practice Forum

A new development for CREW is its role in a Defra and SG funded project to identify the key water management questions in the UK with a view to assessing what available tools can answer them and providing a modelling framework to facilitate sharing and linking of data and models. CREW is co-leading the catchment science forum with Atkins to identify the key water management questions. The project consortium comprises the Centre for Ecology & Hydrology (CEH), ADAS, CREW, Atkins, the James Hutton Institute, and the University of Reading. Involvement in this project will allow CREW to work with a range of policy makers and stakeholders across the UK.

5.0 Progress reports on activities

Summary of progress

CREW Steering Group has met twice during this reporting year. The group has recently increased in membership to include Professor John Rowan from the University of Dundee. This is to strengthen links to the Scottish Higher Education Institute community and act as an agent to stimulate engagement; support CREW's newly created role in managing the Hydro Nation scholars programme; and fill disciplinary/geographic gaps in the current steering group. We value the expertise held within the Steering Group and are keen to make effective use of the Group by setting challenging agendas. For example, the Feb 2014 meeting included a workshop for Steering Group members to identify future and emerging research areas to inform CREW's thinking, long term planning, and strategic direction.

CREW facilitation team has met its objectives during the year. Activities have included managing the call down service and its associated budget; developing the website; administering and supporting capacity building projects in collaboration with our HEI partners at the University of St Andrews; producing papers and delivering actions for the CREW Steering Group meetings; undertaking a re-branding exercise to update and improve awareness raising and publicity materials for CREW (e.g. flyers, PowerPoint presentations, posters for conferences); presenting on behalf of CREW at conferences and attendance at CREW and other water-related events; liaising with relevant organisations and networks. Importantly a lot of effort has gone into responding to the CREW review to make the way we work more efficient and responsive to policy needs. Key to this is the proposal for moving towards a themed way of working and the preparation of a communications plan.

- **All aspects of this project are on track, all deliverables have been met.**

CREW Website acts as a shop window for CREW and is under continual development to record outputs and services. We continue to populate all areas of the website with all (non-confidential) call down requests and outputs; publications; updates as they arise to the Hydro Nation scholars programme. An action plan has been drawn up for the coming year to further improve the site and design in-line with our recent branding exercise.

- **All aspects of this project are on track, all deliverables have been met.**

Evaluating CREW: The Evaluating Science Policy Practice Interfaces project involves defining a baseline for CREW engagement with key end users, and evaluating and reporting on those interactions. End-user feedback from this year has been used to develop a Lesson Learnt report to inform CFT on what has worked and why or why not, and to present recommendations to adapt the next cycle of engagement to address any imbalances. Five outputs are available from the project this year including a paper on Evaluating knowledge exchange in interdisciplinary and multi-stakeholder research, accepted for publishing in the journal, Global Environmental Change.

- **All aspects of this project are on track, all deliverables have been met.**

Call down service: The CREW call down service provides the Scottish Government, SEPA and Scottish Water with access to reliable and impartial information from leading experts. In 2013–14 revised procedures ensures call-down customers are clear on what can/cannot be funded and delivered by CREW; a review was undertaken as to how information on new call-down requests can be better shared amongst the wider customer base; and feedback forms are sent to all policy contacts at the end of a project. Between April 2013 and March 2014, 16 call down requests were received, all of which were delivered by CREW. The call down service continues to show high demand and outputs are demonstrably valuable to policy contacts. 95% of customers reported that the output met their expectations.

- **All aspects of this project are on track, all deliverables have been met**.

Capacity Building Projects:
CREW's capacity building projects deliver longer term (~ up to one year) end user needs and aim to build skill and expertise between the James Hutton Institute and Scottish Universities. This year twelve projects, as described in the preceding sections, are in progress/completed around the main policy areas.

- **All aspects of this project are on track, all deliverables have been met.**

Supporting marine spatial planning with local socio-economic data
An ecosystem approach (EA) to marine management, as mandated by the EU Marine Strategy Framework Directive, requires socio-economic and environmental data inputs with spatial data being a prerequisite. In marine ecosystems insufficient socio-economic data is the rule rather than the exception, undermining marine planning. This project is developing a new approach to gather detailed information on local uses and values of coastal systems, to help underpin marine planning in Scotland. The project will be completed by end May 2014 and is being carried out by the Scottish Association for Marine Science.

- **Project is on schedule**

Natural Flood Management Land Manager Research
To support policy implementation, there is a need for better information on land managers' willingness to implement NFM, and to be able to relate willingness to generic farm characteristics (e.g. farming systems, land use types, geographical location); to different types and locations of NFM measures; and to farm economics. This research involves: (1) a large-scale survey of land managers' attitudes to NFM and to the use of potential policy instruments to promote its uptake and delivery; and (ii) Farm-scale economic analyses of the impact of NFM measures under different scenarios.

The project will be completed by August 2014 and is being carried out jointly by the James Hutton Institute and University of Dundee.

- **Project is on schedule**

Monitoring SEPA planning application decisions
Under Section 72 of the Flood Risk Management Act, SEPA has a duty to provide advice and information on flood risk to planning authorities and others. To devise appropriate data management and reporting systems for flood risk advice, and ensure efficient procedural arrangements within SEPA and between SEPA and planning authorities. The data management system should include a facility for recording flooding responses/objections made by SEPA and integrating planning authority decision notices to allow interrogation and reporting.

The project will be completed in June 2014 and is being carried out by a team from the University of Dundee.

- **Project is on schedule**

Targeting SRDP support for the water environment
Work is underway to develop the next Scotland Rural Development Programme. Scottish Government requested a project to enable water quality and flooding options to be targeted to where they deliver most benefit. This involves linking each option to the potential benefits and mapping them. Scoring criteria for applications will also be developed. This

project involves close working with SEPA and is steered by a small group involving SG and SEPA.

The project will be completed by April 2014 and is being carried out by the James Hutton Institute.

- **Project is on schedule and will deliver in March 2013**

Surface water flood forecasting for urban communities

The overall aim of this project is to review the current state of the art in surface water flood forecasting for urban communities and to develop a potential methodology for surface water flood forecasting in Scotland. This will be tested through a pilot study of a known flooding area in Glasgow East End, venue for the 2014 Commonwealth Games.

The project will be completed by July 2014 and is being carried out by a team from the James Hutton Institute, Centre for Ecology and Hydrology, and Meteorological Office.

- **Project is on schedule**

Scottish Detailed Rivers Network

The Scottish Detailed River Network (SDRN), produced by Ordnance Survey, requires the most accurate and latest data relating to culverted watercourse location. Currently, Scottish Water holds the only single national dataset for culverts. This project will bring together best available data for each local authority area, to provide inputs to the SDRN. This will enable the provision of continuity in terms of water feature locations and attributes across Scotland for use in planning and policy making, management and research. The project is being carried out by a team from the James Hutton Institute in collaboration with Scottish Water, local authorities and Ordnance Survey.

- **The project is behind schedule due to data release delays and IP issues but will deliver in June 2014.**

Scotland Water Sector Map

This work aims to produce an overview of Scotland's water sector in the form of a map which demonstrates the scope and scale of the sector and shows, in manner that can be easily understood by a wide range of stakeholders, how the different parts of the sector link together. The map will focus on the decision-making processes that influence, manage and control Scotland's water resources to enable their full and sustainable use. The project is being carried out by the University of Abertay.

- **Project is on schedule**

Trend analysis of nitrate concentrations in the Ythan

SEPA's Phase 2 report on the Ythan catchment in Aberdeenshire highlighted a clear nitrates impact. The recommendations for Phase 3 work identified the need for an assessment of the link between agricultural loadings and nitrate concentrations, to identify potential causes for the observed changes in nitrate levels. The purpose of this project is to support SEPA's Phase 3 work by using a desk-based, spatially distributed modelling approach to investigate potential drivers of changing nitrate concentrations in the Ythan.The main output is a report describing the results of the study, together with a summary report highlighting the key findings. All of the output data is available in an appropriate (geo) database format.

The work was undertaken by a team from the James Hutton Institute.

- **Project is complete**

Emerging Contaminants of Concern in Waters

A comprehensive review is being undertaken of the sources, impacts, risks and monitoring of water related 'known-unknowns', including potential emerging contaminants of concern within Scottish watercourses; data availability; impact assessment on ground and surface water and current and future risks. 2. Review on monitoring methodologies for emerging pollutants including identification of gaps in the existing monitoring framework, limitations of methods and future prospects. This work will inform Scottish policy development on the Water Framework Directive.

The work was undertaken by a team from the James Hutton Institute.

- **Project completed end February**

Water Quality and Radon

The aim of this project is to understand the implications for Scotland of adoption of a proposal for a Council Directive laying down requirements for the protection of the health of the general public with regard to radioactive substances in water intended for human consumption. It will inform the prioritisation of any potential sampling programme designed to establish risk and sampling requirements under the future Directive.

The work is being undertaken by a team from the James Hutton Institute.

- **Project will complete end June**

Assessing the benefits of private water supply grants

The quality of private water supplies is variable, many have adequate treatment and are well managed, but others present a risk to health due to the quality of the raw water and inadequate, or absent, treatment. This project aims to look at the way the grant has been used to improve private water supplies across Scotland and identify whether it has been a successful tool in improving quality and protecting public health.

The work is being undertaken by a team from the James Hutton Institute.

- **Project will complete end August**

Projects in development

A number of projects are also in development including: work for Drinking Water Quality Regulator for Scotland (DWQR) on assessing raw water quality changes to drinking water; the value of Scotland's water resource for the Scottish Government; the potential for economically regulating catchment management for drinking water, the impact of windfarms on raw water quality; and establishing the potential for reclaimed water including identifying risks and barriers (both Scottish Water). Each of these are currently undergoing a period of thorough review and discussion with stakeholders and end users to ensure that the work, the questions being posed and the outputs are fully developed to meet policy needs.

crew

Scotland's centre of expertise for waters

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The Scottish Government

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