

# Evaluating CREW Year 2: Full Report





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## **Executive Summary**

### **Background to research**

CREW is a centre of expertise funded by the Scottish Government to better connect water policy and research. CREW's objectives are to increase the:

- **networks** between researchers, policy makers and practitioners in the field of water management (coverage and quality of interactions);
- **skills and capacity** of researchers to share knowledge appropriately and in response to policy/practitioner demand; and
- **impact** of knowledge generated by CREW activities, such that it can lead to improved environmental, social and economic outcomes for those involved in water management.

### **Objectives of research**

The Evaluating Science, Policy, Practice Interfaces (ESPPi) project undertakes evaluation of CREW on a yearly basis to assess CREW's performance in meeting these objectives as the centre develops.

Our research objectives are to:

- understand existing science: policy: practice interfaces;
- measure and analyse how CREW's structure, members and activities contribute towards these interfaces; and
- evaluate performance and suggest ways to improve links between research, policy and implementation.

### **Key findings**

- Evidence from the interviews with people involved in CREW work April 2011 –June 2013 shows that broadly CREW is working well to better connect water research and policy.
- Lessons learned from early experience have led to improvements in CREW working during year 2.
- People involved with CREW generally agree that the centre is as much about the process of policy-driven research as the outputs, and that the essence of CREW is effective knowledge exchange.
- Six key areas for further development of CREW are (i) building its profile; (ii) reviewing its remit and operational focus; (iii) improving the science: policy interface; increasing networks; (v) increasing skills and capacity; and (vi) ensuring the whole is greater than the parts.

Findings on these six areas are summarised in this report, alongside our recommendations for implementation.

**Key words: evaluation, knowledge exchange, water research, policy**



## **Abbreviations**

CFT	CREW facilitation team
CREW	Centre of Expertise for Waters
CSG	CREW Steering Group
CXC	Centre of Expertise on Climate Change
HEI	Higher Education Institute
JHI	The James Hutton Institute
MASTS	Marine Alliance for Science and Technology for Scotland
NFM	Natural Flood Management
RESAS	Rural and Environment Scientific and Analytical Services
RoE	Register of Expertise
SAGES	Scottish Alliance for Geosciences, Environment and Society
SEPA	Scottish Environment Protection Agency
SE Web	Scottish Environment Web
SME	Small to Medium sized Enterprise
SG	Scottish Government
SRDP	Scottish Rural Development Programme
SRUC	Scottish Rural University College
SW	Scottish Water

## 1.0 INTRODUCTION

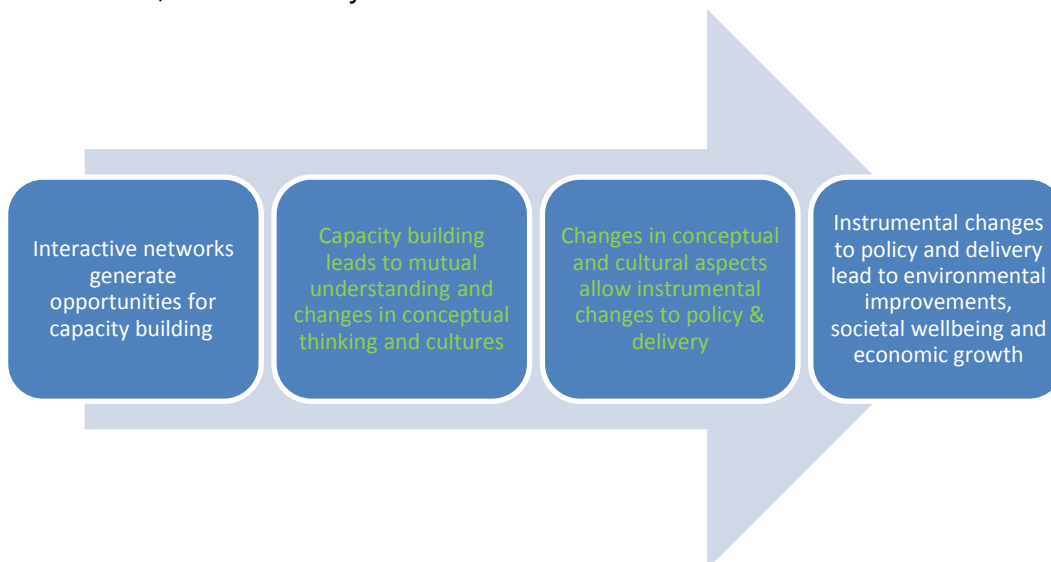
The Evaluating Science Policy Practice Interface (ESPPI) Project aims to assess how far CREW is meeting its original three objectives, and to make recommendations to the CREW Facilitation Team (CFT) and the CREW Steering Group (CSG) for future improvements. This report is based on the views of people involved in CREW (researchers from the James Hutton Institute and the university sector, and policy / practice customers in the Scottish Government, SEPA and Scottish Water).

### 1.1 Evaluation philosophy

CREW aims to better connect water policy and research by increasing:

- the networks between researchers, policy makers and practitioners in the field of water management (both the coverage and the quality of interactions);
- the skills and capacity of researchers to share knowledge appropriately and in response to policy/practitioner demand; and
- the impact of knowledge generated by CREW activities, such that it can lead to improved environmental, social and economic outcomes for those involved in water management.

We have adopted a ‘theory of change’ to explain how the CREW objectives relate to each other, and how they should be evaluated.





The diagram indicates how the first objective to build networks (on the far left) supports the second objective, to build capacity<sup>2</sup>. These are envisaged to lead to the third objective, and to have a positive impact on Scotland's economic, environmental and social outcomes (on the far right of the diagram). Our review of impact evaluation suggests that research will not have an impact on 'final' outcomes without having some intermediate outcomes in place. Building networks and capacity should lead first to changes in the way we all work (cultures) and how problems are conceived. This intermediate stage in making an impact is represented in the 3<sup>rd</sup> box.

Feedback from CSG (September, 2013) suggests that increasing the skills and time for researchers to share knowledge appropriately and in response to customer demand is the main aim for CREW. Increasing networks is a way of generating capacity to respond to time sensitive demand driven research questions.

For this evaluation we categorise CREW participants broadly as researchers (scientists) and customers (policy/practice). Whilst CREW researchers seek positive economic, environmental and social impacts from their work, these impacts are mediated through the use of CREW by its customers. In other words, CREW indirectly makes impact (the right hand box) through achieving change from capacity building (the two middle boxes). Of course the process is iterative and complex, not linear as shown.

## **1.2 Evaluating CREW**

CREW is a new and fast-evolving organization, which provides challenges for evaluation. Formative (process) evaluation is better suited for this than ex-ante or post-hoc (outcome) evaluation. CREW work is structured around 6 interfaces (call down service; capacity building projects; CREW website; CREW facilitation team (CFT); CREW Steering Group (CSG); and horizon scanning); however, assessing CREW's performance is complex and can be like "trying to measure an octopus" (researcher, the James Hutton Institute).

As one respondent noted, ESSPI-CREW is unique in our funding set up; no other centre of expertise undertakes an evaluation process in addition to annual self-report via RESAS reporting requirements. We go beyond Scottish Government's (RESAS) narrative and quantitative reporting to assess performance, including asking for CREW participants' perspectives on the centre's work. This is a process of learning, reflecting and remembering. The process of interviewing allowed us to capture new information and to compare that to data gathered by CFT and RESAS annual reporting but also to answer questions for those unfamiliar with CREW about

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<sup>2</sup> Capacity building refers to both having the skills (capability) and the time (capacity) to deliver the tasks required. Capacity building refers to customers and researchers as both types of CREW participants need skills and time to make the interactions work.



how to find out more information or who to ask. Thus this evaluation is also a form of KE for CREW; and reflection can help with legacy and impact of CREW projects. For example, the interview prompted one (customer, SEPA) interviewee to go back and re-examine CREW work produced on a topic. It is now relevant to a current policy development; this suggests that involving participants in the process of evaluation can help ensure CREW projects have a legacy beyond their project life.

Evaluation is a way of encouraging CREW's ethos of co-production of research through building better communication and mutual understanding. Deliberative discussion of ESPPI findings with the CREW steering group (CSG) and facilitation team (CFT), challenging ourselves about how to do evaluation better (and sharing these challenges with RESAS) are also part of CREW's learning process. This approach to evaluation, combined with monitoring the evolution of CREW's remit and objectives means that this report (and project) has multiple partners/owners. This multiple interest is reflected in the structured recommendations at the end of the report.

### 1.3 Methodology

This report draws on analysis of interviews conducted with a sample of researchers (from Hutton and HEI partners) and customers (Scottish Government, SEPA, Scottish Water) involved in CREW. Sources also include analysis of project documentation (e.g. CSG minutes; CREW annual reports, RESAS narrative and metric reporting); formal call-down evaluation forms (N=18)<sup>3</sup>, ESPPI baseline data; information on the CREW website and project management databases. This range of additional sources was selected to provide an overall perspective on how CREW is functioning, particularly in terms of meeting its overall strategy and direction, and understanding the current 'state of play' of projects and participants.

39 call-down and 8 capacity building projects were undertaken and *finished* between April 2011-13 in addition to the on-going CSG, CFT, and website activities. These involved the Hutton, 15 HEI organisations and 7 policy or practice customer organisations. This equated to 31 JHI staff, 21 HEI staff and 35 policy/practice leads, a total of 87 individuals. We selected a sub-set of projects (n= 26) that covered both capacity building and call-down, and contacted the James Hutton Institute, HEI and Policy leads for each. To date, we have completed 36 interviews from a total of 57 potentials, with 21 non-responses<sup>4</sup>.

Most interviews were conducted by phone in June – August 2013 by a team from Hutton (both CREW and non-CREW staff). Qualitative interview data were analysed using a framework approach to identify common themes. Some participants,

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<sup>3</sup> Response rate of 78%

<sup>4</sup> Two people have retired; three people were wrongly identified as the PI and 3 refused due to change in role or volume of work. The remaining 13 did not reply.





particularly those working on projects ending in 2012, found it hard to differentiate CREW from other similar work. In three cases, individuals contacted for interview claimed they were not involved in any CREW project, even though our records suggested they were. Year 1 JHI project leader interviews were undertaken in March 2012 by CREW and non-CREW members of the evaluation team and findings included in the qualitative analysis. These project leaders were also re-interviewed in June-August 2013 to allow them to report on research impact sometime after project completion.

#### **1.4 Achievements**

Overall, responses to the question of whether projects achieved their aims and objectives show that most CREW projects are meeting their aims. In some cases they have exceeded this by not only identifying/producing evidence but also highlighting key research gaps, which can be used to focus or commission future work within that area.

Interestingly, many respondents did not feel they would change anything, even with the benefit of hindsight, suggesting that the projects went well. Researchers involved in 2011-2012 capacity building projects said they would have improved the project's management, in particular by incorporating more detailed planning and timetabling of meetings with project partners at the start of the process.

More generally, respondents raised issues with projects being overambitious, requiring re-scoping, or delays in delivery – often due to the lack of resilience because of staff unavailability through illness or other more pressing demands on their time, and because of the protracted process for HEI contracting.

Overall, the successful aspects of CREW projects were identified as collaboration; useful products; and providing a legacy for future policy and practice. Less successful aspects related to communication difficulties; delayed delivery; and lack of commitment to CREW from policy makers and the HEI sector.

There is clear evidence of the CFT learning lessons from previous ESPPI findings, and of the CREW organisation evolving and becoming increasingly responsive to customer demands, particularly in terms of growing the 'call-down' aspect of the centre. CREW is seen as a new model of working at the science, policy and practice interface and as such is helping to increase interaction.

In summary, comments ranged from unqualified praise for the remit and delivery (policy customer) to an acknowledgement that CREW was a great idea but could do better in practice (HEI researcher). Perhaps it is worth remembering that users of a service that is free at the point of delivery tend to be positive, and that 2 of the 5 interviewees were CFT members. However, using non-CREW staff as part of the data collection team hopefully overcame any bias due to interviewer position within the centre.

## 2.0 CREW DELIVERY

### 2.1 CREW purpose

A number of people were unsure of CREW's objectives so this may explain the heterogeneity in answers and high 'non-responses' to the question about CREW's purpose. For example, one respondent said: *'There is a lack of clarity as to what the CREW initiative actually is, what its function and purpose are and how it differs from the Main Research Programme. Is it a first port of call for advice on water policy and management; these can be 'instant turnarounds' and longer term projects with more detailed analysis of the issues? Is part of its function to synthesise quite complex information into more easily accessible outputs? Some projects in this round satisfy the latter question'* (researcher, JHI).

Most respondents understood the ethos as the focus on connecting researchers with policy customers and making academic research more visible and accessible to policy makers. Often this was understood to mean placing emphasis on quicker responses to customers' research needs than are possible using traditional research processes. Some respondents believed that CREW was not just about policy development but also the *practice* of policy implementation.

Some responses alluded to a need for co-production of research questions as well as research findings; customers don't always know what they need: *"We're not always sure what the question is, and if you don't ask the right question then you won't get much back. CREW should really push us about what we want"* (customer, Scottish Government). Thus CREW is seen to be not just about final research products but also about building tools and knowledge through social engagement.

Our data identified a desire by some to expand CREW's remit beyond the original RESAS boundaries to include the Hydro Nation agenda and liaise more effectively with industry, and a need for CREW to connect freshwater and the marine sphere. The latter view emphasised the interdependence of water spheres in ecological, social, cultural and economic contexts, despite the institutional divide between freshwater and marine spheres within Scottish Government. There was also debate over to what extent CREW was Scottish focussed or was to promote Scottish water issues internationally, and to what extent CREW produced new strategic science, or applied existing knowledge to specific customer-focussed questions. The Waters Future Day highlighted the need for both new substantive research and methods, but also synthesis and review of policies; data availability and accessibility; and the development of briefings and decision support tools that summarised existing research.

Decisions on the purpose of CREW will influence how CREW is presented; and the role it plays in the wider water research landscape. Any extension of CREW's remit will result in trade-offs if the centre's budget remains static.

## 2.2 Contractual problems

Some projects were reported to have delays in their tendering process – either delays between specifying the project and awarding the tender; or getting the invitation to tender out in the first instance. Respondents see such delays as problematic for the time critical nature of research; projects delivered late are less useful. Intellectual Property Rights were raised by respondents as a problem in a few projects, as a barrier to both signing the research contract and to further developing outputs after project completion. Respondents raised similar concerns about licencing agreements, which may explain why some customers believed that CREW was more suitable for literature reviews and expert opinion than for research involving empirical analysis or model/methodology development. Interviewees who mentioned these problems did not seem to fully understand the relationship between the JHI and MASTS in facilitating CREW research. Some interviewees felt the tendering and procurement process for CREW is convoluted and may discourage HEI researchers from becoming involved.

Some researchers (JHI and HEI) said that research budgets are not properly costed, requiring some of the work specified to be completed while unpaid. One customer specifically noted that they did not know the budget for the project they were specifying, and were unsure how CREW funds were allocated - *“it was a bit of a disconnect, in that I drafted the spec but somebody else decided how much money would be allocated to it”* (customer, Scottish Government). Combined with comments about the coverage of CREW networks, and of water topics, this raises questions about transparency in how CREW awards funds across the Scottish water sectors.

## 2.3 Differentiation and Coordination

Some respondents, reflecting on the early days of CREW, were unsure if customers remember that it was CREW, not the wider RESAS programme, which was delivering the projects. A number of respondents talked about how CREW was supposed to coordinate with CXC and asked to what extent the two centres were learning from one another. Furthermore, there is confusion over ‘who’ is CREW, and reputation risk to CREW if a partner in a project does something to annoy a stakeholder and CREW rather than not the partner organisation is blamed for the problem.

## 2.4 CREW facilitation team (CFT)

The majority of respondents were very complimentary about CFT - *‘brilliant, both proactive and responsive’* (customer, SEPA) and many appreciated their guidance on how to work with, and write for, policy audiences. Yet some respondents noted major dissatisfaction in their interactions with CFT, noting a lack of support leading to a number of peaks and troughs with impacts on the morale of the project team.

Most respondents felt well-informed and that projects were well managed, with help provided by CFT when things were going wrong, such as how to handle HEI partners who were not sticking to the specified brief, or customers who were changing the specification once the project was underway. A number of respondents highlighted the importance of having a dedicated CREW manager and were concerned about

how the loss of current manager, Wendy Kenyon, and her contacts would impact on CREW. Customers believed that having regular, face-to-face contact with CFT members in Edinburgh was seen as very important. A couple of cases were identified which involved difficult call down projects, and respondents stressed the need to communicate more, ensure sufficient resources to deliver on time, and to learn from SNIFFER to deliver such research better. Some researchers (generally those who did not have direct communication with customers) felt that they needed direct contact with the customer but were unable to enter dialogue because that CFT tend to 'guard the gate' too much. However, on the other hand, some respondents felt they had too little interaction with CFT to comment (generally those involved in 2011-2012 capacity building projects).

Some respondents were unclear how further ideas generated by CREW projects are handled and also about the CFT's role in determining whose priorities were funded for research. An associated issue was to what extent CFT has an overview of what CREW is producing and how the overall sum of all the materials is utilised and exploited. This links back to questions about how CREW shares its learning with the RESAS programmes and centres of expertise, Knowledge Scotland and beyond.

Requests for the CFT to do more were normally qualified by recognition this would require more resources – *"CREW is a new model for JHI and RESAS and is still on a learning curve which requires extra resources"* (customer, Scottish Government). The need for more resources may be exacerbated by two issues – the shift between fewer long-term capacity building projects to more rapid response call downs and the expansion of the role to include SMEs and innovation under the Hydro Nation agenda. Furthermore, such views raise the question of the role of the CFT and how it fits with the roles of the wider CREW community (including the CSG).

### **3.0 CREW NETWORKS**

#### **3.1 Changes in CREW networks**

Overall our analysis suggests that the networks between researchers and customers are expanding and deepening. CREW is recruiting new organisations and individuals, whilst retaining repeat participants; the majority are willing to participate in further projects when required. There is still a need for CREW to increase its profile and to ensure it is attracting the 'right people', i.e. the most relevant experts available to participate in CREW work when required. Our sample was drawn from the population of CREW participants in year 1 (2011-2012) call downs (n=18) and projects (n=8), and from participants in the additional 21 completed call downs completed by April 2013. A further 10 call down projects and an additional 10 capacity building projects are in progress, but were not completed in time for the year 2 (2012-2013) evaluation<sup>5</sup>.

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<sup>5</sup> These will be evaluated in the next round, resulting in lessons learnt from year 3 of CREW.

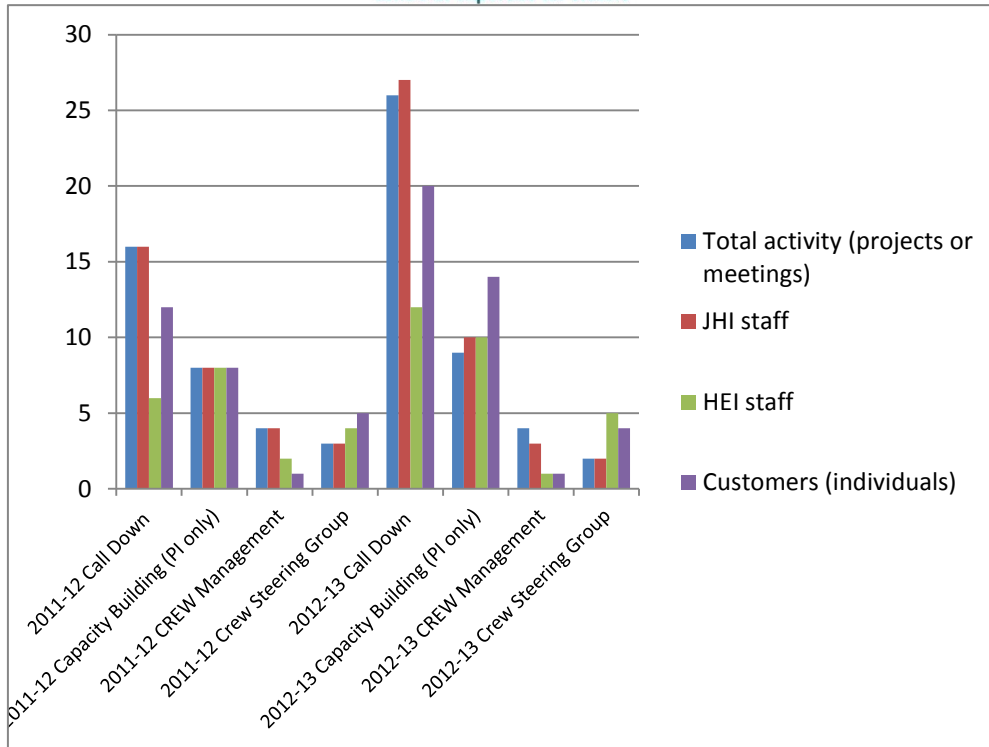


Figure 1: CREW Activities by participant type 2011-13

The CREW research completed by April 2013 involved six policy and practice organisations (Scottish Government, SEPA, Scottish Water, SNH, HIE and NHS); 15 HEIs (8 new organisations were engaged in delivery, including two from England) and the JHI. CREW work to April 2013 involved 30 JHI researchers (an additional 17 from 13 PIs identified in 2011-12); 20 named university researchers (an additional 10 from 10 PIs identified in 2011-12); and 34 named customers from the policy and practice organisations (an additional 12 from 22 policy/practice leads identified in 2011-12). Some CREW research only involved two people – the policy/practice lead and a JHI/HEI deliverer; but others involved up to 10 people across several organisations, with increased transactions costs but also more opportunity to draw on multiple expertise and experience.

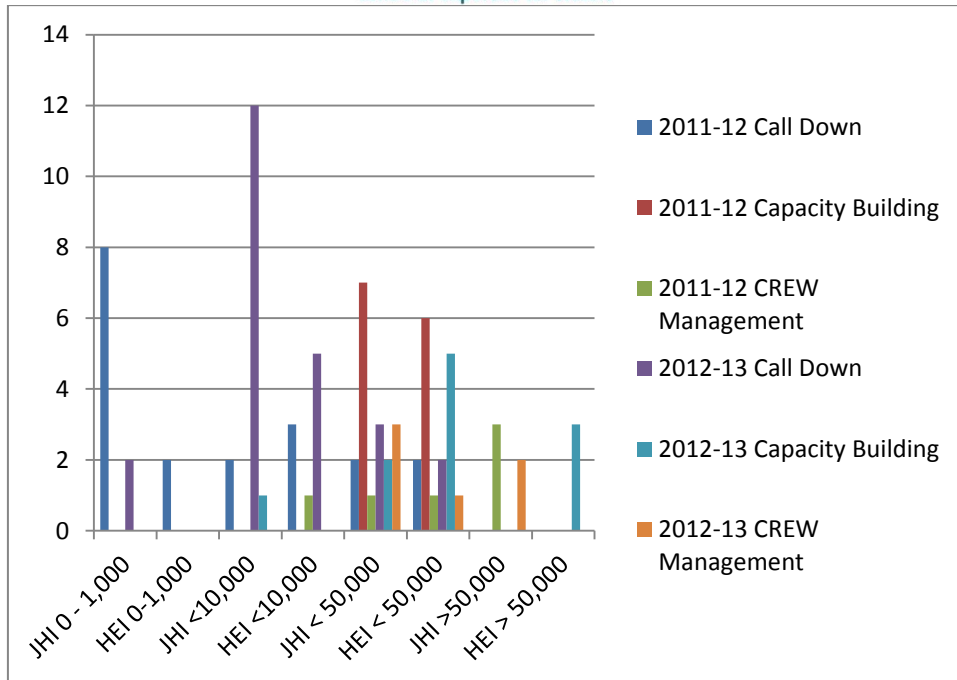


Figure 2: Value of CREW projects by project type 2011-13

Surprisingly, RESAS returns for 2012-13 show a decrease in the overall academic FTEs from 7.5 FTE to 3.9 overall (2 FTE from the research providers and 1.9 FTE from the University Sector<sup>6</sup>). A couple of comments were made about initial difficulties in ensuring SEPA staff were able to use CREW effectively, but word of mouth about CREW has led to an increase in requests from this organisation<sup>7</sup>.

### 3.2 The role of networks in CREW

The literature emphasises the role of networks in effective knowledge exchange and recognises that they can take different forms, such as a group of temporarily interconnected people or on-going interactions. Crucially, both forms need those interconnections and interactions to exist, so that the benefits of developing initial contacts are maintained.

Whilst CREW metrics demonstrate networks generated for the life of each project, it is important that these networks are supported beyond this timeframe, so that the capacity is not lost to future policy needs. Over half of our interviewee sample had been, or currently were involved in, another CREW call down/capacity building project (not necessarily with the same individuals); 15 individuals had only interacted with CREW on a single project. Even removing CFT members from the count, two individuals had involvement in 6 CREW projects, and another two had 5 CREW projects on their CVs. The majority of the sample would do a CREW project again,

<sup>6</sup> This may reflect a change in how the metrics were collected and calculated.

<sup>7</sup> There were 3 Capacity Building projects and 8 call down projects involving SEPA in 2011-12, rising to 4 capacity building and 12 call down projects in 2012-13.





so long as the topic was of sufficient interest to them and/or fitted with their remit and role in their organisations (see also comments on quality section 4.3).

We have not collected data on all those involved in project workshops nor who has been accessing the website or reading the CREW newsletter. These passive or transient members of the CREW networks may provide a latent resource for future project delivery. The CREW register of expertise (RoE) has 140 full records that allow analysis. These show that there is a larger pool of organisations (a further 24 universities and consultancies) and individuals interested in CREW who are not yet directly involved in CREW project delivery. This raises the questions of how to access this latent resource, and how the RoE should be used, which relate to the issue of who can contribute to CREW.

### **3.3 CREW visibility and network reach**

Ensuring you have the right people involved/at the table was seen by many as key to the success of CREW and the work it undertakes. “*You need to make sure the right people are in the room not just the usual suspects; you need those with the authority who can make a decision or take things forward*” (customer, Scottish Government). Some respondents (particularly policy and practice customers) did question whether CREW was sufficiently visible in the academic arena and able to attract the ‘right’ people to deliver specific contracts. There is an on-going need for profile building so CREW is ‘the’ centre for water expertise in Scotland. Some customers raised concerns about lack of HEI response to tenders and also wondered what happens if the tenders received are not suitable for the work required? Some respondents were unclear as to how CFT ‘assigned’ experts to the projects.

A few respondents (both customers and researchers) felt that CREW could be ‘JHI-centric’ and should seek more expertise beyond JHI or even beyond Scotland. A specific issue was how to involve expertise from SRUC, which is not an eligible CREW research provider. Some tenders do not receive any HEI bids, meaning that they have to be delivered solely by JHI researchers (see why people use CREW below).

Discussion with the CSG opened up a debate over whether the current restrictions on who could supply the ‘science’ in the science, policy and practice interface should be revisited to allow for input by non-Scottish academics<sup>8</sup> and/or to open tenders up to consultants or analysts in other public sector organisations. It was felt that CREW contracts, given their current value and focus, may not be sufficiently attractive to most HEI academics, and that other research providers might be more appropriate to deliver the main objective of CREW – to better connect water research and policy by

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<sup>8</sup> CFT has already secured permission to go to English Universities if no relevant expertise is available in Scotland up to 10% of the overall budget





providing customers with tailored advice and evidence to improve policy and practice.

As noted in section 1 above, building networks is not an aim in itself but a prerequisite to get the right capability at the right time (capacity) to deliver CREW's primary aim. Being part of wider international networks is important to ensure that CREW draws on the best research and is up to date with current ideas, even if CREW projects are delivered by Scottish organisations. CREW, as part of Hydro Nation, can showcase Scottish research internationally. These are separate but interlinked aspects of the question to what extent should CREW be part of wider UK and international networks, as well as building its own networks. Links between CREW and CXC are also important. In three of our sample cases, customers were referred from CXC as CREW was viewed as more suitable for their needs. CREW has also referred customers to CXC as the best route for their needs. CREW could make better links to other centres of expertise in order to share best practice.

### **3.4 CREW members: why people use CREW**

People generally agree with the view illustrated in the comment that “*CREW is making progress. People are warming to doing the work and more rapid response type answers and realising that you do not have to shelve academic rigour to give an answer*” (JHI researcher).

**Customer perspective:** Most customers chose CREW because it was seen as a cheaper and easier way to fund rapid response research, including the normal SG procurement process and the strategic RESAS 5-year programme, which was perceived as hard to access once up and running. CREW also provides a formal route for policy makers and practitioners to ‘ask an expert’, with funds attached, rather than just hoping that researchers can provide advice on an informal basis.

For some 2011-12 projects, some customers and researchers noted that they were invited to join projects once they had started. However, by 2012-13, respondents said they tended to use CREW because it understands the need for ‘demand-driven’ research and generating appropriate outputs.

It is worth noting that CREW is ‘free’ at the point of delivery to these customers, which is very valuable in the current climate of public sector cuts. For example, one Scottish Government customer would prefer to use SNIFFER but felt compelled to use CREW as this is where the funding is channelled. Some of these problems resulted from poor communication about the purpose of CREW (see recommendations to CFT). Problems with intellectual property rights (IPR) and tendering were also seen to be a barrier for customers considering using CREW.

**Researcher perspective:** Some researchers believed it was easier to win funding for small scale or pilot projects through CREW and liked the opportunity to build closer relationships with policy and practice. Some JHI researchers reflected on how CREW projects helped them position their other research more effectively and how they can build on the CREW networks to help themselves and JHI in future research funding competitions. Implicit in some of the issues raised elsewhere in the

interviews is the sense that there are still divergent agendas at times, with some researchers using CREW funding to further develop 'pet projects' rather than primarily to deliver to policy.

There was some feeling among HEI researchers that CREW did not reward them sufficiently for the time and effort required: demand-driven research requires skills and experience and it can take time to condense research information into concise policy messages. Problems highlighted by researchers show that there are structural barriers to making CREW work more attractive to researchers. For HEIs, the 'impact agenda' within the Research Evaluation Framework for universities does not reward the kind of demand-driven research undertaken in CREW; for JHI, confusion about whether CREW counts as 'external income' and is sufficiently well-regarded by senior management (as CREW income is not included in current Science Group Review returns) is a key issue.

CREW was regarded by some HEI researchers as consultancy work, rather than high quality original research, particularly as the centre focusses on synthesis and review. Some researchers felt that JHI picked up much of the 'procedural' work from CREW as the university sector is only interested in pursuing novel questions that fitted with their own research agendas.

### **3.5 Network focus: how research topics are chosen**

Our interview data suggest that intermediate cultural, conceptual and policy impact are more likely to occur when customers identify the research problem; and that research benefits from dialogue between customers and researchers to specify the questions and during the research process. Respondents who were not involved in such dialogue tended to raise this as something they would change in hindsight. However, this does raise the question of how much dialogue is needed, or can be managed, within a very time constrained call down project, and in a context of high workloads.

The 2011 capacity building projects generally researched topics identified by researchers in response to perceived policy problems; some projects used workshops to collectively prioritise, focus or refine research questions. Now, however, in most cases, the research team drafts the specification in response to a policy or practice issue, using CREW templates, and the specification is finalised after comment from/discussion with the lead customer. There is a strong focus on filling 'knowledge gaps' and signs of following up issues raised in previous research (or both).

It was often unclear whether research problems are identified by a particular customer or arise from a collective discussion within the organisation. Some problems remain in identifying the main point of contact within the client organisation and understanding exactly what is required by them. Getting the objective of the CREW project 'right' was seen to be a skill that many customers needed help with from the CFT. In most cases, respondents agreed that their project objectives were clear. Those disagreeing tended to be involved in 2011-12 capacity building projects

where they did not feel they were involved in specifying the question. From 2012-13 onwards, all capacity building projects' action plans (including research objectives) must be signed off by the policy lead, so this should ensure increased shared understandings at the start.

The CSG indicated that increased attention to the specification and scoping stage would help CREW maximise its impact on policy, by engaging all those involved in the topic at the start and answering the 'real' problem, rather than the question that the individual customer might have in mind. Where there are multiple owners of the policy problem, this can add complications to specifying the research and identifying clear objectives. It was generally agreed that if CREW is to be a real KE mechanism, the demand side has to drive the research agenda: *"I feel a degree of ownership and because I feel ownership I am more likely to remember that [research findings] exist, to disseminate them further, and if there are opportunities to disseminate them, I will take them up"* (customer, 2011-12 capacity building project).

While researchers generally respond and debate or amend the specification before capacity building project work starts, often researchers are 'selected' by CFT for call down work, with no direct discussion with the customer about the research. In some cases, this negotiation is done by CFT, rather than researchers and customers discussing the specification directly.

A number of respondents were in favour of more direct interaction between researchers and customers as part of developing a mutual understanding of needs, risks and issues of policy research: *"we have a bit of to and fro on what do you mean and why do you say that, crazy policy person, and I say well we don't need all that academic stuff and 99% confidence levels, we just need to know does it work most of the time in most places"* (customer, SEPA). However, in a few cases, respondents recognised that a short and tightly specified call down project did not justify lots of interaction; and noted the difficulty of finding time for these interactions, preferring to leave the project management to the CFT.

### **3.6 Evolution during the research process**

Even where shared objectives are agreed, it does not mean that projects do not evolve or drift from the initial starting point. In some cases the objectives and aims of the project had to be revised, even if they seemed clear at the start. Often this was not seen as a problem, but rather a flexible response to changing policy needs or to the fact that responding to research questions was often more complicated than originally anticipated, making the original objectives too ambitious.

This relates to some comments made about whether the customer fully understands the research implications of the questions they are posing (or whether any of us can tightly specify research on an unknown problem); and how direct interaction between researchers and customers can help ensure a mutually understood and viable specification. When decisions about revisiting the project specification need to be made, it seemed to work best when there was direct and clear communication between all parties involved (the researchers, the customer and CFT).

In some cases, the evolution (or drift) during the research process was seen as problematic. Some researchers talked about learning to be more realistic about what they can do for the allocated time and money, and learning not to over-promise. In some cases, the lack of specificity or guidance meant researchers felt they had to learn as they went; and evolution in objectives over the course of the project, due to new insights from new participants, meant that it was difficult to complete a project on time and on budget. A counter example is where one customer would have liked to evolve the project in response to initial results but was unsure how to extend the budget to allow this. CFT have dealt with this issue on several occasions by specifying a capacity building project after the call down work is complete, or undertaking a further call down project to address additional issues arising.

### **3.7 Quality and quantity of network interaction**

Establishing the centre has provided a formal mechanism for policy-practice-research interactions, and CREW is seen to have increased both quality and quantity of interaction among participants. CREW was also seen to legitimise direct interaction between researchers and research customers. Even in cases where the customer was already aware of/knew an expert, they welcomed CREW as a mechanism to initiate interaction for a particular evidence need. In other cases, the customer noted that they would not have approached an academic partner, were it not for CREW giving a 'proper procedure' to the process.

Overall the responses showed that interactions arising from CREW work are seen to have broken down barriers, and introduced people to new contacts, and to wider networks, making it easier to make contact in the future. Responses that were less positive mentioned that CREW will not help increase interactions due to Scotland having a small research and policy community, with most people knowing each other anyway, and lack of impetus to interact once a project is completed unless more work in the area is funded.

Customers were more likely to respond positively about increased interaction, with the CREW work highlighting experts in the field and putting them in touch with new contacts. Many respondents felt that work via CREW would help to increase future interactions. Reasons for this included better knowledge of the research communities involved in CREW work, wanting to continue working with CREW partners on new work, and increased confidence in contacting people 'once the ice is broken'.

Both quantity and quality of interaction may depend on the type of project (call down or capacity building), the duration of the research, or the approach to project management taken by the PI. Communication was seen as a key part of good project management- getting wide input at the project initiation stage, with customers improving their skills in defining research questions and keeping in regular contact throughout the project. Responses showed a wide range of types of interaction within CREW. Cross-sectoral/face to face workshops and events are seen as useful in increasing effective interactions between science, policy and practice, allowing

thorough discussion of the evidence and its potential implications, and allowing different perspectives to be shared.

Potential for future interaction seems to depend on the particular project in question, with some researchers on shorter projects (call downs) reporting fewer opportunities for future interaction based purely on that work. This is because there is little time for engagement and interaction during very short term projects, via project meetings or workshops for example. A number of researchers on call-down projects said they did not know who their policy lead was, suggesting the research was an instrumental transaction between science and policy rather than a building of mutual understanding and co-production of knowledge and skills. Often, the customer was only aware of the PI from JHI/HEI, rather than being able to name all the individuals involved in delivery, suggesting that communication can be restricted to key individuals.

Despite this, the call down service was seen by one policy customer as key to increasing interaction: *“the call down service encourages us to [interact] more often as we can ask questions quickly and it is part of the process and a good safety check that we have not missed something. It’s extremely valuable to us”* (customer, Scottish Government).

Poor quality interaction seems to be due to communication failure during project work. Responses noted that customer/CREW timescales tend to be critical, and slippage causes problems; following up on activities and keeping relevant people informed of progress, and setting schedules sufficiently in advance to ensure the right people can attend meetings was seen as essential for effective delivery.

Customers and researchers participating in research that builds on completed CREW work is likely to deepen network interaction between these individuals, but is less likely to widen the network to include new participants. New partnerships formed to undertake CREW work potentially generate a wider, but not necessarily deeper, set of connections associated with the centre. The question is how to focus CREW; can it effectively operate to deepen and widen interaction, or should the centre decide between providing policy support for an ever-increasing set of topics (widening) and restricting provision to build depth of knowledge in an agreed, static set of topics (deepening)?

#### **4.0 CAPACITY BUILDING**

CREW is a demand driven approach, providing research to enhance the formation, implementation and delivery of water-related policies in Scotland. CREW therefore needs to ensure its members (science and policy) have the ability to generate the knowledge required and communicate that knowledge in an appropriate way. This is the new capacity which CREW aims to foster.

##### **4.1 Capacity building**

Issues of whether CREW is reaching all the relevant individuals in Scotland has been raised in the section on networks, but it is important to consider capacity as a



factor in explaining why and how CREW objectives may or may not be achieved. Issues raised in interviews about quality and difficulties in delivery were often explained by insufficient input from the relevant experts at the time required by the customer. In particular, having a single researcher delivering a project made it more prone to delay. The lack of a strong pool of researchers to draw on has sometimes led to members of CFT stepping in to help deliver projects. This adds to their workload and may inadvertently cause problems with other projects, due to delays in project management communication.

What is interesting is the perceived lack of capacity by some respondents despite the 140 entries on the RoE. However, not all experts registered with CREW are eligible researchers, e.g. because they are based outwith the UK, or are employed by consultancies. Neither can be funded through CREW currently. Also, not all eligible experts are available when they are needed.

#### **4.2 Increases in capability**

Capability refers to the skills, knowledge and experience needed for CREW success. Respondents tended to mention new knowledge, or increased understanding of their knowledge gaps most often. Many respondents (customers) felt CREW work enabled them to better frame research questions/or ask more pertinent questions. Some respondents (customers and researchers) who believed that no new knowledge had been generated noted that the work had resulted in better understanding of knowledge gaps. New skills were less evident, and most mentioned were communication skills. In particular, writing skills were seen as very important for CREW work.

Customers and researchers mentioned presenting research findings in ways useful to policy. Researchers “*tend to want to put in all the detail and technical issues leading to a 20-30 page report, by which stage policy makers and practitioners have given up and walked away*” (customer, NHS). Customers indicate that they want short briefings focused on research conclusions and their policy implications. Customers see producing such outputs as a key skill and responses suggest they recognise that the more these skills can be developed, the more customers and researchers work together.

One researcher noted that CREW work made them think more about how to present things simply, yet without losing the detail of the research results. Responses also indicate that working with more senior researchers has helped those less experienced gain understanding of how to work with customers while also learning about a topic and research methods. The few responses that mentioned new capability beyond communication and project management skills focused on the potential arising from links made through CREW work (networks and connections) to increase dialogue across different communities of interest and geographical locations.

### **4.3 Matching capacity and capability**

There are often difficulties in matching capabilities (skills, expertise, experience) on the register with capacity (availability), particularly given the responsive nature of much of CREW's work. There are competing organisational rhythms that make it difficult to schedule research required: around teaching commitments of researchers within HEIs; around budget and policy cycles for customers; and reporting/planning deadlines for the JHI, all making it difficult for co-ordinated research.

This mismatch between capacity and capability is a crucial issue for CREW as co-produced, demand-driven research is time sensitive. Should project specification and start-up be delayed through lack of available capacity then more iterations are likely to be needed to ensure the research questions are still relevant; and there will likely be a need to bid for budgets across more than one financial year.

The CREW model indicates the importance of 'policy entrepreneurs'- individuals acting as a bridge between science, policy and practice networks who can catalyse ideas. Although water is often seen as a technical area of research, interestingly, there were more social scientists (1.6 FTE) than natural scientists (1.4FTE) within the JHI involved in CREW in 2012-13. This might reflect the fact that the core CFT members belong to the social, economic and geographical sciences group, although the CREW manager post is now located in the environmental and biochemical sciences group.

### **4.4 Mechanisms for Knowledge Exchange (KE)**

Very few projects in our sample did not result in a written output that is accessible via the CREW website. Many respondents stressed the importance of the website as the main 'shop-front' for CREW and the need to keep it accessible, up-to-date and easy to search. There were comments regarding the fact that CREW was not using the website and associated social media to its full potential as a dynamic platform for knowledge exchange, currently it is information provision only. There are early discussions within CFT to identify how to use existing platforms e.g. SE Web more effectively.

The format, length, and type of written outputs varied enormously, reflecting the different types of project (from a few days technical review to a longer term capacity building project) and the audience for which the product was intended. The majority provided some form of report, but alternative outputs included: Natural Flood Management and Sustainable Urban Drainage databases; a Rivers Keepers Handbook and a photographic display. Many projects generated more than one output (with some having 6 or more outputs associated with it), either following the model of a longer report plus a research summary briefing; or multiple reports on different aspects of the work. Sometimes workshop reports were generated in addition to the overall research project from the project. Note that 33 of the 188 policy relevant outputs entered for RESAS 2012-13 reporting period were counted to CREW.



Knowledge exchange takes a number of forms from outputs such as noted above through to academic peer reviewed papers to workshops and other engagement processes, such as members of the CSG/CFT sitting on science-policy advisory committees. There was relatively little (recorded) reference to using social media such as tweeting or highlighting issues on the JHI or other organisational websites. Some recognised that the 'Communications Strategy' covering the website and social media needed more work, e.g. having a CREW rather than James Hutton Institute Twitter account. Some of the 2011-12 capacity building projects have been presented at conferences in 2012 and beyond but there are also many projects that have not done any further dissemination beyond the publication of the project report on the CREW website. Interestingly, some respondents seemed to think that dissemination of CREW output became the responsibility of CFT once the project ended. CREW could make more of its access to networks such as SAGES, MASTS and the Telford Institutes to publicise its existence and disseminate its material. Finally, an HEI respondent felt that if CREW was really about effective engagement and interaction, then 50% of the funding should be spent on KE.

#### **4.5 Quality, relevance and accessibility of outputs**

In order for CREW work to result in impact, the outputs must be concise, timely, and accessible. In nearly all cases, customer respondents felt the quality was sufficient for their needs. A few examples were given where a time-sensitive policy-driven project was delayed, and therefore became less relevant by missing the policy window. Some examples indicated that where the customer was not involved in specifying research objectives, outputs were not as relevant as they could have been. Most interviewees agreed that CREW outputs were clear and accessible for their audience; audiences however varied, from small numbers of technically competent expert customers to more generalist customers<sup>9</sup>. Call down evaluation showed that most customers rated the call-down outputs' relevance, accuracy, impartiality, readability and conciseness as either very good or good.

Some feedback was very complimentary ('*perfect, spot on*' – customer, SEPA)<sup>10</sup>, whereas others talked about things being 95% there, or accessible and clear but limited in terms of answering the research question. CREW report and briefing templates were seen to help researchers provide what policy makers need- "*a clear outline of the findings, implications and caveats around the data, something they can then use to take into account in policy making*" (customer, Scottish Government). Nevertheless it was noted that some researchers still tend to write reports that are too long and detailed, without sufficiently clear and 'brave' recommendations. One respondent noted the output produced for their project as being the most successful part of the work. "*You can't overemphasise the importance of layout, design and simple language – it was the appropriate style and format for the user, simple,*

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<sup>9</sup> Raises question about who is the final audience for the report on the web?

<sup>10</sup> Should we convey this feedback to the relevant PIs?

*looked good, short, explained the key terms and gave good relevant examples that are context specific to Scotland*". The policy customer agreed, stating, *"it was very relevant and simply presented"*. Interview responses also suggest that CREW research findings should be disseminated more widely, but appropriate formats or forums are needed so that such effort is not wasted.

There were some comments about quality. One respondent suggested that the CFT should use suitably qualified external reviewers to peer review outputs that are beyond the technical expertise in the CFT; and comments from the Water Futures Day suggested that CREW could use social media platforms to get expert input into ensuring the questions were right and peer reviewing the outputs. Interestingly, a small number of academics have published the research funded by CREW (or intend to) (N=5<sup>11</sup>) and these researchers pointed to this as a form of quality assurance. In a couple of cases, CREW was used to pilot ideas with researchers planning to develop further research using PhD studentships rather than via another CREW project.

Another researcher believed that CFT or the customer (the researcher was unsure which) cared more about presentation than content when editing final reports. A social scientist raised concerns about CREW projects staffed by natural scientists doing social science badly, which could result in stakeholder fatigue; reputational damage and impact on the quality of evidence for evidence based policy (see capacity above). In a couple of cases, policy clients argued that they would use CREW for short call-down type contracts, particularly literature reviews, but not for longer projects such as the development or application of models because of their concerns about the quality of CREW deliverables<sup>12</sup>. Some customers and researchers noted that in some cases, work produced by HEI partners was not of the required quality, and that it was unclear how CFT or PIs could manage communicating feedback, particularly where the HEI partner was more senior than them.

#### **4.6 Uncertainty**

Associated with quality are the issues of uncertainty and ensuring limitations of research data are recognised. Respondents tended to focus on one of these two issues. Higher degrees of 'uncertainty' (or confusion) surrounding the policy or practice question leading to the CREW research made it more challenging for the research to result in clear policy recommendations in an evolving and messy topic. One researcher was concerned that if they stressed the degree of uncertainty too much, policy makers might retreat to 'business as usual' rather than considering more innovative approaches.

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<sup>11</sup> No papers were ascribed to CREW in RESAS 2012-13 returns but our interviews picked up references to 3 papers having been published and 2 more under development.

<sup>12</sup> A six times CREW customer and a 5 times CREW customer

A number of respondents could not remember how uncertainty was handled (normally for projects from 2011) but stressed that understanding research limitations was very important, particularly when findings might be used to underpin public funding. Understanding the limitations of research results was seen as more relevant for empirical research than for literature reviews. However, even researchers undertaking literature reviews talked about the need for caveats to their recommendations. Only one respondent talked about doing statistical tests on their findings for data confidence levels. Others felt uncertainty would need to be addressed in longer or more complex projects but was not needed for their short call-down project.

For qualitative research, it is not so much uncertainty as the inappropriateness of generalizability that needs to be highlighted; as qualitative research should be assessed differently to statistically analysed data.

## **5.0 IMPACT**

Common forms of impact in the literature include increasing awareness, altering attitudes, influencing behaviour, and informing policy. More subtle forms include an increased willingness to engage in knowledge exchange activities, by both individuals and institutions, and the establishment of relationships and networks. One of the main aspects of our theory of change is that using networks to develop both research capacity and capability will deliver conceptual, cultural and instrumental changes to policy and practice. These lead to impact, i.e. environmental improvements, societal wellbeing and economic growth.

However, these do not equate readily to impact statements for the Research Evaluation Framework process, which may prevent CREW attracting HEI partners on the basis of illustrating impact for their research.

### **5.1 Changes to conceptual and cultural understandings**

Interview responses showed that most participants believed that the work they delivered or requested did respond to the needs of science, policy or practice. Most responses focused on meeting policy needs, seen to be met by ongoing production of a useful evidence base; focusing on agreed research objectives; and providing direct responses to the research questions asked in policy summaries. Reasons given for work that did not respond to policy needs were project delays; customer uncertainty about the research question to ask; and poor communication.

Interestingly, these problems do not preclude an understanding of policy needs but suggest issues of capacity or capability in how to respond to them.

The responses to whether the particular projects/activities increased understanding of the needs of science, policy, or practice were divided approximately 50:50. Many researchers believed that their understanding was not increased as they had worked in the topic area or with policy customers in the past and their CREW interaction did not lead to further understanding. Other respondents, however, did believe that the CREW work had brought science and policy together, with interactions across

sectors being noted as particularly useful. An example of this was a cross-sector workshop. *“It gave a better understanding of the different perspectives of science, policy and practitioners, as the people at the workshop were from different areas. The exercise at the workshop looking at the three top things that needed to change was very interesting as it threw up some unexpected answers-this definitely increases understanding (customer, Scottish Government)”*. For researchers, interactions during CREW processes were seen to result in better understanding of policy and the time pressure customers face as part of their role.

Our data suggest that the crucial element for developing both capability and capacity for all those involved in CREW is to provide opportunities to develop mutual understanding and relationships of trust and reciprocity.

## **5.2 Building and strengthening mutual understanding**

The need for effective communication through network interaction was a theme that dominated many of the interview responses, ranging from identifying potential projects, through to communicating the final outputs. On-going dialogue during the project was also seen as important to help customers and researchers understand why problems have arisen and how they can be resolved. For example, interview data suggest it is important to communicate data access issues and other constraints during the research to ensure customers know why there is a delay rather than researchers ‘going quiet’.

Underlying these points was not just a need to convey information, but to use communication between customers and researchers to better understand the nature of policy/practice problems and to ‘co-produce’ strategies to research them. Gaining a broader insight from working with other people and other sectors across different networks was often cited as one of the benefits of CREW, and whilst many thought CREW did this well, such co-working was also seen as an area that requires on-going investment to sustain its success.

CREW has a role to play in horizon scanning before specific capacity building research projects are developed. Many respondents liked the CFT Waters Future Day event held in 2012 to deliver this role, but suggested more frequent and targeted workshops or discussions rather than an annual general event. Active recruitment of those on the RoE to attend these events would help promote a more vibrant CREW community. The lack of a proper follow up to the Waters Futures Day was noted in some responses. These comments also relate to ensuring that the ‘right’ people are engaged in these CREW Knowledge Exchange mechanisms.

Interestingly, CFT is modifying the approach to horizon scanning this year – a WFD will be held but with parallel targeted workshops, which will discuss priorities identified by the CAMERAs evidence workshops that are relevant to CREW. Discussion between researchers and customers during workshop sessions will also identify further priorities within each target theme. Follow up is to be planned in advance this year in a series of meetings between lead customer/lead researcher to specify 2014-2015 projects.

Co-production of research questions was seen as very important, as policy makers often do not know how to frame what they want to ask or how complex the problem might turn out to be. For example, a buffer strip project looked straightforward but a workshop exposed a 'can of worms' so the project had to be extended to ensure accuracy of the guidance (customer, SEPA). Knowledge exchange between customers and researchers could result in better specification, as understanding how the research output would be used, or who might use it, is likely to lead to better outputs.

Responses indicated that improving research specifications could include broadening the research question, and more scoping beforehand to ensure existing information on research gaps is considered. Getting all relevant bodies involved in the project to ensure a more inclusive approach was also mentioned as an element of better project specification. Responses indicate that there is a role for CFT to help facilitate dialogue and improve co-production skills for both customers and researchers.

Project planning was seen by many researchers as an important skill for CREW work, and a key element of capacity. Time emerged as a key aspect of project planning: many respondents wished they had specified more time to complete the project, or wished they had started engagement with project partners earlier. Some responses showed that at the end of a project, researchers appreciated much more fully the usefulness of early discussions with policy contacts to discuss plans despite the time costs involved. Such knowledge exchange was seen to lead to better definitions of the project aims, and some responses noted that more meetings during the research period would also have helped.

### **5.3 Instrumental changes to policy or practice**

Direct impacts have been identified with work providing evidence for policy and feeding into policy documents such as the Scottish Government Biodiversity Strategy (although it is difficult to directly attribute causation) and Government funded projects, including the new catchment pilot programme. Without direct and specific feedback from the policy customers, it is difficult (if not impossible) to link the work and these outcomes as direct impact. For example in one case, the PI believes it did feed into policy, while the policy customer felt the work undertaken by CREW acted to validate what they had already done in-house and is therefore a good 'check' for them.

CREW call down work has also contributed to the work of key customers: research on the value of Scotland's water resources directly impacted on policy by feeding into legislation and influencing the phrasing of the Act as passed. While the work was noted as short, it was felt that "it will have a lasting impact on policy". CREW work has also helped to 'ground-truth' the work undertaken by policy, thus shaping future practice. Research on flooding and insurance was seen to have direct impact, because it provided evidence for use in talks with DEFRA, and could therefore influence the DEFRA position; and research on NFM incentives call down was seen to have direct impact as it has contributed to a SEPA handbook currently being



prepared. From the call down evaluation sheets, it was clear that the outputs from the projects were much more likely to inform and influence future policy or practice development (9) than influence specific legislation (3) or ministerial briefings (1).

Several PIs noted that their projects had already made an impact, and saw impact as emerging from:

- Continuation within CREW projects of previous work;
- Direct delivery of project findings rather than delivery via third parties; and
- Information given to policy makers and practitioners, whether or not these were immediately followed up in policy development.

CREW research was also seen to have made an impact through informing policy makers' decisions on policy. Other impacts were noted as furthering knowledge and identifying knowledge gaps.

#### **5.4 Future impacts for CREW**

All interviewees who felt the work they had been involved in had not resulted in impact believed that it was too soon in the process to tell, inferring impact is not always seen immediately, but recognised as a longer term objective. Most respondents felt that project impacts would come later, and PIs saw this as mainly through policy makers making use of project outputs.

PIs noted difficulties in assessing impact, especially in identifying impact that can be specifically attributed to a specific KE intervention. They emphasised that it takes time to build relationships that will help make an impact in the future, and the added complication of difficulties in disentangling the respective impacts of current work and of previous work on related projects.

Some who believed that initial work may not have had direct policy impact yet noted that the research has resulted in further work (or highlighted further work needed), which *will* impact on policy and which has already helped to form new networks between researchers and customers. Examples given included WFD monitoring techniques and SRDP measures. This CREW work has already had impact but is expected to further influence policy through inclusion of new wording within legislation, feeding directly into tools and methods for NFM, and flood appraisal management procedures.

These findings suggest that the initial questions being asked may not lead to direct policy impact but increase the joint researcher-customer understanding of what is not yet known. Thus the intermediate impacts of identifying knowledge gaps and/or reframing how problems are perceived may have important indirect impacts on how new policies or practices are developed. However, this is very hard to track.

As with publications, there is no current process by which CREW can track where projects were used as pilots to support applications for further funding e.g. LIFE or INTERREG bids, but these are further types of future impact.



Finally, there may be future impacts on policy arising from the ‘institutional’ memory of CREW in that the CFT can help coordinate and synthesis the disparate information collected in the variety of CREW projects for different customers. The CFT may be one of the few opportunities to have an oversight of the sum of CREW’s parts.

## **6.0 KEY FINDINGS and RECOMMENDATIONS**

Evidence from the Interviews with people involved in CREW work April 2011 –June 2013 shows that broadly CREW is working well to better connect water research and policy. Lessons learned from early experience have led to improvement in CREW working over- time. People involved with CREW generally agree that the centre is as much about the process of policy-driven research as the outputs, and that the essence of CREW is effective knowledge exchange.

Six key areas emerged for improving CREW’s performance:

- building its profile;
- clarifying its remit and operational focus;
- improving communication;
- sustaining its networks;
- increasing capacity; and
- ensuring the whole is greater than the parts, i.e. that CREW interfaces for knowledge exchange are effective in increasing the value CREW adds to the Scottish Government’s strategic research programme, and to water research more generally.

Issues arising in each area are outlined below, and recommendations made for CREW management to address these issues.

### **1. Profile building**

Interviewees suggested more profile building is needed within the science, policy, and practice communities in Scotland to increase the coverage and quality of CREW networks. Increasing the quality of interaction within networks was widely viewed as a matter of communication, and that more work is needed to communicate CREW’s aim, objectives, ethos, and opportunities effectively. Profile building was felt important in order to increase CREW’s potential to have greater impact on effective water management outwith Scotland. Several interviewees suggested use of CREW branded social media, e.g. Twitter, LinkedIn, for profile-raising.

**Recommendation:** Crew Facilitation Team (CFT) should develop a communications strategy to increase visibility and promote the benefits of CREW.

### **2. Remit and operational focus**

Interviewees’ views of CREW’s purpose, and discussions of our findings with the steering group, suggest that aspirations for CREW exceed its current remit. There is particular support for CREW to increase its contributions to (i) the Hydro Nation



policy development, (ii) water industry development, (iii) the international water arena, and (iv) engage with marine policy. Interviewees also indicate that it is unclear whether CREW should aim for innovative primary research or focus on synthesis and reviews in meeting the needs of policy and practice customers.

**Recommendation:** CREW's remit and the focus of its work should be clarified, bearing in mind that additional objectives and activities will require more resources.

### **3. Improving the science policy interface**

People involved in CREW generally agree that co-construction should lead to better research questions and policy solutions. Interviewees particularly value on-going dialogue and workshops for effective knowledge exchange, and also as mechanisms to allow research objectives to be revisited if required. Better communication between customers and researchers at the start of projects should ensure that issues relating to contracts and intellectual property rights are resolved at an early stage. Face to face meetings were the preferred means of contact.

**Recommendation for CREW:** CREW should increase the potential for face-to-face meetings of the right people (both key policy makers and relevant, expert researchers) at the right time (to address the policy research need when it is 'live').

### **4. Increasing networks**

Evidence from the evaluation shows that more people from policy and research are becoming involved in CREW work; most are willing to continue involvement. Difficulties remain in ensuring Higher Education Institute experts are well represented in CREW, and engaging practice as well as policy. Some interviewees (both researchers and customers) queried the restriction of CREW funding to Scottish HEIs; others suggested that consultancies may better deliver CREW work given the demands of delivering policy relevant research i.e. working to tight time scales. Interviewees indicated that CREW work is not a priority for HEI researchers working to the Research Excellence Framework; and the James Hutton Institute needs to ensure that CREW work is valued. Publishing papers is generally seen as more important for career development than CREW work. In addition scientists said that CREW work is often more difficult and time-consuming than anticipated.

**Recommendation for CREW:** Decisions are needed on (i) how to engage more HEI research expertise, (ii) how to ensure JHI researchers work is valued so that they continue to work for CREW, and (iii) whether funding should extend more widely for CREW work.

### **5. Increasing skills and capacity**

The capability of CREW to better connect water research and policy has two elements: capability or the skills of people involved in CREW work, and their capacity, i.e. the time that they can devote to this way of working. So far, capability has been slow to develop in CREW and is mainly building on existing skills. Our findings show that while many people involved in CREW believe they have the skills needed for policy research, the evidence suggests that this is still an area that

CREW needs to improve upon. In terms of capacity, interviewees suggest that more resources are needed to ensure projects are resilient, i.e. to avoid project delays if a crucial researcher cannot complete their work, or projects not starting to schedule because of lack of capacity.

**Recommendation for CREW:** Consideration needs to be given to (i) training for shorter term, demand-driven research (ii) increasing understanding of policy-driven research, and improving key skills for this approach among the communities involved.

## 6. Summing the parts

Individual CREW activities have made a positive impact on policy, but there is little evidence of building on the results of each project to make more of CREW research; to link CREW findings to other RESAS research; and to become more strategic in CREW work, e.g. by delivering to agreed topic themes. Our evaluation found that no clear mechanism exists to sum the parts, and no responsibility has been formally allocated.

CREW projects have developed a large number of final outputs (e.g. 33 web-published outputs from 8 capacity building projects). It is unclear however, whether these outputs reach their target audiences and are promoted within wider platforms publicising land and water policy research. Researchers interviewed indicated that their role in CREW projects ended on publication of outputs, and saw disseminating CREW outputs as a role for CFT.

**Recommendation for CREW:** Responsibility for summing the parts, and for on-going dissemination of outputs, should be attributed and resources allocated accordingly.

### 6.1 Learning the Lessons from Year One

In this section we revisit the key lessons from ESPPI-CREW year 1 findings and report progress. Key lessons refer to CREW's aims to increase networks, capacity and impact.

**To build networks:** The CREW facilitation team needed to make the aim of building on-going networks a higher priority in year two.

- more time was required in engaging science and policy in the work of CREW
- mechanisms needed to be developed to allow for dialogue among CREW members. This could take the form of an online space allowing for on-going communication e.g. a CREW LinkedIn group.
- CFT needed to ensure that best practice is followed in CREW's approach to engagement.

**Results:** Whilst there is positive feedback about the development of 'space' for science-policy practice dialogue, there are still calls for CREW to facilitate more face to face interaction and to use social media more effectively in between such



meetings. Despite CFT disseminating KE best practice guidance, it is unclear that best practice is being followed in all projects.

**To create new capacity:** The CFT needed to recognise that CREW was a different way of working for many researchers and policy makers.

- CFT needed to do more to help people understand this new way of working, and give them the opportunities to gain the skills to be able to work in this way.
- CFT should work in year two to identify the benefits to scientists in responding to policy demands for research, and provide opportunities to realize such benefits.

**Results:** CFT has provided more support to PIs in how to deliver policy-led research. However, more could be done to sell the benefits of policy-led research to encourage more people to join the CREW networks.

**To increase impact:** When considering impact, the emphasis needed to be on assessment. Whilst some mechanisms such as the RESAS Key Performance Indicators are useful to the funder, they may have limited use in evaluating and improving CREW.

- Further work on assessing impact should feature in next stage of the ESPPI-CREW project. For example some pertinent questions emerged from the literature that would benefit from further reflection: impact evaluation for whom: the funder, CREW management, the researcher, the end user? Who defines what the impact is? How is practice shaped by the need to show impact? Is this beneficial to achieving the aims of CREW?

**Results:** The ESPPI CREW team have reviewed impact evaluation studies and operationalized it for this review. There is also a report on this literature on the project webpage.

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