
























iCASP Impact Report

April 2024

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Abbreviations

CBMDC	City of Bradford Metropolitan District Council
CC	Calderdale Council
CFR	Communicating Flood Risk
CIRIA	Construction Industry Research and Information Association
CoP	Community of Practice
CoYC	City of York Council
DCRT	Don Catchment Rivers Trust
Defra	Department for Environment, Food and Rural Affairs
DsPH	Yorkshire and Humber Directors of Public Health
EA	Environment Agency
EAC	Environment Audit Committee
ELMs	Environmental Land Management Schemes
EMG	Executive Management Group
EFRA	Environment, Food and Rural Affairs
ESWFF	Enhanced Surface Water Flood Forecasting
FASII	Leeds Flood Alleviation Scheme Phase Two
FCRIP	Flood and Coastal Resilience Innovation Programme
FFC	Flood Forecasting Centre
FLEEX	Flood Engagement Exercise
FOREWARNS	Flood fOREcasts for Surface WAtER at a RegioNal Scale
GBI	Green and Blue Infrastructure
GG	Governance Group
HMT	His Majesty's Treasury
iCASP	Yorkshire Integrated Catchment Solutions Programme
IEG	Impact Evaluation Group
INNS	Invasive Non-Native Species
ITF	Impact Translation Fellow
KC	Kirklees Council
KEF	Knowledge Exchange Fellowship
LAs	Local Authorities
LCC	Leeds City Council
LWWP	Living With Water Partnership
MFFP	Moors For the Future Partnership
MO	UK Met Office
NE	Natural England
NERC	Natural Environment Research Council
NFM	Natural Flood Management
NFU	National Farmers Union
NT	National Trust
OHID	Office for Health Improvement and Disparities
OPR	Optimal Peatland Restoration
PbR	Payment by Results
PfO	Payment for Outcomes
PFR	Property Flood Resilience
RBMP	River Basin Management Plans
SME	Small and Medium-sized Enterprises
SUIM	Systems-based Urban Infrastructure Management
S.U.N.O.W	Swale, Ure, Nidd, Ouse and Wharfe
UKRI	United Kingdom Research and Innovation
UoL	University of Leeds
UoS	University of Sheffield
UoY	University of York
WYCA	West Yorkshire Combined Authority
WYFLIP	West Yorkshire Flood Innovation Programme
Y-PERN	Yorkshire and Humber Policy Engagement and Research Network
YPP	Yorkshire Peat Partnership
YRFCC	Yorkshire Regional Flood and Coastal Committee
YW	Yorkshire Water
YWT	Yorkshire Wildlife Trust

1. Overview

The Integrated Catchment Solutions Programme (**iCASP**) received £4.82M of Natural Environment Research Council (**NERC**) funding in order to capitalise upon existing environmental science to deliver societal and environmental impacts across Yorkshire. It set out to support partnerships between regional organisations and researchers to co-design ways of managing flood and drought risk, improving water quality, and enhancing the carbon storage, productivity and resilience of soils and woodlands, through joined-up approaches to land and water management in the River Ouse basin, covering almost eleven thousand square kilometres. Since 2017, iCASP has become a highly valued and successful impact-delivery network, using transdisciplinary environment-centred research to embed solutions across partners. It has supported new business cases worth £334M, of which a value of £214M was successful. For example, a £25M investment case for flood protection measures in the Wortley Beck catchment was a direct outcome of iCASP activity. iCASP also provided strategic evidence and support for on-the-ground delivery of existing investments including the £500M *Our Spaces* programme in Leeds which is transforming the amount and quality of blue and green spaces to enhance the lives of citizens. iCASP has provided tools and techniques that are now used at regional and national level by non-academic partners, with our outputs downloaded more than 75,000 times. We have directly informed and influenced regional and national policy, supported communication and cohesion among regional stakeholders, provided new ways of working, and strengthened the confidence among regional networks in NERC-funded environmental science. While the NERC-funding has now ended, through partnerships and new sources of funding, iCASP remains as a sustainable regional resource for stakeholders and is seeking to deliver more ambitious outcomes. This ensures the original NERC-funded iCASP project outputs can continue to have impact, and iCASP can now strive towards unlocking £1Bn of investment in the region by 2030.

We can't not have iCASP - we need iCASP in the region

- Head of Major Projects - Kirklees Council

We thank NERC for providing the long-term funding with its flexible approach which has been critical to enabling so many amazing outcomes. We wish to thank all our partners, academic colleagues, highly skilled impact translation fellows and the iCASP support team for their passion, dedication and outstanding work to date. We have been privileged to work with such amazing and talented people who all want to ensure that we have a positive impact on people's lives and develop solutions so that the regional environment thrives for future generations. We thank Finn Barlow-Duncan for leading the compilation of this report, and all who have contributed to the report and the delivery of the underpinning work across iCASP. We hope you enjoy reading this report which gives a flavour of some of the work we have been engaged in and the associated impacts.

Professor Joseph Holden and Professor David Hodgson

Directors of iCASP

1.1 iCASP in Numbers

Between 2017 and 2024, iCASP delivered 56 impact projects directly involving 51 different partner organisations (see [Figure 1](#)) and 165 university-based staff. A further 274 partner organisations have engaged with iCASP through workshops, events, and direct engagement activity. The programme has secured £5.3M of additional cash funding, enabling it to continue beyond the initial 5-year NERC funding period. There are currently (April 2024) 12 live ongoing projects.



Figure 1. iCASP in Numbers – Total delivery between March 2017 and April 2024

[Figure 1](#) provides a high-level snapshot of the activities, outputs and impact delivered to date. These numbers will continue to grow and accumulate, especially as several projects have only recently concluded, and as iCASP is continuing to operate beyond the NERC funded phase. The process of outputs delivering impacts is not instantaneous, with impacts such as organisational behavioural change taking time to embed, but iCASP has a track record of seeding such changes. In addition, iCASP projects are designed to influence ongoing policy reform and strategies, many of which operate on timelines outside of the original NERC funding. However, by adopting a sustainability model (detailed in [section 8](#)), iCASP can continue to track these developing and newly emerging impacts from the NERC funded projects.

1.2 Impact Highlights

[Nature-Based Interventions for Health and Well-being](#)

A systematic review of the evidence produced a publicly available [online tool](#), which has been embedded into the [Yorkshire and Humber Directors of Public Health \(DsPH\)](#), [Humber and North Yorkshire Health and Care Partnership](#) and the [Office for Health Improvement and Disparities \(OHID\)](#) training packages. OHID's Health and Well-being Programme Manager described this tool as *“easy to use, interactive and effective, therefore we have used it and disseminated it both nationally and locally”*. This project also worked with Natural England's (NE) Natural Capital team to develop a cultural ecosystem service and health and well-being indicator tool, which is now used to support policy implementation and decision-making nationally, including actions to deliver the 25-year environmental plan.

[West Yorkshire Flood Innovation Programme \(WYFLIP\)](#)

In response to stakeholder needs, where a more joined up approach to flood mitigation was highlighted, along with the need to embed environmental science into local authority practice, iCASP developed, co-ordinates and manages WYFLIP, which brings together City of Bradford Metropolitan District Council (CBMDC), Calderdale Council (CC), Leeds City Council (LCC), Wakefield Council (WC) and Kirklees Council (KC) along with the Environment Agency (EA), Yorkshire Water (YW) and West Yorkshire Combined Authority (WYCA) to develop and deliver innovative flood resilience projects. This novel approach has unlocked over £1M of additional funds to the region, from a variety of non-traditional flood project funding sources (e.g.: [Local Digital Fund](#)), by embedding research and a catchment approach into business cases.

“There's just a difference in our collective ability to do innovation and positive things in West Yorkshire as a result of having WYFLIP. There are some real tangible examples of things that just would not have happened if we did not have this programme. The model is working and that additional capacity in the region just wouldn't have been there and we're seeing the benefits of that already but there's a lot more to come.”

([Video](#))

Jonathon Moxon – LCC Flood Risk & Climate Resilience Executive Manager

[Water Efficiency Standards](#)

iCASP provided LCC with an evidence brief on water availability and usage to inform their 2019 Local Core Strategy select review ([EN2: Sustainable Design and Construction & Water1: Water Efficiency](#)). It highlighted the strategic need to improve water efficiency and alleviated developers' hesitance by demonstrating the minimal costs to deliver it (£9 per dwelling). The state appointed planning inspectorate concluded *“the need for a requirement to meet the optional building regulations requirement of 110 litres per person per day is justified by the evidence”*. As such, all new major residential developments in the local authority area must adopt the recommended more stringent water efficiency targets.

[Green-Blue Infrastructure \(GBI\) Business Cases](#)

The iCASP work demonstrated that there is no standard tool to monetise GBI value within economic business cases ([tool review report](#)). The project recommended a [system-of-systems](#) approach, which advocates that the strategic value of a GBI intervention should therefore be evidenced strongly in strategic business cases. This recommendation has been supported by the HMT Green Book user group, and iCASP is working closely with the £4M Research England Development funded [Yorkshire and Humber Policy Engagement and Research Network \(Y-PERN\)](#) to deliver a two-year programme of associated training events. These events will help regional business case writers, appraisers, and funders to interpret the Green Book review's recommendations, thereby unlocking funding for green and blue infrastructure projects. This system-of-systems approach was also adopted by the £500M LCC [Our Spaces Programme](#).

"[iCASP] helped the [public realm] team develop their strategic narrative for the delivery and extension of the £500M+ OUR SPACES programme; in particular by linking city ambitions, such as the 'Best Council Plan', to global challenges related to the climate emergency. [iCASP] also helped to shape qualitative and quantitative measures to monitor progress towards the OUR SPACES ambitions. These essential measures will enable business case authors to bring the creation of green infrastructure to the forefront of all new development proposals that are brought forward in Leeds."

Jane Walne – LCC Head of Projects and Programmes

[NFM Community of Practice \(CoP\)](#)

iCASP created a CoP on natural flood management (NFM) as a mechanism to help embed recent environmental science into policy, practice, and local community actions, and to support knowledge sharing and co-creation across organisations. To date, 16 CoP events have been delivered, engaging with 90 different organisations, on a wide variety of different topics, disseminating the learnings from the iCASP NFM project portfolio; such as road-testing the CIRIA UK NFM guidance handbook. This network is highly regarded and considered a "*recognised body*" by the Yorkshire Regional Flood and Coastal Committee (YRFCC). It has also been "*included in the EA River Basin Management Plans as a regional resource, which doesn't exist in other parts of the country*". The CoP has now become self-sufficient through a sponsorship model, with iCASP being commissioned to co-ordinate events. [Research evaluating](#) this CoP demonstrated that it has fostered social learning between participants, leading to improvements in NFM design and delivery.

"NFM community of practice has been one of the real shining lights of iCASP. The nuts and bolts and getting the machinery in place to run a COP just shouldn't be underestimated. Empowering people with the time together to explore NFM, then knowing that whatever we discussed there are people in iCASP to pull the lever and make it work"

Steve Wragg – City of York Council Flood Risk Manager

2. iCASP's Mission

iCASP's Original Mission Statement

- Support partnerships between regional organisations and researchers to use UK NERC-funded science to manage flood and drought risk in the context of climate change, improve water quality, and enhance the carbon storage, productivity and resilience of Yorkshire's soils and woodlands, through joined-up approaches to land and water management in the River Ouse basin.
- Become self-financing beyond 5 years and generate more than £50 million of benefits from influencing investments, identifying cost savings, and creating new products and jobs.

2.1 Objectives

iCASP set out to promote resilience in the region's rural areas, towns, and cities through provision of science to influence the policies and investment strategies of local authorities, other Government agencies, businesses, NGOs, and major landowners. iCASP aimed to do this through developing a novel model of operation, with stakeholder co-construction as its foundation, to boost the regional economy by leveraging NERC-funded science to provide economic, sociological, and environmental advantages.

UKRI funded iCASP as part of NERC's Regional Impact from Science of the Environment programme. The purpose of this programme is to bring research organisations together with businesses, policymakers, and other organisations to deliver "*high-impact, focused research translation and innovation in environmental science*." UKRI has five themes at the heart of its current five-year strategy (2022-2027) and the overall delivery of iCASP has contributed to the realisation of these including 'building a green future, building a secure and resilient world', and 'creating opportunities and improving outcomes in communities across the country'. The co-benefits produced also contribute to 'securing better health, ageing and wellbeing for everyone'. iCASP brought together specialist tools and expertise in catchment processes, atmospheric science, environmental economics, and sustainable agriculture from across the White Rose Universities (Universities of Leeds (**UoL**), York (**UoY**), and Sheffield (**UoS**)), and the NERC National Centre for Atmospheric Science.

Delivering benefits at catchment scale enables a cohesive and integrated approach to core objectives across the iCASP programme, combining effort across multiple spatial scales. Collaboration across multiple partners enables contiguous areas of land to be managed using catchment-based solutions to better align with the principles of effective land use and conservation. For example, the Lawton review (2010) highlighted the needs for a "*bigger, better, more connected*" approach toward conservation management in the UK to develop the resilience of ecological communities and the habitats that they occupy. Integrated catchment solutions refer to those interventions that require coordinated ideas and working to amplify the economic and societal benefits across the entire catchment, as well as resource pooling among regional partners.

iCASP aligns closely with both local and national policy targets. Specific examples include the National Flood Resilience Review (2016), which emphasized the value of enhancing flooding resilience through the development of better data and modelling tools for local authorities and infrastructure managers; and the Agriculture Act (2020) which promotes more sustainable farming practices and environmental stewardship, aligning with the goal of reducing negative farming impacts, maintaining production, and enhancing and restoring habitats and biodiversity. Underpinning many of the priorities realised through iCASP is the 25 Year Environment Plan (2018), legislation which

included clear targets on enhancing water environments through catchment management through actions such as River Basin Management Plans (**RBMP**) to achieve clean and plentiful water within at least three quarters of UK waters, whilst managing these systems to be close to their natural state as soon as practicable. There are a wide range of impact opportunities given the ongoing and evolving strategies in peatland restoration like the England Peat Action Plan (2021) and UK Peatland Strategy (2018), both themselves influenced by iCASP and which set out the UK Government’s and UK International Union for Conservation of Nature’s strategy for the long-term management, protection, conservation, and restoration of peatlands, so that they may continue to provide benefits to wildlife, people, and the planet. Further opportunities such as Environmental Land Management schemes (**ELMs**) and the Agriculture Act (2020) can support in the region’s transition to sustainable agriculture, while policy such as the Water Framework Directive and Environment Act (2020) and methods such as Natural Flood Management and catchment-based approaches can support freshwater habitat restoration and protection.

2.2 Yorkshire catchment challenges

The Ouse basin, the principal catchment in Yorkshire (red boundary on [Figure 3](#)), is home to 5.5 million people and covers 10,770 km² and drains three National Parks. The catchment connects northern England's Pennine uplands to major cities including Leeds, Sheffield, Bradford, and York. It comprises 10 metropolitan areas as well as lowland agricultural zones that flow to the Humber estuary. Leeds, Sheffield, and Bradford are three of the four largest councils in the UK, having rivers that originate on upland moors and flow into densely populated areas with high-value infrastructure. Many of the headwater tributaries respond rapidly to rainfall, with complex upland terrain for which real-time rainfall monitoring using traditional radar technologies is challenging. These factors result in critical uncertainties in flood warnings. At the same time, there are challenges around understanding the science base on the extent to which upland management solutions can provide reduction in flood risk. Businesses in Calderdale alone suffered £47M in losses as a result of the Boxing Day 2015 floods with £170M cost to the local economy in that area ([Sakai et al., 2016](#)). Downstream, 7500 properties were flooded at ~ £3Bn cost and Yorkshire Water suffered £30M infrastructure damage.

The Yorkshire Ouse basin comprises a UK-representative range of different landscapes and management scenarios, from upland moors and blanket bog, intensive agricultural landscapes, to densely populated urban centres. The basin has sharp rainfall gradients: >2,000 mm per year in Pennine headwaters to <500 mm in the Vale of York lowlands. In the east of the region there are important areas of lowland agriculture, and major agri-food businesses and supply chains. Vulnerability to drought and to flood conditions needs to be reduced by ensuring soils and landscapes have good water holding capacity, crops and farming techniques are adapted, and nutrient, resource and pesticide loss are minimised.



Figure 3. Ouse drainage basin – iCASP’s original focus area

3. iCASP's Operating Framework

3.1 Integrated Catchment Solutions

Our springboard (see [Figure 2](#)) and supporting partners co-designed five impact statements which formed the foundation for iCASP's programme of work.

1. Promote resilience in the regions cities through provision of science tools to directly influence the policies and investment strategies of local authorities, other Government agencies and major infrastructure owners.
2. Mitigate drought and flood risk and target co-benefits for economy, society, and the environment through integrated catchment management tools.
3. Support the delivery of flood forecasts through the EA via the Met Office (**MO**) by bringing together relevant data and models, developing regional practices, which build upon the existing flood forecasting systems to meet local challenges of upland terrain, rapid response catchments and urban flooding.
4. Develop novel approaches to improve water quality entering raw water treatment works and reduce water treatment costs and to improve the ecological status of surface and groundwaters.
5. Enhance carbon sequestration in soils and woodlands and secure investment, job creation and societal benefits through green financing mechanisms.

Partners stressed that to deliver against these statements, activity should be carried out at a catchment scale using integrating research from different disciplines to embed solutions across multiple organisations.

3.2 iCASP structure

Seven integrated impact workstreams (**WS#**) were established to address the five impact statements. Each WS was assigned an academic lead, responsible for conducting the available NERC research that could be used to address the user community's needs. These leads were spread across the three iCASP universities (UoL, UoY) and UoS) and sat on the programme's Executive Management Group (**EMG**), along with the programme director, Prof. Joseph Holden (UoL) and deputy director Prof. David Hodgson (UoL) (see [Figure 4](#)).

[WS1 – Climate Resilience](#) – Prof. Piers Forster (UoL)

[WS2 – Drought and Flood Risk Mitigation](#) – Prof. Colin Brown (UoY)

[WS3 – Flood Forecasting](#) – Prof. Alan Blyth (UoL/NCAS), later led by Prof. Cathryn Birch (UoL)

[WS4 – Water Quality](#) – Prof. Pippa Chapman (UoL)

[WS5 – Carbon Sequestration](#) – Prof. Andy Baird (UoL), later supported by Dr Cat Scott (UoL)

[WS6 – Sustainable Agriculture](#) – Prof. Jonathan Leake (UoS)

WS7- Socio-economic impacts of catchment solutions, led by Prof. Julia Martin-Ortega (UoL), ensured projects were designed across all workstreams to prevent siloed thinking, address a range of challenges, and provide multiple benefits. These challenges were identified through extensive consultation and co-design with the user community.

In addition to the EMG, three further groups were formed to ensure that projects sought to deliver solutions to real-world challenges.

1. **The iCASP team**, managed the day-to-day running and delivery of the programme. Within this team the impact evaluator and impact officer provided guidance to both academics and partners seeking iCASP project funding. This ensured proposals were designed in collaboration with partners and included clear, achievable, and measurable pathways to impact. This early engagement and feedback ensured that (95%) of submitted proposals were successful. This approach was radically different to other funding bodies and was seen as a strength of the programme.

“The flexibility of iCASP funding and the easy, supportive application process was extremely

helpful. The skilled iCASP team connected me with a completely new set of partners, and their support during the application process meant that I had a clear understanding of what they needed. Regular feedback from partners meant I was able to modify project work throughout, strengthening the pathway to impact. Thanks to this, I have achieved far more direct impacts though my iCASP projects compared to my other funded projects, even though the monetary value of the iCASP work was a lot lower.” – Prof. Cathryn Birch – University of Leeds

2. **The Impact Evaluation Group (IEG)** was chaired by Prof. Mark Reed (Scotland’s Rural College), a recognised expert on impact and trainer, and linked to the EMG through Prof. Julia Martin-Ortega’s membership. The group’s function was to: **i)** develop the programme’s indicators of impact; **ii)** create a mechanism for recording and evaluating the impact from individual projects and the programme as a whole ([see section 6](#)); **iii)** provide expert advice to the Impact Translation Fellows (**ITF**) on best practice for impact delivery; and **iv)** provide assurance to the Governance Group that submitted proposals had developed a robust pathway to impact.

“The iCASP programme was really interesting and beneficial to engage with. It is totally different to other programmes I have worked on, being so impact focused, which was at first a barrier but one that just required a mindset shift. The iCASP staff helped overcome this mental barrier and as a result I feel that the engagement with the programme has had multiple benefits to my research and particularly my teaching”– Prof. Mark Trigg – University of Leeds

3. **The Governance Group (GG)** was made up of prominent professionals selected from the [16 springboard partners](#) ^o, detailed in iCASP’s original funding proposal, and three additional organisations (Don Catchment Rivers Trust (**DCRT**), National Trust (**NT**) and Yorkshire and Humber Drainage Group) ([Figure 2](#)). These partners represent the breadth of sectors functioning within iCASP’s workstream themes. The GG’s function was to review submitted proposals to ensure that the regional and stakeholder needs were being addressed. This was seen as a novel and unique approach:

“I have never come across a project in the academic community run in this way. The focus on engagement is very unique. iCASP is also very interesting because of the diversity of people involved, and they are different people from whom we [Met Office] normally come into contact with. It builds awareness of what stakeholders want, what they worry about, and the language that they use, which is very valuable to informing science. It is an interesting experiment in bringing together lots of different communities.” - Dr Adrian Hines – Met Office.

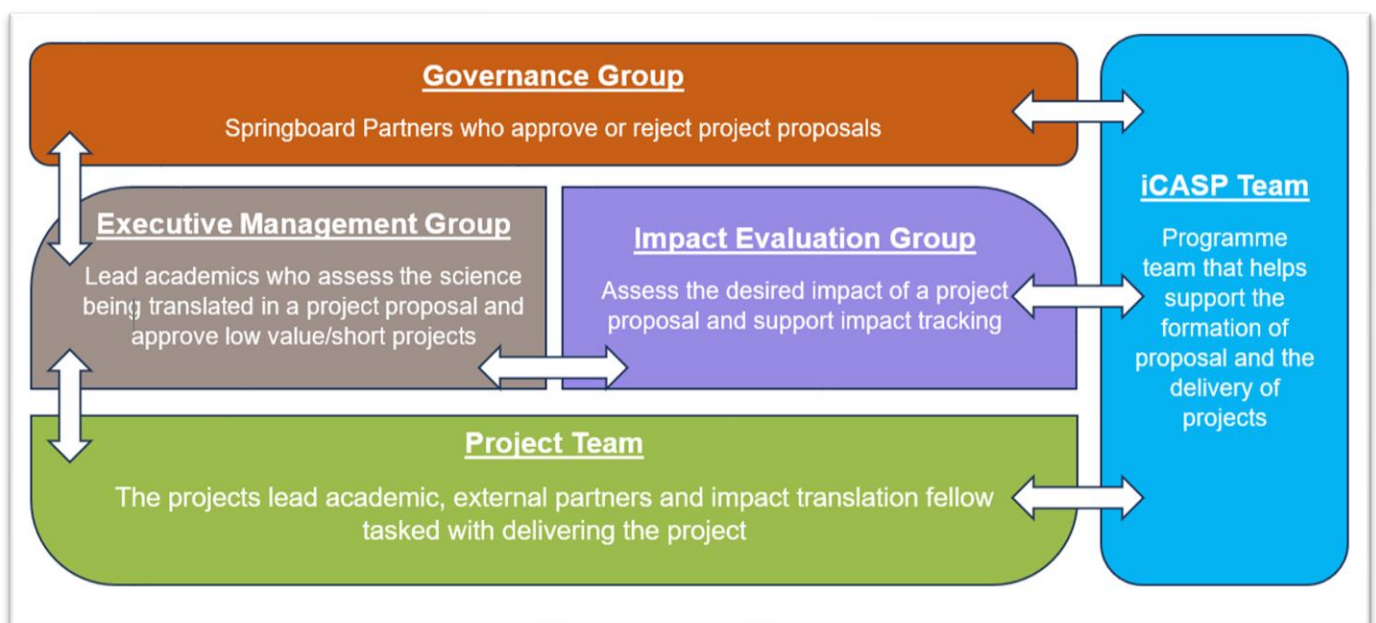


Figure 4. ICASP Governance Structure – Team roles and connections

4. Project design and delivery

4.1 Co-designed projects

Fundamental to the iCASP process is the bottom-up approach to develop projects. This method, outlined in [Figure 5](#), evolved over the lifetime of iCASP to reflect partner feedback and changing needs. In particular, bringing together academics with partner organisations via co-design workshops to generate project ideas has been the key foundation activity for iCASP's success. These events are highly valued:

"iCASP are the catalyst for all these great ideas. They bring everyone together to share knowledge. You get information through from so many different people. You can take that away and learn from it."
– Cllr. Katie Kimber – Calderdale Councillor

"iCASP has done a really good job of bringing a range of partners together, which aren't necessarily the usual suspects. They have created a neutral ground for people to meet, discuss problems and begin to address solutions. Trust has developed through these meetings; previously similar meetings had been viewed with some scepticism." – Geoff Roberts – Aire Rivers Trust (ART)

"It's so much more than just arranging meetings and facilitating, because the people within iCASP have so much relevant knowledge which they bring to each event, with the added value of being neutral" – Jonathan Moxon - LCC Flood Risk & Climate Resilience Executive Manager

iCASP sustainability has been, in part, secured through organisations commissioning similar co-design activities and events across the region, including [WYFLIP](#).

4.2 Integrated Catchment Network

To date we have delivered 142 workshops and engagement events. A total of 325 different organisations have attended from a broad range of sectors, representing £1.3M of in-kind support over the last 7 years (predominantly staff time). The development of this network has increased the engagement of stakeholders and facilitated new connections and partnerships both within and external to the programme. This includes new PhD sponsors, research projects and working groups.



Alex Sobel MP highlighting how best to inform government policy at the 2019 iCASP Confluence.

organisations. It's delivered some really great projects. I think it's been really impactful in advancing the knowledge of the region" – Amanda Crossfield – Yorkshire Dales Rivers Trust

"Partnerships have definitely improved as a result of iCASP, particularly in terms of working with the EA's national team – that's been really useful." Ben Ashton – Yorkshire Water (YW)

"The fact that the EA and others have been able to ask iCASP questions has been extremely helpful, and they've made links with people they hadn't worked with before." – Sally Kelling – Environment Agency

"iCASP has been really great at bringing together policy makers with practitioners and providing a space for those people to share ideas and knowledge. It has developed a different way of working. More collaborative, and it's facilitated relationships across JBA, councils, Yorkshire Water and more

“Relationships between practitioners and academia were built and strengthened, a really enduring legacy of iCASP” - Martin Slater- Yorkshire Wildlife Trust (YWT)– Deputy CEO

“The people at iCASP are great at bringing together and organising networks and events but at the same time contributing and informing technical subjects” – Andrew Walker – Yorkshire Water – Catchment Manager

“iCASP have been really good at getting people together – it sounds simple, but it just doesn’t happen otherwise, and doing it well and effectively is another thing” – Steve Wragg – City of York Council (CoYC)

4.3 Projects

Between 2017 and 2024, iCASP designed and delivered 56 projects, with a further 12 still ongoing. These projects can be broadly categorised into four groups, outlined in [Table 1](#). Projects were specifically designed to cover multiple workstreams, involve several partners and look to deliver impact against a range of impact indicators ([see section 6](#)). The iCASP website provides further details of these projects and links to their public facing outputs – [Project portfolio](#) ⁶. A full list of projects can be found at the end of this report in **Annex A: Projects**.

The process of designing, approving, and delivering projects evolved over the duration of the programme; further details can be viewed in **Annex C: Lessons learned**.

Table 1. iCASP project categories

Project Type	Description	Number of projects
GG approved projects	Subjected to the design and approval process outlined in Figure 5 . Over £20k in value and characterised by having multiple partners and work packages.	19
EMG approved projects	Expedited approval process. Typically, <£20k in value. Short delivery time to influence an impact opportunity	21
Bolt-on projects	Follow-up project to resolve issues or extend the impact reach	5
Externally funded projects	Contracted work and new research awards using iCASP as a case study	23

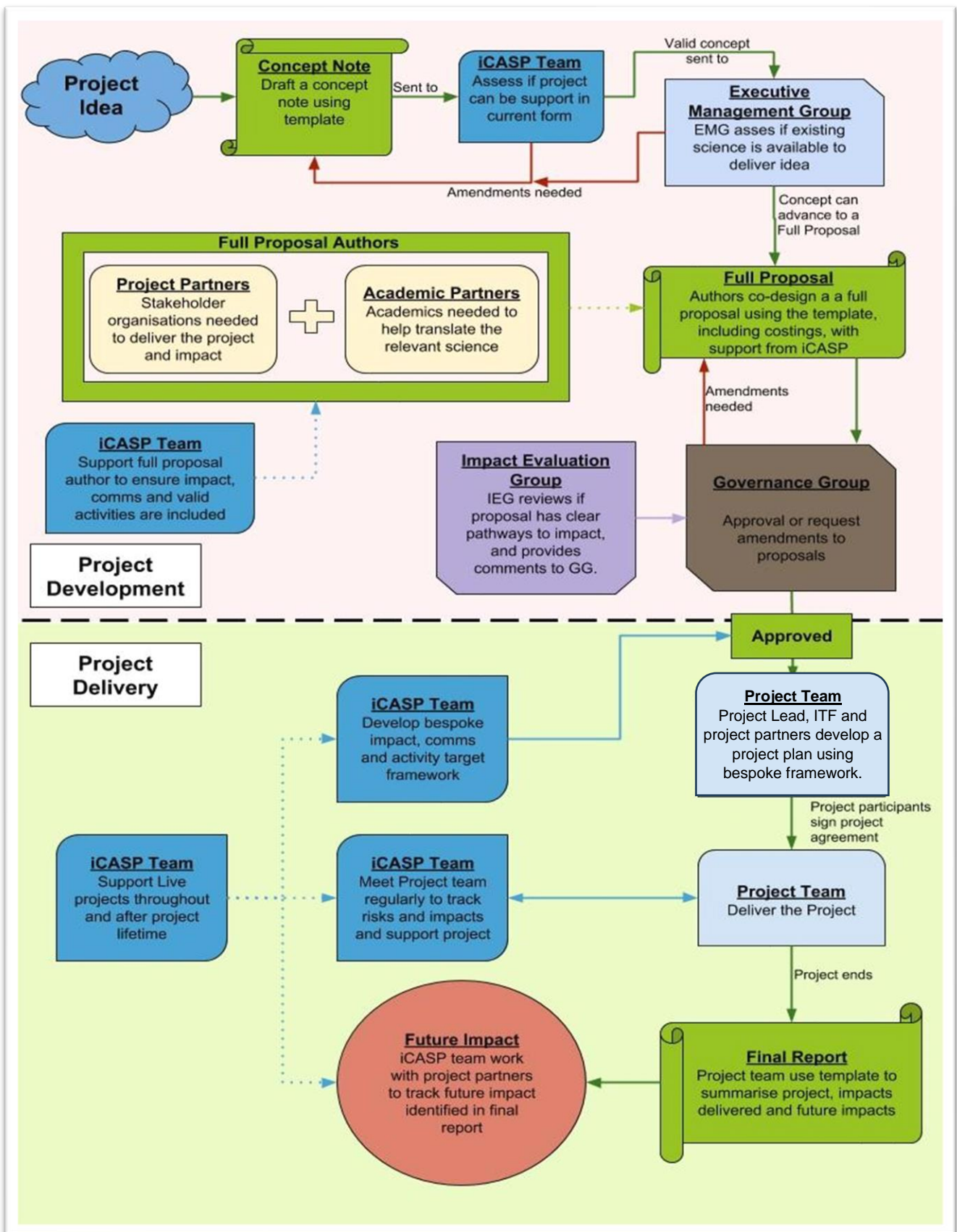


Figure 5. iCASP project roadmap

4.4 Impact Translation Fellows

56 ITFs and 100 academics from 12 different institutions were involved in the delivery of the iCASP projects. Typically, the ITF was responsible for the management and delivery of projects, with academics providing input and insight in their area of expertise. Adopting this working arrangement has resulted in the development of a highly skilled cohort of ITFs, with a broad range of catchment management knowledge and project management skills. ITFs have gone on to secure positions in the private, public, and academic sectors where they are utilising the skills they developed through iCASP.

“Working for iCASP was a great experience that provided me with opportunities to progress my knowledge and skills in developing and delivering projects as well as enabling me to undertake professional development courses, all of which I make use of in my current role at a Senior Associate with the Climate Practice at WTW” – Dr Jenny Bonner – Willis Towers Watson

“Being an ITF was demanding but rewarding. I was able to work across a broad range of interdisciplinary topics, many of which were outside my field of expertise. This has given me a well-rounded view of catchment management issues which has benefited me in my current role as a Climate Risk and Adaptation consultant at WTW” – Dr Ben Rabb - Willis Towers Watson

“My work as an ITF for nearly six years benefited my career. It provided me with useful project management skills, that many ECRs do not get the opportunity to learn, and due to the multi-disciplinary nature of iCASP projects, it has significantly broadened my scientific knowledge outside of my PhD specialism. The support of the iCASP impact team and access to the wide network of partners improved my grant writing by having direct access to stakeholders to understand the research gaps and I have been successful in applying for two different NERC fellowships (Industrial Mobility and Knowledge Exchange)” - Dr Janet Richardson – Edge Hill University – Senior Lecturer

“Working on both the iCASP communicating flood risk (CFR) and the Climate Change Risk Assessment and Resilience Review projects has helped my career, specifically in my current role as Senior Scientist at the Environment Agency. The CFR project helped me understand the wide range of stakeholder communications needs, and have a good understanding of what happens in an incident” – Dr Juliet De Little – Environment Agency - Senior Scientist



ITF Dr Jenny Bonner ground truthing NFM opportunity maps.

5. Outputs

5.1 Reports, guides, and tools

Working with the GG, our reports, user guides and tools have been explicitly designed and tailored to directly address the needs of the end user. Given that projects have multiple users, these outputs are often delivered in multiple different formats (e.g., an evidence review, practitioner user guide, one page policy brief etc.) to ensure the maximum uptake and impact can be achieved.

“Writing up the results of a technical modelling project, in a way that a layperson can understand, is a challenging task. The iCASP team worked with us to translate the findings into opportunity maps, and we very much appreciate the time and effort they put into this” - Dr Ed Shaw – Don Catchment Rivers Trust Director.

Where possible these outputs are free and publicly available. This was seen as vital to ensure uptake of measures at a catchment scale. Project outputs are available to download from the iCASP website: <https://icasp.org.uk/projects-directory/> to date these outputs have been downloaded over 75 thousand times.

5.2 Recommendations

iCASP has acted as a regional voice piece for both partner organisations and the academic community. At a programme level we have collated views and opinions from our partners and combined this with the scientific evidence base to respond to 19 central government and government agency consultations and inquiries. This has resulted in project leads giving oral evidence to both the Environment, Food and Rural Affairs (EFRA) inquiry on [soil health](#) and the Environmental Audit Committees (EAC) inquiry on [invasive species](#). Several of the latter's recommendations were [approved by the government](#), including the need for improved biosecurity awareness and training, which a bolt-on iCASP project is providing ([see end of section 7.4.1](#)).

Project findings have also been used to generate 48 policy briefs and recommendations, including the [Water Efficiency Standard](#) project (highlighted in [section 1.2](#)) and the [EA's Challenges and Choices consultation](#). The latter prompted the EA to directly commission iCASP to provide input into the new [RBMP consultation](#). Of the 170 organisations and 56 individuals that inputted into the RBMP consultation, iCASP were the only academic body that were invited to provide input through a facilitated in-person event. Our input has helped shape which measures will be used to tackle the various water resources issues nationally, influenced where funding will be prioritised and advocated for an iCASP style strategic framework for stakeholder engagement.

“There has been a lot of interest in iCASP's response to the RBMP, which advocated to embed the iCASP model across the different EA regions. As a result of this I have been invited to sit on the EA's national Integrated River Basin and Catchment Planning Network, where I am advocating this recommendation and the value of involving academia in partnership working and anticipate future collaboration with iCASP and national impact as a result.” – Duncan Fyfe – Environment Agency – S.U.N.O.W Catchment Co-ordinator

A full breakdown of iCASP's responses to consultations and inquiries can be found in **Annex B: Consultations and Inquiries**.

5.3 Videos

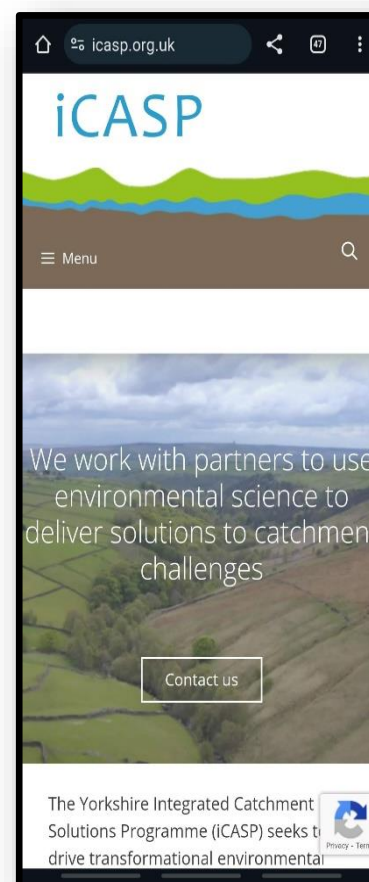
Our communications officers have generated a series of films and animations that can be viewed on the [iCASP YouTube Channel](#). These include simplified summaries of highly technical projects such as the Living With Water Partnership (LWWP) [telemetry project](#) and includes an [interview with Rishi Sunak](#) about the importance of peatlands in providing ecosystem services. These products have been used to showcase the range and breadth of iCASP projects and promote the added value we bring. These, in conjunction with our social media platforms ([X](#), [LinkedIn](#)), have help expand our network and disseminate outputs. During COVID restrictions we moved many events online. Recordings of these conferences, workshops and training videos are also hosted on our YouTube channel.

5.4 Website and Platforms

The iCASP external website – www.icasp.org.uk will remain live after NERC funding has ended. It is the central data hub for programme information, news, project summaries and public facing project outputs. Both the externally funded WYFLIP and NFM CoP groups use the iCASP website as a platform to promote their activities and disseminate useful resources amongst their members.



Still of Rishi Sunak as an MP taken from 'iCASP The Movie'.



Mobile browser view of the iCASP website.

6. Impact indicators

The IEG developed four key success measure categories, each with a set of impact indicators (see [Figure 6](#)). These indicators were used to: **a)** help applicants design project proposals; **b)** assist the EMG, IEG and GG in reviewing proposals and **c)** facilitate impact tracking and evaluation. The importance of point **a)** cannot be overstated. The Impact Officer (**IO**) and Impact Evaluation Officer (**IEO**) emphasised that delivery of an output was not the end of a project, but a stepping-stone to deliver impact. iCASP designed Impact planning support tools for partners and academics, to help shift the focus from outputs to impacts. This helped identify where post output delivery activities such as additional training, translation, dissemination, and impact monitoring were needed.

6.1 Impact Tracking

The impact data contained within this report has been collated using a variety of methods and sources. A quantitative impact tracking database was created, which was updated from projects through regular meetings between the ITF, IO, IEO and project partners. In addition, impact theory of change documents were produced to understand the different pathways used to deliver impact. These documents were summarised into project closure reports, which were counter signed by partners to validate any claims made as well as providing opportunities to capture any qualitative impact and feedback. Closure reports also detailed when future impacts were likely to materialise and who to contact to validate whether they had occurred. This post project support was key in capturing the full extent of iCASP's impact, given the time lag between project output to realised impact.

To date, more than 30 impact interviews have been carried out including through use of an independent reviewer.

KSM1: Value Creation	KSM2: Science-user Engagement	KSM3: Policy Formation & Implementation	KSM4: Practical Benefits
1.1 Economic Benefits	2.1 Science-use Regional Network Connections	3.1 Contribution towards policy influenced	4.1 Use of Outputs
1.2 Research Funds leveraged	2.2 Size of iCASP Partnership	3.2 Policies Informed	4.2 Exporting Expertise
1.3 Job Opportunities Created	2.3 Project Partnership Legacy	3.2 iCASP Representation on boards/committees	4.3 Non-economic Societal Benefits
1.4 Value of Catchment Solutions Influenced	2.4 Number of Secondments	3.4 Political Engagement	4.4 Capacity Building
1.5 Influence of Business Case Developments and Investment Plans	2.5 Communication Geographical Reach		4.5 On-the-ground interventions
	2.6 Dissemination of Project Outputs by Partners		

Figure 6. iCASP’s Four Key Success Measures – with associated impact indicators

It is important to note that iCASP projects were specifically designed to influence ongoing policy, strategies, and priorities. As such, in some areas it is difficult to attribute change solely to iCASP. However, our partners confirmed that iCASP’s input and involvement supported, enhanced, and accelerated this ongoing work.

“iCASP has supported the Agency’s ongoing regional NFM projects and strategy by demonstrating the wider benefits NFM measures can provide. The iCASP NFM Community of Practice (CoP), has highlighted the importance of this work both regionally and nationally and has ensured that the momentum to fund and deliver NFM projects has remained. Influenced by the iCASP NFM CoP there is now an Internal EA NFM CoP for EA staff. Using the partners, I made through the iCASP network, I am looking to replicate the success of the CoP model through a new NERC research bid focusing on citizen science”– Duncan Fyfe – Environment Agency – S.U.N.O.W Catchment Co-ordinator




7. Impact examples

For the purposes of this report, we have highlighted a few projects that speak to each of our impact work streams. These projects could be assigned to multiple work streams as they were designed to be cross cutting and integrated. Our aggregated impacts across the entire programme and all projects are detailed in [Figure 1](#) above.

7.1 WS1 Climate Resilience


Enhancing climate resilience has been a key theme for iCASP that also connects across the other workstreams. Two years into the programme, nine regional local authorities declared climate emergencies and their ask of iCASP reflected this new priority. To support this emerging agenda iCASP delivered projects that helped stakeholders access funds to improve climate resilience, though valuation tools, frameworks to identify synergies and evidence to support business cases.


7.1.1 Green-Blue Infrastructure (GBI) Business Cases


Partners approached iCASP to assist with unlocking investment for GBI schemes. Business case writers were unsure how best to demonstrate the benefit of GBI and appraisers questioned the robustness of the valuation tools used. The project conducted a [review of commonly used tools](#)  and found that there was no single standard tool to monetise GBI value within the economic business case. LCC, YW, WYCA, EA and KC were used as case studies to demonstrate the benefit of using a 'systems of systems' approach for embedding GBI into business cases. The project's [recommendation](#)  was to emphasise the holistic value of GBI within strategic business cases. This approach was used in the £500M LCC [Our Spaces Programme](#)  which also benefitted from secondment of iCASP staff into LCC. The iCASP work strengthened the strategic narrative, extension of the work, enabled LCC and partners to ensure climate resilience challenges were embedded, and shaped the project's monitoring strategy for its KPIs.

"We have been able to strengthen the case for green and blue infrastructure developments within Leeds City Council and collaborating authorities. This was possible by drawing on the systems-of-systems approach which provides a scientific rationale for developing a strategic narrative for infrastructure developments. This is in line with our activities and helps to build a stronger case for green and blue infrastructure investments than standard approaches to cost-benefit analysis." Jane Walne – LCC Head of Projects and Programmes


Importantly, iCASP's recommendation has been supported at national level by HMT's Green Book user group.


"The approach to systems thinking in economics developed within the iCASP Green and Blue Infrastructure Business Cases project is helping to embed the requisite change in 'mind set' for business case practise that is needed in order to implement the recommendations of HMT's November 2020 Green Book Review." – Bec Riley - [HMT Green Book user group chair](#) 





iCASP is working closely with the £4M Research England Development funded [Y-PERN](#)  to deliver a two-year programme of training events. These events will embed the GBI project's findings, helping regional business case writers, appraisers, and funders to interpret the Green Book Review recommendations and thereby unlocking funding for green and blue infrastructure projects. To date approximately 300 government and Local Authority (LA) staff have attended presentations and training events. *"The model of working that iCASP has developed is in my opinion unique. Y-PERN would not exist in its current form had it not been for iCASP demonstrating what is possible. The fact that it has been able to create a legacy funding mechanism is extremely rare and is something that I intend for Y-PERN to learn from"* – Prof. Andrew Brown – Y-PERN Academic Director & University Policy Engagement Network co-chair.

The systems of systems approach advocated in this project has also been used by [The Yorkshire and Humber Local Policy Innovation Partnership](#)  in a recently successful £5M UKRI grant bid.





7.1.2 Nature-Based Interventions for Health and Well-being

This project expanded on the issues raised in the GBI project and was delivered in two phases. The first carried out two reviews of the peer-reviewed scientific literature demonstrating the links between natural capital assets (their quantity, quality and location) and (1) cultural ecosystem services and (2) health and wellbeing benefits. These reviews were used to develop a [report](#)  and a cultural ecosystem service and health and well-being indicator tool (available on request), which has been adopted by Natural England.



“The Natural Capital Indicators and Metrics Evidence Review tool has established the published evidence base for Natural England’s [Natural Capital Indicators](#) , which is a key framework for linking the state of natural assets to the benefits they provide to people.” – Jenny Craven – Natural England


The second phase delivered four workshops to understand the needs of providers of nature-based activities, social prescribing link workers, and current and future participants of green social prescribing. These workshops found users struggled to ‘*make the case*’ for the benefits of green and blue spaces within business cases. To address this the project produced a series of user-friendly evidence reviews, reports on how stakeholders use evidence and a publicly available [online tool](#) . The tool has been used by several community groups including [Hyde Park Source](#) , [Running Seeds](#)  and [Horton Community Farm](#)  (HCF).

“It [the workshop process] particularly helped us (HCF) give a good response to changes we would make based on an actual user voice. The outcome being we successfully secured a further two years of funding (£4300) in a competitive tendering process” – HCF activity leader.

Public health partners such as [DsPH](#) , [Humber and North Yorkshire Health and Care Partnership](#)  and the [OHID](#)  have used this tool in their training packages. It has also been used to update the materials on the [Making Every Contact Count](#)  platform, which is used by anyone working in the public sector.

“Resources like this are very useful to our local partners as it enables them to make the case for public health interventions. It’s easy to use, interactive and effective, therefore we (OHID) have used it and disseminated it both nationally and locally”. – Karren Horrocks- Health and Wellbeing Programme Manager – OHID

Additionally, this project is also being embedded and expanded on in both the [WYFLIP Accelerator](#)  and the Flood and Coastal Resilience Innovation Programmes [Ousewem](#)  projects. Dr Laura Harrison, the ITF on this project, has subsequently been successful in securing a knowledge exchange fellowship (KEF).

“The knowledge and skills I gained through the iCASP project helped me to develop a [YES! KEF](#) , which is the first time that I have been a PI on a grant. The project idea came from discussions I had with nature-based providers during the iCASP workshops. Like the iCASP work, it focuses on knowledge exchange and capacity building, but has expanded into North Yorkshire and the Humber” – Dr Laura Harrison – University of York

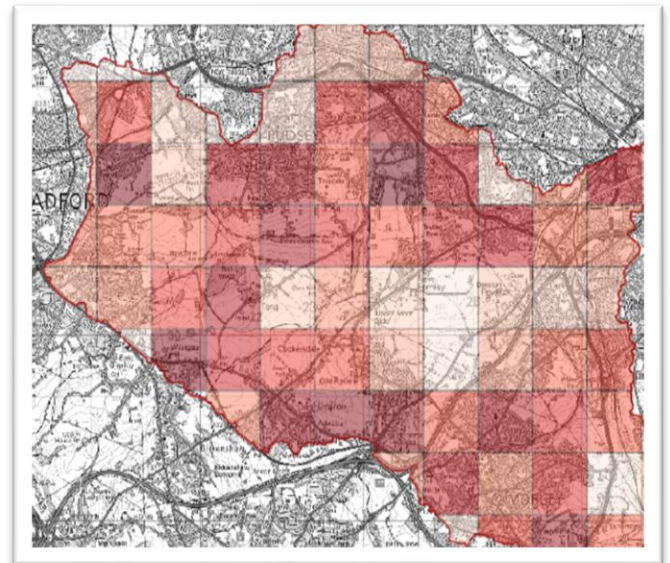
7.1.3 Systems-based Urban Infrastructure Management (SUIM)

A newly developed modelling and spatial analysis method, which helps identify both the areas prone to flooding as well as the sources of flood risk, was combined with the ‘systems of systems’ approach recommended through the GBI project. This was piloted on the Leeds Wyke Beck sub-catchment to highlight where existing or new urban development could provide climate resilience by addressing the identified flood source areas. Pilot partners were impressed at how this novel approach could be embedded into their day-to-day flood risk planning, especially in the identification of new opportunities, partnerships, and funding:

“[SUIM] can be used as a catchment prioritization tool, allowing for pre-business case optioneering before requesting specific sites for full study...Providing a system perspective for city-wide strategic flood risk planning/policy, in the upcoming Strategic Flood Risk Assessment”- Vanessa Allen – Leeds City Council

“Storage is often thought of but could be used more in the future and SUIM helps identify potential areas to investigate” - John Woods – Environment Agency



“The statistical summary is really useful, can be used to provide bespoke evidence to metrics of specific funding criteria... WYCA, EA, ... steering us towards where collaborative funding could be harnessed” – Luke Williams – Environment Agency - Flood Risk Management Advisor



Example of flood source model output for the Wortley sub-catchment in Leeds


The project recommendations are now being used by partners to identify where flood mitigation measures are to be deployed:

“Using the SUIM model on Wyke Beck highlighted valuable lessons, such as prioritising schemes to impact the sources of flooding. The council have now used these lessons and applied it to other sub catchments within Leeds, notably Wortley Beck and Meanwood Beck. Adopting this tool has enabled the council to unlock additional funding for mitigation measure in these areas by identifying section 106 contribution opportunities. The location of £25M worth of measures in Wortley Beck are being influenced by this tool” – Jonathan Moxon - LCC Flood Risk & Climate Resilience Executive Manager

The lessons learned during this project were used by the lead ITF in a successful submission to the Institution of Civil Engineers (ICE), [becoming ICE’s ambassador for Water](#)  and being appointed to their Flooding and community advisory board. This project is also being embedded and expanded on through the [WYFLIP Accelerator](#)  Project.

7.1.4 Bridging the knowledge gap to boost SME resilience (SME)

Two innovative tools were co-designed with 126 SMEs across 15 different districts. The Tool to Assess Economic Costs (TAEC) established that on average for every £1 of direct flood damage to a business there was a further 63p of indirect costs to the local economy. The TAEC tool is being used by LAs to lobby for additional funds to become more climate resilient.

“This project will help improve the economic assessment tools that we currently use to determine the true costs of flooding to SMEs and its wider economic impact on our communities. The tool developed by iCASP will also enable us to better articulate the need for future investment in flood risk management infrastructure and our response to future flood events across the City Region” – Roger Marsh – Chair of the Local Enterprise Partnerships and [NP11 Group of Northern Local Enterprise Partnerships](#) 

“This study is helping us better understand the needs of SMEs and improve our flood risk management strategy. This collaborative initiative is an important step towards our ambition to make West Yorkshire a place where everyone can enjoy the economic, health and environmental benefits of a net-zero carbon economy by 2038” – Cllr Tim Swift – WYCA - Portfolio holder for Climate and the Environment

The Tool to Assess Effective Resilience (**TAER**) was co-designed with insurers, lenders, surveyors, and brokers. TAER facilitates the understanding of the flood risk faced by SMEs and the effectiveness of flood mitigation measures they use, which has improved the confidence of insurers that risk is accurately priced and managed.

“This project is key to helping insurers, brokers and SMEs capture and understand the effectiveness of the flood resilience that has been put in place, so decisions can be made with a detailed understanding of the flood risk.” - Ian Gibbs - National Technical Manager at [Sedgwick](#)

The findings and recommendations of this project have been further disseminated via a report, [academic paper](#), a series of videos ([Link 1](#), [Link 2](#)) an [animations](#) and has generated significant press coverage ([Yorkshire Post](#), [Halifax Courier](#), [Dewsbury Reporter](#)). Graham Brogden, a partner in this project, has used the TAER tool to help develop an app and data platform for Property Flood Resilience (**PFR**) professionals, business owners, citizens and insurers - <https://resilico.com/>

“Flooding can have a significant impact on SMEs with many of them failing to open following a flood. Resilience plays a crucial part in helping them recover more quickly, potentially saving their business and allowing them to source insurance cover. This study is helping businesses and insurers understand the importance of protecting their property and the effectiveness of those measures.” - Graham Brogden, Managing Director at GJB Consultancy Oxford Ltd

7.2 WS2 Drought and Flood Risk Mitigation

Flooding has been a high priority for a wide range of organisations working in the region. As such, the majority of iCASP projects have had flood and drought mitigation elements. Thanks to projects such as ‘[NFM Modelling and Monitoring](#)’ and the ‘[NFM CoP](#)’ there has been a significant change in the stakeholder community’s understanding of the issues and what solutions they seek. This upskilling has meant that with each new project the ask is much clearer and work more targeted to deliver real world impacts. As such, the stakeholders are much better connected to the research, and the academic community’s understanding of partners’ needs is greatly improved. The highly engaged network that has been developed has raised the profile of NFM both regionally, within the YRFCC, and nationally, informing EA’s NFM funding grants and the Construction Industry Research and Information Association (**CIRIA**) [NFM manual](#). iCASP connections have also led to further investment in the region, such as the £5.9M Flood and Coastal Resilience Innovation Programme (**FCRIP**) funded [Ousewem project](#). The added value that these integrated projects and network deliver is reflected in the continued investment from partners via commissioned work such as the ‘[Healthy Lands, Healthy River](#)’ project and the funding model adopted by WYFLIP.

7.2.1 Natural Flood Management (NFM)

iCASP has become synonymous with NFM advice and guidance (see [Figure 7](#)). To date there have been 15 NFM projects have across iCASP’s different impact workstreams.

“iCASP NFM projects have really established University of Leeds as a centre for impactful NFM projects”. – Dr Megan Klaar – University of Leeds

Notable impact projects include:

- Supported the EA, LCC and [Thomas MacKay](#) with the [Leeds Flood Alleviation Scheme phase two](#) (Leeds FASII) bid.

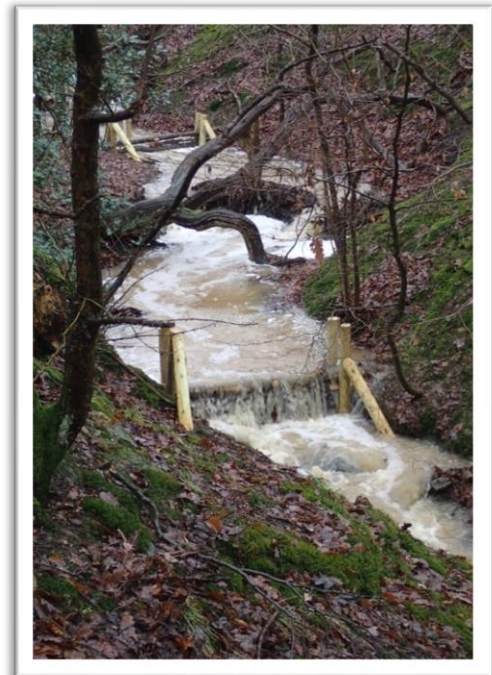
“iCASP’s input on the £115M Leeds FASII business case was great. When this was submitted the funding rules made NFM difficult to include. The academic backing iCASP provided helped challenge this and push the proposal over the line. This successful bid (£76M - £5M of which was for NFM) was the first NFM programme in the UK to be implemented at a catchment scale. I think this

work was pioneering and highlighted the importance of NFM; something that has been recognised by the government with the recent £25M NFM grant scheme. – Jonathan Moxon - LCC Flood Risk & Climate Resilience Executive Manager

- Supported six [Yorkshire NFM pilots](#) (value of £2.7M) with modelling and monitoring guidance, and established a NFM Community of Practice (NFM CoP). Project findings were used to update [EA's Working with Natural Process Evidence Directory](#) and inform the £150M FCRIP Programme.

"The modelling work iCASP carried out on the Backstone Beck NFM pilot has been used to justify further investment by EA partners for additional NFM measures across Ilkley Moor." – Duncan Fyfe – Environment Agency – S.U.N.O.W Catchment Co-ordinator

- Being appointed by [CIRIA](#) to co-author a [UK NFM guidance handbook](#) which embedded the combined learning from iCASP's portfolio of NFM projects. [This government endorsed guidance](#) provides industry standards for NFM selection, construction, and maintenance nationally and was road-tested by iCASP's NFM CoP. *"iCASP is a unique project in the University and draws together a wide range of expertise in water and the environment. This expertise includes cutting-edge research into NFM issues but is also grounded in partnerships with practitioners who are applying NFM already. This experience allowed us to help with the balance between the scientific aspects of the new CIRIA manual as well as the practicalities of its application"* – Prof. Mark Trigg – University of Leeds



Leaky dam NFM during a rain event. Image courtesy of Derwent Catchment Partnership

- Partnering with Calderdale Council and the EA we supported the delivery of five actions in the [Calderdale Flood action plan](#) through the development of a new framework for the spatially distributed rainfall runoff model [SD-TOPMODEL](#). This model was able to identify how existing landscape features and new measures can reduce flood risk. The outputs of this project have been used by several partners:

"The iCASP project has helped us understand the effect of land management practices and which landowners to work with, how to work with them and how to reduce flooding by specifically targeting particular landowners and particular interventions. It's also helped us to provide brilliant evidence for future funding." – Ben Fenton – Calderdale Council – NFM officer



Leaky dam NFM on Backstone Beck on top of Ilkley Moor

"For landowners like the National Trust this has been a really beneficial project. It has really helped us understand exactly where our NFM interventions will be the most useful and what type of interventions are the best for us to use. In terms of future projects and informing how we do things differently on this site and other sites it's been really helpful" – Rosie Holdsworth – National Trust – NFM manager

"iCASP is doing some really exciting work to help us to target where and how we invest in those solutions across the catchment to make the biggest difference to flooding in the Calder Valley that

we can. The heart of this approach is to do some really clever modelling undertaken by researchers at the University of Leeds that identifies where we can store the most floodwater in which parts of the catchment and how do all of these measures help us to reduce flood risk to towns like Hebden Bridge and Mytholmroyd long into the future” – Oliver Harmar - Environment Agency – Yorkshire Area Director (now Chief Operating Officer for Natural England)

“The framework that this project developed, to use SD-TOPMODEL for NFM mapping, has had several unexpected impacts. Thanks to this iCASP project we now understand how to apply the model in novel new ways and have used this to secure funding for two new projects (£2M NERC Funded [CASTOR Treescape project](#) and £267k Leverhulme funded ‘[Sink or Swim](#)’ project) with a further NERC bid in review”. – Dr Megan Klaar – University of Leeds

- The work delivered through the [Hidden Heritage Secret Streams](#) and [Upper Rother Projects](#) has influenced on the ground flood mitigation measures, raised capacity and unlocked funding for the DCRT – [Summary Video](#)

“Working with iCASP has greatly benefitted the Don Catchment Rivers Trust, myself especially, and our ability to deliver NFM. The partnership with iCASP significantly strengthened the successful applications for funding for my role (approx. £500k) and gave me access to its wider network of knowledgeable academics, practitioners, and experts in the field of NFM. This has allowed me to keep up to speed with the latest research and to visit other projects showcasing NFM in action, which has, in turn, boosted my confidence in recommending and delivering NFM with a variety of landowners, and to embed best practice in my own work. New partnerships have evolved from working with iCASP and existing ones have been strengthened, such as with Natural England’s Catchment Sensitive Farming Team. Without the support of iCASP we would not have been able to conduct NFM modelling and opportunity mapping work due to a lack of expertise internally and budget constraints of contracting out the work. The work conducted by the ITFs has given us much greater confidence that NFM delivery in the catchments modelled can achieve a meaningful real-world reduction in flood risk and that the risk of exacerbating flooding by causing peak synchronisation is very low. These findings are incredibly promising and motivational for the team. It was an aspiration of the trust to work with NFM and iCASP has facilitated the growth of this new arm of work. We are now seen as a recognised and trusted source of NFM advice locally.” – Dr Debbie Coldwell – Don Catchment Rivers Trust – NFM officer

7.2.2 [Natural Flood Management Community of Practice \(NFM CoP\)](#)

This group was originally convened through the iCASP NFM project, but has become self-sufficient through a sponsorship model, in which iCASP is commissioned to deliver events (16 so far). To date, 90 different organisations have joined this community through their attendance at events on a wide variety of different topics, where the learnings from the iCASP NFM project portfolio are disseminated. The NFM CoP is extremely well regarded and is seen as a flagship iCASP product, with multiple impacts, as highlighted in a [summary video](#) and [research paper](#).

“NFM community of practice has been one of the real shining lights of iCASP. The nuts and bolts and getting the machinery in place to run a CoP just shouldn’t be underestimated. Empowering people with the time together to explore NFM, then knowing that whatever we discussed there are people in iCASP to pull the lever and make it work” - Steve Wragg – CoYC - Flood Risk Manager

“The NFM CoP is a great thing to be a part of, it’s the first of its kind and simply wouldn’t exist if it wasn’t for iCASP. The neutral, independent space that is open to all practitioners is such a valuable resource. It’s written into EA’s RBMPs as a regional resource which doesn’t exist in other parts of the country. Learning from others, specially catchment wide opportunity maps, has given the council the confidence to deliver its first ever NFM project through its capital works programme ([page 31](#)). The design of the new [Aire resilience company](#) was informed by lessons shared at CoP events by the NFM payment for outcomes and blended finance projects, as well as learning from schemes around the country.” – Jonathan Moxon - LCC Flood Risk & Climate Resilience Executive Manager

“The CoP has been a fantastic resource for the EA. It has raised the capacity of regional staff, provided opportunities to make new connections and significantly raised the profile of NFM. The iCASP NFM projects influenced the direction and development of the £5.9M Ousewem project and I now sit on the newly formed NFM ‘task and finish’ group of the Yorkshire RFCC, where I use my learnings from iCASP to influence RFCC support for, and directing funding of, further investment in NFM across Yorkshire such as the work of the Wharfe NFM action group.” – Duncan Fyfe – Environment Agency – S.U.N.O.W Catchment Co-ordinator

“NFM community of practice is absolutely invaluable in being able to connect and speak with others involved in that area of work, it’s such a strong network”. -Dr Ed Shaw – Don Catchment Rivers Trust Director



NFM CoP event in Oughtershaw looking at tree planting.

7.2.3 Flood Risk Management Workshops

Using methods developed through the GBI and SUIM project, combined with the network established through the NFM CoP, iCASP delivered three Flood Risk Management Workshops across West Yorkshire to design on-the-ground intervention and identify necessary investment. These workshops brought together academics with LAs, EA, infrastructure providers and others working in catchment management to identify joint aims and where multiple benefits might be delivered, in addition to reduction of flood risk. These events highlighted priority areas and informed flood risk management plans and fostered new partnerships, which were used to develop business cases for investment.



April 2019, LCC Flood Risk Management workshop

“iCASP is synonymous with delivering well facilitated workshops, bringing together a broad range of stakeholders to identify shared challenges and solutions. The flood risk management workshops are a great example of this, it identified half a dozen areas across the city, which have now become focus areas for the council to deliver flood mitigation work over the next ten years. This is in addition to the Leeds FASII work and represents a further £50M+ approx. of investment.” – Jonathan Moxon - LCC Flood Risk & Climate Resilience Executive Manager

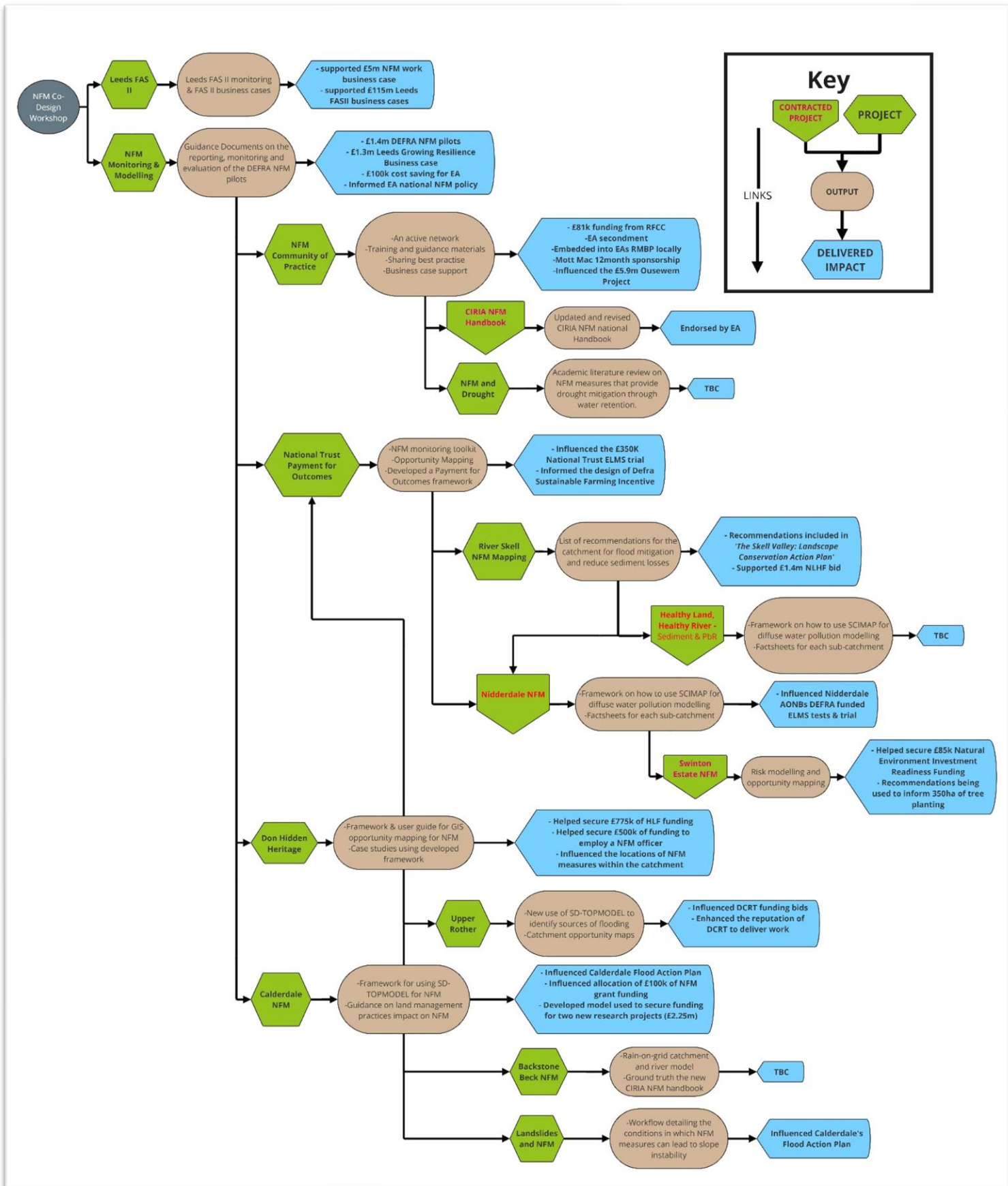


Figure 7. NFM project flow chart – Highlighting how projects build on previous projects outputs to deliver new impact.

7.3 WS3 Flood Forecasting


The region is susceptible to coastal, fluvial, groundwater and surface water flooding, all of which pose their own flood forecasting challenges. These challenges are compounded by geomorphology of the region. More broadly, across England more than 3 million properties are at risk of surface water flooding alone, which is defined as flooding before the water reaches a major watercourse. This occurs in both the region's urban areas, when rainfall exceeds the capacity of drains, and in rural steep sided catchments, such as Calderdale, when rainfall runs directly off the hillsides and pools in the urbanised valley floors. Surface water flooding generally occurs due to short duration, high intensity rainfall from summertime convective storms, whose timing and location are difficult to predict with sufficient accuracy. The events are often classed as 'low likelihood, high impact', which is challenging to communicate in warnings. Urbanised, low-lying areas, such as Hull, often have complex drainage networks that add further challenged to flood forecasting. Partners also highlighted an urgent need for engagement tools to help communicate both the risk of flooding and warnings for when an event could occur. A number of projects have attempted to address these issues including two that have co-developed and tested new forecast tools with regional flood responders and the national Flood Forecasting Centre and the Met Office.

7.3.1 Enhanced Surface Water Flood Forecasting's (ESWFF): Phase 1

Flood incident responders, such as utility companies, LAs, EA, MO and the Yorkshire Ambulance Service, took part in a mock incident response workshop to understand current flood responder needs for flood forecasting and assess whether running a flood model in real-time using probabilistic rainfall forecasts helps improve warnings and decision-making.

Delegates reported the enhanced forecasts would be useful to their organisation, but it would also be helpful to use pre-computed information on the amount of rainfall required to cause flooding, rather than running a flood model in real-time. Delegates also reported that the workshop increased their understanding of current forecasting services and the future potential for better information for more effective decision-making.

LCC practices were influenced via a submission to the Leeds Local Flood Risk Management Strategy consultation.

"This project helped the council [LCC] identify that it is unfeasible to holistically defend Garforth from flooding. As a result of these findings we have shifted towards better warnings and resilience measures for the area, and we are investing in tools such as [MAP rain](#) . Through this project the council have now been working with the Met Office to develop a future forecast for Garforth ([City Packs](#) ). How best to take all this data and make it meaningful encouraged us to be involved in iCASP's communicating flood risk project." – Jonathan Moxon - LCC Flood Risk & Climate Resilience Executive Manager

The project team were invited to present at the 'Ensuring Effective Resilience, Management and Response' conference chaired by Baroness McIntosh of Pickering (Chair of the EU Energy & Environment sub-committee of the House of Lords). Project findings were disseminated nationally through the Emergency Planning Society's 'Resilience' and the EA's 'Current' magazines.



Left image: EA's 'Current' magazine.



Right image: Emergency Planning Society's 'Resilience'

The project also contributed in shaping the DEFRA Surface Water Flooding Action Plan – specifically by assisting the combined Met Office, EA & Defra team refine their approach for a national forecast service, as well as the [Scottish Environment Protection Agency approach](#) in Scotland.

“In response to Defra’s Surface Water Management Action Plan, the Environment Agency and Met Office are scoping a new capability for sharing with responders very short range and rapid update forecasting (“nowcasting”) for the type of rainfall that causes surface water flooding. The Enhanced Surface Water Flood Forecasts project final report, including feedback from the incident response workshop, has provided valuable information and user response insight for the discovery phase of this project and we expect that continued engagement with the iCASP team will continue to be beneficial for understanding user needs and exploring piloting opportunities.” – Graeme Boyce – Flood Forecasting Centre (FFC) – Strategy and Development Co-ordinator

Further development of the tool was delivered through phase 2 of the project (see below).

7.3.2 Enhanced Surface Water Flood Forecasting (ESWFF): Phase 2

The surface water flood forecast tool developed in Phase 1 was refined following user feedback to produce forecasts at a coarser (catchment) scale to allow for uncertainties in the rainfall forecast and to run using pre-computed thresholds rather than using a flood model in real-time. The tool was renamed as FOREWARNS (Flood FOREcasts for Surface WATER at a RegioNal Scale).

The refined tool was tested at a workshop with flood responders in November 2022 based on three recent but contrasting flood events in Northern England. Feedback from Yorkshire users and national MO and FFC forecasters and scientists was very positive. Responders stated that their organisation would use them primarily one day in advance of potential flood events for action planning and up to three days in advance for routine monitoring, with particular value placed on forecasts issued within 36 hours of an event.

Subsequently, additional external funding (£23k Research England Participatory Research fund) was secured to scale up the forecast system over all of England and Wales and was tested alongside existing forecast tools used by the MO and FFC via a testbed throughout summer 2023. Feedback from the testbed indicated that FOREWARNS would add value to existing tools for making the daily

national Flood Guidance Statements that are issued to flood responders. The MO and FFC are starting the process of running FOREWARNS as part of their operational forecasting suite. FOREWARNS is also being tested at nowcasting (short lead time, 0-6 hours) timescales in the summer 2024 testbed to assess its value for aiding the production of their new Rapid Guidance Statements.




Bill Leathers from the Met Office presenting at the ESWFF Phase 2 Workshop in November 2022

“After successful trials during the summer 2023 testbed, The Met Office/Flood forecasting Centre aim to implement FOREWARNS onto a non-operational research and development platform from later this year for further investigation into its use in operational flood forecasting, and as a tool to aid rainfall ensemble model evaluation. This summer we

will also test a version of FOREWARNS run at nowcasting (i.e., shorter) timescales to assess its value for contributing to the new Rapid Flood Guidance we are trialling operationally over summer 2024. Following this, operational deployment of the tool will be considered. Improved flood guidance, with more detail on the timing, location and severity of events will enable flood responders to prepare better and respond more effectively. The new tool and the knowledge gained about user needs from the iCASP projects has been invaluable for aiding development of our operational forecasting capability.” – Julia Perez – Flood Forecasting Centre, Met Office – Senior Hydrometeorologist

7.3.3 Living with Water Partnership (LWWP) Telemetry Project

The iCASP team at UoS collaborated with YW and the LWWP to develop a proof-of-concept early warning flood system for the city of Hull. Separate telemetry data, collected by the different organisations within the LWWP, was combined using a machine learning predictive model to identify how the city’s different drainage systems interact. Using real-time rainfall data, the developed approach was tested at two sites, producing forecast of up to 4 hours for water levels in drainage networks and surface water systems. To facilitate the uptake of this model a [user guide](#)  was developed showcasing how to obtain water level predictions for key points in the city and the necessary calibration for application to other towns and cities.

“Over the last three years, LWWP has been developing a long term strategy ([Blue Green Plan](#) ) which focuses on holistic surface water management in Hull and the surrounding area. The strategy has been informed by advance hydraulic modelling, detailed stakeholder consultation and influenced by the partnership’s learning to date which includes the iCASP LWW Telemetry Project. The Blue Green Plan is a layered strategy including infrastructure, managed change, people, and culture. One key layer is SMART, as we progress into our next phase (2025 - 2030) we are reviewing and utilising the outputs of the iCASP project to inform the SMART strategy by helping us to better understand opportunities for additional telemetry.” – Emma Brown – Yorkshire Water - Strategic Partnership Manager

The project helped better understand the existing telemetry network across the city, identifying the best locations for monitoring and gaps in the coverage.

“In Hull there are lots of flood management authorities that all manage different types of flooding in different ways. We wanted to bring all the information together including telemetry. Until this project all this data was separate. It didn’t talk to each other. We wanted to link together all of our data points to give us a better idea of what water does in Hull.” Dr Jessica Fox – Hull City Council – Senior Flood Risk Management Officer

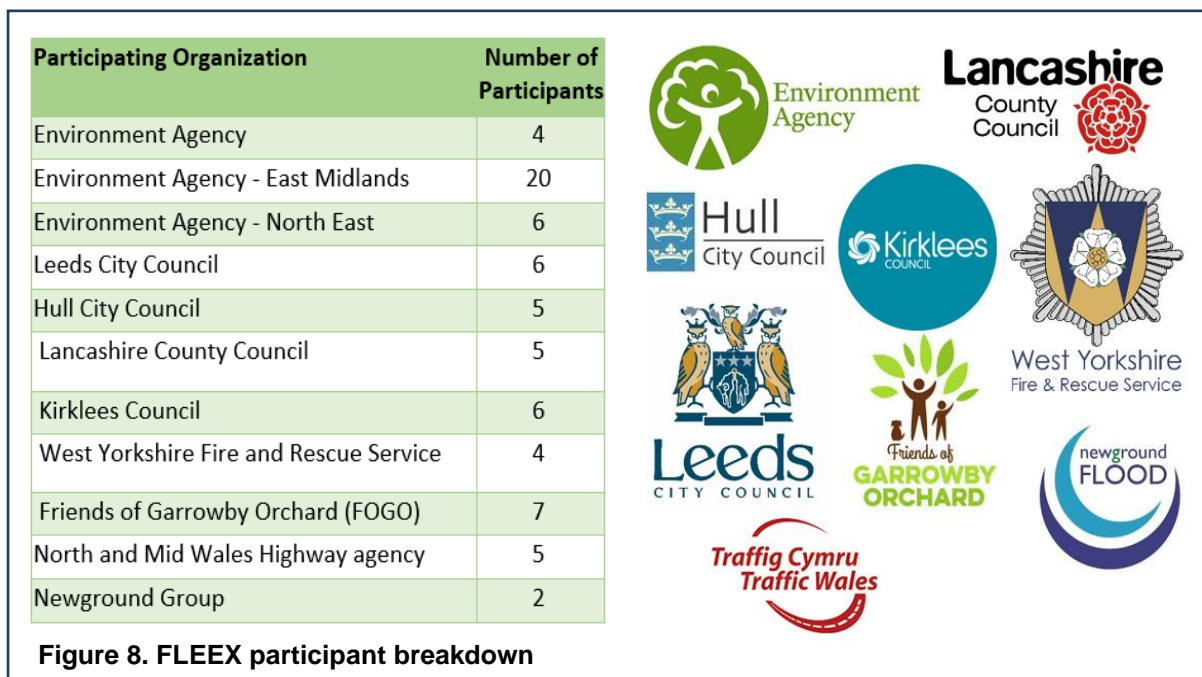
7.3.4 Communicating Flood Risk (CFR)

Flood forecasting and early warning tools are only useful if the risks they highlight can be effectively communicated to those at risk. To do this, 28 different partners were interviewed to understand their challenges and needs. This feedback was used to develop [an award winning](#) practical engagement tool (Flood Engagement Exercise - [FLEEX](#)) for professionals and engaged members of the public (EMP) which helped communicate flood risk to different audiences and therefore promote resilient behaviors in communities vulnerable to flooding. This tool was tested and refined over 15 in person and online sessions, in which there were 70 participants from 9 different organisations across England and Wales ([Figure 8](#)). Of the feedback received, 92% said the exercise ‘*improved their understanding of effective flood risk messaging*’ and they would also ‘*recommend FLEEX to others*’ and we received many positive comments.

“*I’ve not been to a training session with that type of structure before and it worked really well. I think everyone got a lot out of it and it will definitely help me going forward*” - Environment Agency participant

“*I learnt a lot about the most effective communication and how challenging it can be to get right. I think there are a lot of takeaways for the incident team to put into practice within the EA that we possibly haven’t come across or thought as deeply about before. It will definitely help to start those conversations and I’d encourage anyone involved in incidents to participate*” - Environment Agency participant.

“*Luckily, we have not had a major flood incidence in Leeds since 2015, so being involved in the CRF roleplay exercises was a great training tool for staff that had not yet experienced a real-life event. It provided new and valuable insight on different groups that we should be communicating with. We have used the experience to influence how we raise awareness of the various flood schemes being developed.*” – Jonathan Moxon - LCC Flood Risk & Climate Resilience Executive Manager



Due to the popularity of this tool, particularly with EA delegates, the team was approached by the EA national flood resilience team to deliver an additional condensed version of the FLEEXs as part of National Flood Action week. This enabled further engagement with 17 new delegates from 9 organizations.

To ensure further impact from this work the project team are in the process of re-designing the tools to create a '[train the trainer](#)' package. This free professional facing tool will allow organisations to develop their own flood risk communications plans, helping inform local flood risk management strategies.

7.4 WS4 Water Quality

Freshwater ecosystems are facing multiple pressures from a cocktail of pollutants, including synthetic chemicals, microplastics, pharmaceuticals and antimicrobial resistant pathogens, changing hydrological cycle induced by climate change and land management practices, invasive species, harmful algal blooms, salinisation and cumulative stressors. This is putting public health and nature at risk as recognised by the RSPB's '[Troubled Waters Report](#)'. Poor water quality can result in loss of aquatic invertebrates and fish kills, threaten the structure and stability of the aquatic food chain, be dangerous for bathing and lead to enhanced drinking water treatment needs and costs. Thus, there is a need for freshwater science research, industry, regulatory and policy communities to come together and collaborate to improve the water quality of UK rivers, protect freshwater biodiversity, and adapt to a changing climate. Water Quality is increasingly becoming a priority for stakeholders in the region, driven in-part through national media attention. The findings of iCASP projects, as well as the system that has been developed to ensure academic outputs deliver maximum societal impacts, are now being shared nationally through the £8.4M NERC funded '[Understanding changes in quality of UK freshwater's](#)' programme. The iCASP team are the [co-ordinating hub](#) for five new research projects to ensure that outputs bring about direct improvements to the UK freshwaters, though building an interdisciplinary freshwater quality community. In addition to the various iCASP NFM, peatland and sustainable agriculture projects that all impact water quality we have also delivered projects focusing on invasive non-native species (INNS) and river sediment.

7.4.1 Biosecurity and Invasive Non-Native Species (INNS)

To embed biosecurity into working practices of LA staff and contractors, this project steering group highlighted the need for the following outputs:

- a) A series of plain English [factsheets](#) explaining what aquatic INNS are,
- b) A report on the economic, health and reputational impacts of INNS,
- c) Demonstrate how human activity on LA land, for example proximity to [access points, recreational sites and development areas](#), increased the likelihood of the presence of INNS,
- d) Low-cost simple bio-security user guides and toolbox talks

"The outputs from the ICASP INNS project were very useful. We at the Yorkshire Wildlife Trust used it to provide a more robust joint report to one of our contractors [BMBC]. This helped strengthen the case for the use of preventative measures as well as restorative action. From this original collaboration we have further engaged with iCASP to help organisations small and large design scientifically robust biosecurity policies and guidance. The trust have embedded the biosecurity best practice recommendations from iCASP which is helping us deliver against our INNS strategy." – Alex Green - YWT INNS and Biosecurity officer

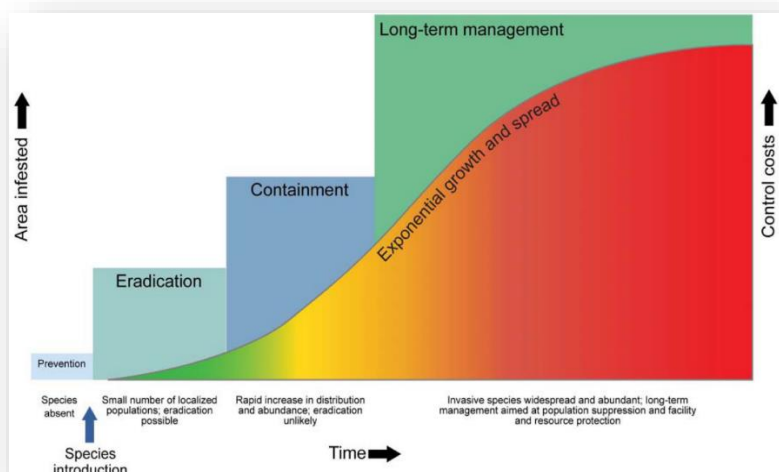


Figure 9. The invasion curve for invasive species - control costs increase as invasion spreads - United States Government Accountability Office. 2015. [Aquatic invasive species](#)

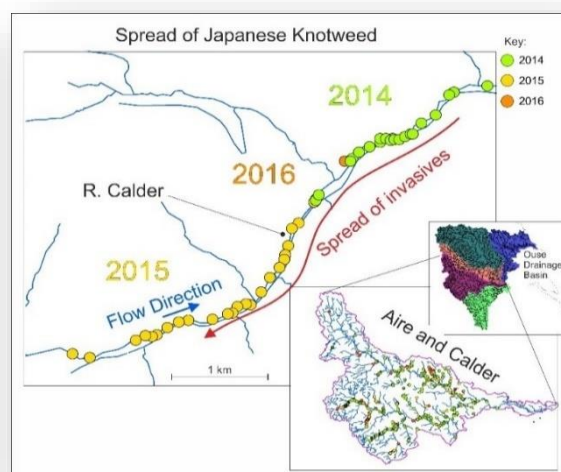


Figure 10. The Spread of Japanese Knotweed on the River Calder over time

Regionally, the connections made through this work facilitated the project lead becoming a formal member of the [Yorkshire Invasive Species Forum](#). This enabled the further dissemination of the projects best practise biosecurity recommendations.

“Dr Dunn’s regular input at steering group meetings and involvement in the forum has directly influenced INNS strategy for the region, ensuring that biosecurity plays an essential part in delivering effective INNS strategies for the region.” – John Cave – YWT - INNS Team leader

“The Dales to Vales River Network (DVRN) Project Mandate for the “INNS Out!” project details our plans to take forward the work of Dr Dunn’s NERC funded biosecurity project and the iCASP INNS project working with local authorities, using the methods and outputs developed by these projects to help partner organisations within the DVRN to implement better biosecurity within their operations, and to take forward the biosecurity message to stakeholder groups such as landowners and recreational users of our waterways” – Dr Marie Taylor – Yorkshire Dales Rivers Trust – Operations Director

Nationally, recommendations were also shared with the 6350 members of the Chartered Institute of Ecology and Environmental Management through their ‘[in practice](#)’ magazine and a follow up [webinar](#). The project also provided both [written](#) and [oral](#) evidence to the EACs inquiry on invasive species. Our recommendation for the need for improved biosecurity training and awareness was [approved by the government](#) (point 26).

“The government agrees with the Committee that generating greater levels of public awareness and support is critical to tackling invasive species and that this needs resourcing. This will be considered as part of departmental business planning and future government spending reviews, including [Spending Review 2020](#).” (HM Government, 2020)

Findings were discussed on MP Mary Creagh’s ‘[Emergency on Plant Earth](#)’ podcast and further disseminated to all MPs through our input on the POSTnote [issue 673](#). Through this exposure the project team were asked to provide feedback on Defra’s draft INNS Evidence Strategic Plan. This strategic plan sets out the government’s key evidence needs for both researchers and funders. Several of our recommendations were included in the [final version](#) including:

- Cost-benefit for biosecurity and the economics around incentivisation at GB and local scale.
- The social science element to biosecurity - including identifying cost-effective and practical ways to encourage adherence to biosecurity measures and discouraging high risk behaviours.

We are now supporting the delivery of these recommendations nationally. The GB Non-Native Species Secretariat (**GBNNS**) invited the project lead to be the sole university representative on the new INNS Training Coordination Group (**TCG**) where she is part of the working group producing guidance for developing and delivering effective INNS training for different sectors.

To action the group's mission of removing training barriers and increasing uptake of biosecurity practices, we have delivered a bolt-on project which developed and produced a free e-learning biosecurity training package that will be hosted on the GBNNS [e-learning portal](#), imminently. We have also facilitated NERC representation on the TCG, with the aim to ensure that our biosecurity training becomes mandatory for all future funded field work across UKRI.



L-R: Mary Creagh MP (Chair of the EAC) with some of the witnesses from the enquiry, Professor Helen Roy (CEH), Dr Alison Dunn (iCASP, UoL) and Professor Elizabeth Cottier-Cook (University of the Highlands and Islands and Scottish Association for Marine Science)

This project is also having further additional impact through two externally funded projects.

1. [Calderdale Council Biosecurity](#)

A successful submission to Research England's Policy Support fund is supporting rolling this project out to CMBC, where we have supported the development of a biosecurity policy.

"The policy document produced by iCASP was very useful and was used to advocate for the need to produce our own policy, which was incredibly helpful. The production of which is still in progress" - Julie Swift – CBMC

This work has enabled further engagement with WYCA procurement and contracts team as well as 15 different affordable housing development organisations.

2. ['Sediment matters' – NERC Knowledge Exchange Fellowship](#)

"Through working on the iCASP INNS project, I have an increased knowledge of invasive non-native species. After this project I worked with Yorkshire Water looking at the impact of signal crayfish on sediment budgets, in which Prof Alison Dunn was involved. Working on these projects has allowed my KEF to become more holistic, and I have updated my fellowship to have an ecology aspect to acknowledge the impact INNS have on bank erosion and sediment budgets." Dr Janet Richardson – Senior Lecturer – Edge Hill University

7.4.2 [River Skell Mapping](#)

This project supported the NT in a successful £1.4M National Lottery Heritage Fund bid by: **1)** developing baseline data to measure the effectiveness of future mitigation measures against flooding and sediment losses, **2)** creating opportunity maps that identify where measures could have the greatest impact on flood and sediment loss reduction, and **3)** providing recommendations on the principles of Payment by Results (**PbR**) schemes (monitoring impacts, valuation frameworks etc.).

This work highlighted that a potential 121 tonnes of sediment per year could be prevented from entering the River Skell, through the adoption of appropriate land management techniques within the study area.

"iCASP did NFM opportunity mapping using SCIMAP and then iCASP did detailed opportunity

mapping in the valley. This information produced by iCASP directly led to lottery [£1.4M] and European Regional Development Fund funding [£230k] – Nabil Abbas – National Trust

Subsequently, iCASP has been commissioned by the NT to deliver work as part of this newly funded project (see [section 8.1](#) for further details).

iCASP staff have also provided direct advice to Government via the [Water Targets Expert Advisory Group](#), where iCASP project findings were incorporated into the [water targets evidence report](#). This reports findings and recommendations on [environmental water targets](#) were passed into regulations in 2023.

7.5 WS5 Carbon Sequestration

The carbon sequestration theme within iCASP supports, amongst other solutions, peatland restoration, which is extremely important as peatlands are key to the regional carbon cycle, and there is an urgent need to reduce emissions from damaged and degraded peatlands.

The work had two main themes; one on the assessment of the monetary value of peatland restoration, and one on using a hydrological model developed for peatlands to guide more cost-effective deployment of restoration infrastructure such as dams in ditches and gullies. Additional projects on soil carbon in agricultural systems and regenerative agriculture are now leading to new approaches (see [section 7.6](#)).



Side of a peatland gully where modelling can support understanding of hydrological impacts of different restoration actions.

7.5.1 Optimal Peatland Restoration (OPR)

The OPR project partnered with Moors For the Future Partnership (MFFP) and the Yorkshire Peat Partnership (YPP) to translate research on peatland modelling and socio-economic valuation, and produced: **1)** a user-friendly version of the digital computer model ([DigiBog Hydro](#)) which can be used to optimise the placement of restoration infrastructure such as peat dams, and to indicate how the effectiveness of this infrastructure may change with climate change; **2)** a [valuation user guide](#) to help practitioners value the benefits of peatland restoration. MFFP used the valuation user guide to inform the delivery of their [€16m MoorLIFE2020 project](#) which has restored and protected of 95km² of blanket bog ensuring that potential losses of 2629 tonnes CO_{2eq}/yr were avoided.

“The User Guide for Valuing the Benefits of Peatland Restoration has turned out to be quite a formidable body of work – while at the same time it is accessible and vastly useful to anyone becoming interested in peatland restoration, bringing the concept of ecosystem service valuation within the reach of non-specialists. iCASP have achieved a brilliant balance between detail and simplicity, backed up by sound evidence. This is an excellent piece of work” – Mike Pilkington - MFFP

Project outputs were also used by YPP in their €6.5M [Pennine PeatLIFE project](#) which has restored 1780ha of blanket bog and avoided the release of an estimated 21700 tonnes of CO₂.


“Through the OPR project, your research has led to a range of impacts in my organization. Specifically, I can confirm that the capability of restoration officers within the Yorkshire Peatland Partnership that I represent has been increased. Thanks to the Valuation User Guide that you have produced, we now have a better understanding of existing methods for the monetary valuation of benefits derived from peatland restoration. We have integrated this work into our practice and processes.” – Dr Tim Thom – YPP – Peat Programme Manager

7.5.2 Peatland Monetary Valuation Protocol

The various users of the OPR user guide identified that the ‘Deliberative Monetary Valuation’ (DMV) protocol was their preferred method to demonstrate the non-market benefits that peatland restoration provides. To facilitate wide scale use of this method iCASP delivered a bolt-on project in partnership with the YWT. A package of resources was co-created for non-academic environmental practitioners to enable them to deliver this protocol with their stakeholders.

“The knowledge that we gained from iCASP has strengthened our position and put us in a very good state to develop new projects and attract more tenders. Through being part of iCASP, we have gained new capability; we have now got something extra that we can offer. As a result of our additional expertise, our visibility and reputation has clearly increased.” - Jenny Sharman – Yorkshire Wildlife Trust (YPP member)




7.5.3 Yorkshire Peat Pilots

iCASP worked with Defra and Natural England (NE) to design and shape the criteria for the £400k [2020 Peat Pilots](#) . This tender (ITT_6520) cited that:

“The contractor will work with the DigiBog_Hydro model and the Optimum Peatland Restoration (OPR) Project delivered by the Yorkshire Integrated Catchment Solutions Programme (iCASP).... There will be a requirement to engage with iCASP to ensure the specific data requirements and ecosystem modelling techniques being used are appropriate.”

Five pilots were funded including the £80k North York Moors National Park:

“Our [YPP] capacity to use the tools that you [iCASP] have produced played a significant role in winning the contract.” – Dr Tim Thom – YPP – Peat Programme Manager

The findings from these pilots in conjunction with iCASP’s response to [EFRA Peatland inquiry](#)  and a Westminster event, were used to shape the [England Peat Action Plan](#) . This £50M investment aims to restore 35000 ha of peatland by 2025 and create a new [England Peat Map](#) ,

both of which iCASP is influencing further through the WaterLands project and project advisory roles.

iCASP has also been supporting the Ministry of Defence, to assist in their targets of achieving a net zero estate by 2050. The programme’s advice on the need for peatland restoration at a landscape-scale has been accepted and embedded within a Peatland Master Plan which will be deployed at two sites covering a combined 26000 ha.

iCASP served as a vehicle for impacting on the CCC land use report, helping to unlock £640M for peatland restoration and informed questions on peatland restoration to HM Government via the House of Lords.



L-R: Rishi Sunak MP, Julian Sturdy MP, Thérèse Coffey MP, Rob Stoneman Chair of Pennine PeatLIFE and Rob Brown, owner of Howesyke Farm. Image courtesy of IUCN UK Peatland Programme.

“Defra successfully secured funding for peatland restoration as part of the [£640million Nature for Climate Fund](#) . This was influenced by the peatland aspects of the [CCC’s Land Use report](#) , which was heavily reliant on papers from the Valuing Nature Programme’s Peatland Tipping Points project. Defra’s analysis on costs were also based in part (amongst other inputs) on the CCC report.” - email received from Defra

7.5.4 WaterLANDS

The ongoing EU-funded WaterLANDS project is using learnings from the other iCASP projects (such as [NFM CoP](#) and [OPR](#)) to help the delivery of upscaled peatland restoration across the Great North Bog, which covers 6600 km² of deep and shallow peat across northern England. WaterLANDS is a €23M EU Horizon 2020 Programme Green Deal funded project working across 14 countries to restore wetland sites across Europe and lay the foundations for scalable protection across much wider areas. iCASP in partnership with the other UK partners (Defra, NE and the IUCN UK Peatland Programme) host a 'knowledge site' and one of the six 'action sites' delivering on the ground restoration. The UK knowledge sites draws on experience of peatland restoration from across the UK to demonstrate best practice.

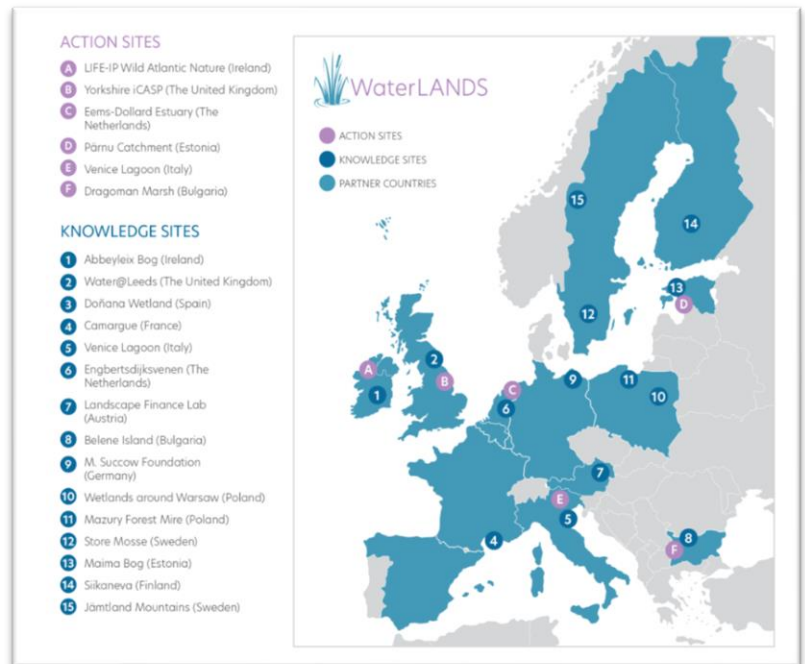


Figure 11. Locations of WaterLANDS 'Knowledge' and 'Action' sites

The UK action site is supporting the Great North Bog to deliver its ambitions to restore all remaining degraded upland peatlands across the North of England, a relationship that formed through engagement activities with the peatland partnerships involved with iCASP. The work with the Great North Bog focuses on impact activity with stakeholders to remove any remaining barriers to landscape-scale and accelerated peatland restoration and iCASP is directly informing and shaping the coalition on how to undertake restoration work and community engagement. We have also opened new lines of collaboration with the partners on new areas such as the finance of peatland restoration. Through WaterLANDS, iCASP have been further developing DigiBog_Hydro through an expanded and improved user interface and we will be working with the partnerships to explore how it can be used to help design restoration infrastructure across the Great North Bog. This project is feeding into the sustainability model of iCASP and further amplifying the impact of the NERC funded projects.

7.6WS6 Sustainable Agriculture

Soils not only give us 95% of the food we eat, they also provide us with a host of ecosystem services, such as cleaning, filtering and storing water; recycling nutrients; regulating the climate and floods, as well as being home to millions of microorganisms. Healthy soils are therefore vital to our existence on this planet, but we are losing soil at a faster rate than it is being formed. Soil is a non-renewable resource, so we need to look after it. However, agriculture is the primary driver of soil degradation and biodiversity loss, contributes to water and air pollution, and is vulnerable to climate change. Therefore, there is an urgent need to transition to more sustainable farming.

During the iCASP programme the delivery of public goods through agri-environmental schemes, including payment by results, and nature-based solutions emerged as a key priority for stakeholders. We were commissioned by Defra to conduct [Test and Trials](#) to help inform the development of the ELM schemes, participated in a large EU project ([CONSOLE](#)) on agri-environment schemes with iCASP being a case study, and developed iCASP funded projects on [Payment for Outcomes \(Pfo\)](#) and the delivery of public goods.

7.6.1 Soil Health Review

This project carried out a systematic review of the academic evidence base concerning the impact of ten countryside stewardship land management options on eight soil health indicators, which relate to key soil functions that deliver public goods (See [Figure 12](#)).

The project’s findings and recommendations were used to create a final report, executive summary, and a policy brief. The policy brief was used during the ‘[Defining a Future for Yorkshire Farming](#)’ event to brief Julian Sturdy MP (Member of the EFRA) and the then Secretary of State for Environment, Food and rural Affairs private secretary, Kevin Hollinrake MP.

Following this event members of the project team were invited to sit on the Yorkshire Agricultural Society’s [Farmer Scientist Network](#) , where Prof. Jonathan Leake was recently appointed [vice chair](#). . Through this network the project team were invited to run re-occurring [knowledge-exchange events](#) on regenerative agriculture and soil health at the Great Yorkshire Show.

Recommendations were presented to NE, Forest Research and various Defra Land Management teams at the ‘*Defra Environmental Land Management Evidence & Research Mapping for Policy Event*’. Academic advice was provided to help with the development of new farm payment systems for the delivery of environmental goods and services.

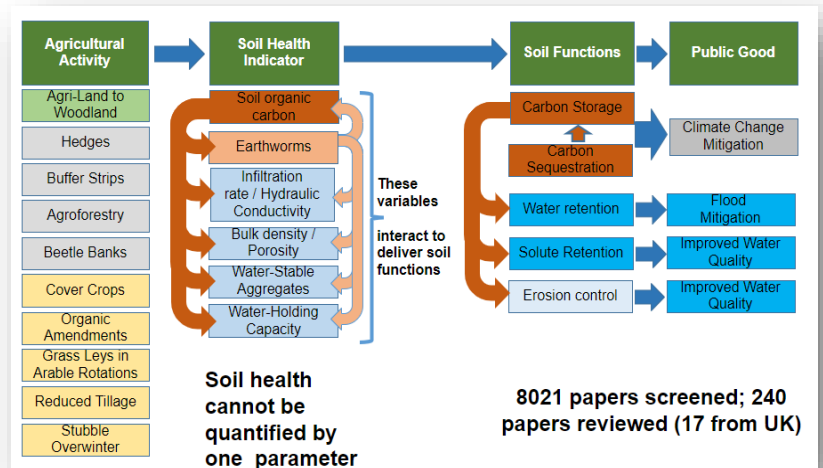


Figure 12. Links between soil health indicators, soil functions and delivery of public goods.



L-R Prof. Jonathan Leake, Adam Henderson (BBC Countryfile), Prof. Pippa Chapman, Isobel Lloyd and Dr Ruth Wade at the ‘Regenerative Agriculture’ stand during the 2023 Great Yorkshire Show.

The NFU were keen to use this report to highlight the need for additional research: “We [NFU] have highlighted to Defra that we would like to see data that can be used at a farm level to help farmers make informed decisions, so [iCASP] highlighting the lack of evidence will really bolster the farming and environmental communities’ concerns” – NFU representative.

Our outputs were also used to inform submissions to Defra’s consultation *Health and Harmony: the future for food, farming and the environment*, the Environment, Food and Rural Affairs Commons’ Select Committee’s Inquiry on Agriculture Bill (both [from iCASP](#) and the [Yorkshire Agriculture Society](#)).

7.6.2 [Payments for Outcomes \(PfO\)](#)

This project supported the NT and Yorkshire Dales National Park Authority in the delivery of a Defra funded [ELMs test and trial](#) pilot. Using outputs from our NFM projects (see [section 7.2.1](#)) iCASP extended the scope of this trial beyond pollinators and soil health to explore whether NFM could also be delivered through a future PfO scheme. The project concentrated on three key areas.

1. Create NFM opportunity maps for the pilot area to then ground truth with farmers,
2. Capture farmer and landowner views and opinions on the feasibility of PfO schemes and the integration of NFM measures,
3. Develop practical easy to use guidance on how to monitor NFM outcomes.

The [lessons learned](#) were captured and fed back to Defra through consultations and the pilot report.

This project improved the understanding of NFM and its uses with both farmers and farm advisors:

“It was interesting to be involved with iCASP. The exercise provided us with an insight into the principles of natural flood management in the uplands. The process allowed us to see how specific measures might be integrated within our existing farming systems in order to help slow the flow of water from the land whilst qualifying for the proposed ELMS scheme” – Tom Akrigg – Upper Wharfedale Farmer

“Use of the SCIMAP outputs, and subsequent field visits, were valuable in explaining that NFM did not just address water flows but was also important in tackling issues associated with sediment. The input of iCASP team members was crucial to this understanding, both in terms of the interpretation of the map outputs and explanations of the extent of their value in the field” - Elizabeth Sullivan – NT - Ecologist

“Although, I had a good understanding and knowledge of NFM before the project, I have learned more about the wider context for NFM. The project has made me think more critically about the ways in which NFM can be applied and has helped me think about NFM from a farmers perspective” – Stewart Clarke – NT – National Specialist for freshwater, catchments and estuaries

An article in the Chartered Institution of Water and Environmental Management ‘[The Environment](#)’ magazine has facilitated further national dissemination of project findings.

The NFM monitoring toolkit generated a lot of interest with the wider iCASP network and has been downloaded by 21 different organisations, including Natural Resources Wales, Harper Adams University, Countryside, Wildfowl and Wetlands Trust and Community Research Institute, all of which are outside of the iCASP network area. Working with the NT on this project led on to several additional projects, including contracted work that is detailed in [section 8.1](#) and [Figure 7](#).

In addition to influencing Defra through the pilot study and responses to consultations, an outgoing iCASP staff member took project learnings into their new role in Defra.

“My involvement with the design of iCASP projects, specifically the Soil Health Public Goods review and Payment for Outcomes projects, helped me understand land managers’ needs, which measures can deliver public goods and how best to communicate this information to different audiences. This was invaluable in helping me design Defra’s new Environmental Land Management Schemes, namely the Sustainable Farming Incentive and Countryside Stewardship offers for farmers.” – Robert Munroe – Defra Environmental Land Management - Senior Policy Advisor

7.6.3 [Landscape Recovery Defra Test and Trial](#)

In addition to the payment for outcomes project, iCASP has delivered several other projects that combine farmers viewpoints with academic experts of a range of subject matters, including:

- [INMYFarm](#) – a proof of concept project bringing together policy, research and farming practises to develop an [integrated nitrogen management tool](#) (cited in [Defra Water Targets report](#)).

- [CONSOLE](#) – a horizon [2020 EU funded project](#) across 13 countries looking at the design and implementation of innovative agri-environment schemes, in which iCASP provided a case study bringing together the 13 Yorkshire Countryside Stewardship Facilitation Fund (**CSFF**) projects. iCASP outputs from this project have informed discussions on the development of Defra’s Environmental Land Management Schemes.
- [Financing UK ecosystem services](#) – a joint project with the [Resilient Dairy Landscapes](#) project looking at how public and private finances can be blended to pay for ecosystem services and the surrounding challenges.
- [Farm Soil Carbon Code](#) – Working with the [Sustainable Soil Alliance](#) the project developed a minimum set of standards for soil carbon codes.



CSFF members taking part in soil analysis as part of the CONSOLE-CSFF CoP

The lessons learned in these projects were used in the delivery of the Defra landscape recovery (**LR**) test and trial, which iCASP was commissioned to carry out. It provided an opportunity for farmers and advisors to give feedback to Defra on the proposed scheme, highlighted the potential legal contract issues and demonstrate the value of academic-knowledge-transfer during the application stage for future LR schemes – [Summary video](#)

A final report outlined 15 key recommendations for Defra to consider when designing the Landscape Recovery components of the ELM scheme, including a need for farmer training on the opportunities of carbon markets and other private payments for ecosystem services schemes that can support farmers, especially in the uplands. Recommendations regarding the legal issues generated by the landscape recovery scheme, particularly its negative impacts on agricultural inheritance tax reliefs, were also highlighted.

“Working on the CONSOLE and the Landscape Recovery Test and Trials project improved my knowledge and understanding of agricultural schemes. Specifically, about what makes for a successful scheme and what landowners and partners now require in order to uptake the scheme. As a result of this increased capacity I am now supporting several landscape recovery scale projects and have recently assessed three Natural Environment Investment Readiness Fund (NEIRF3) applications”– Duncan Fyfe – Environment Agency – S.U.N.O.W Catchment Co-ordinator

The above iCASP work was used in two responses to the EFRA inquiry on soil health ([UoL submission](#), [UoS submission](#)). As a result, Prof. Pippa Chapman was invited to give [oral evidence](#) to the EFRA committee, which produced 22 recommendations from the evidence received, that are currently under [government consideration](#)

7.7 Programme level impact

iCASP’s projects are not the sole mechanism in which impact is delivered. The holistic, often unquantifiable impact that iCASP has delivered through being a known entity in the region is one that our partners are keen to stress.

“iCASP is seen as a very useful and practical programme. They have increased the sum of knowledge in the region and developed a different way of working. All of the people have been lovely people to work with, they’ve made contacts and did things! It’s been like having another member in your team.” – Amanda Crossfield – Yorkshire Dales Rivers Trust

“We can’t not have iCASP - we need iCASP in the region. Their MO [modus operandi] can’t be done by a consultancy. No-one else can do what they do, and it’s needed in the region.” – Rashid Mahmood – Kirklees Council – Head of Major Projects



January 2020 NFM CoP event in Bradford looking at future funding opportunities.

“I think there is a range of things that iCASP has had an impact on in the region. It’s created a forum for people to collaborate. It’s delivered projects that are practical, and we’ve seen delivery of that in a number of places. But it has also created a regional voice that has allowed us to lobby and allowed us to investigate problems outside the region as well.” - Jonathan Moxon - LCC Flood Risk & Climate Resilience Executive Manager

“iCASP has certainly influenced wider political establishments such as the RFCC, but also the WYCA. It’s an impossible thing to measure but I think this has been quite powerful over the 5 years of iCASP, a real achievement.” - Martin Slater- YWT – Deputy CEO

well facilitated, collaborative, knowledge exchange activities, such as our annual conferences. (Highlight videos of these ‘Confluences’ can be viewed on the iCASP YouTube channel [2022 video](#) , [2023 video](#)).

iCASP has become a byword for coordinating

“iCASP has fundamentally improved how the flood sector works in Yorkshire, we are better connected and more informed. iCASP is more than just a programme of projects, it’s a verb for a better way of working. Without iCASP the region would be worse off.” – Jonathan Moxon - LCC Flood Risk & Climate Resilience Executive Manager

“I think iCASP is having a big impact in that we are learning new things. There’s so much research being done that people aren’t aware of and bringing that together can help us try and solve problems. I may be looking at something that another local authority has done and work that iCASP has done with them can give me that learning. We are trying to stop flooding to residents and actually improve their lives so I think that is a big impact.” – Paul Maddison - Wakefield Council – Flood Risk Manager

“I feel iCASP is having significant impact on the work we do day-to-day and the strategic planning we get involved in as well. For me, iCASP is there to provide that innovation and that challenge which can be thinking differently, working with different people and reduce flood risk in a different more innovative way” – Mark Wilkinson – EA – Team Leader WY Programme and Partnerships

“Trust is a big part of working with iCASP.” - Dr Ed Shaw – DCRT - Director.

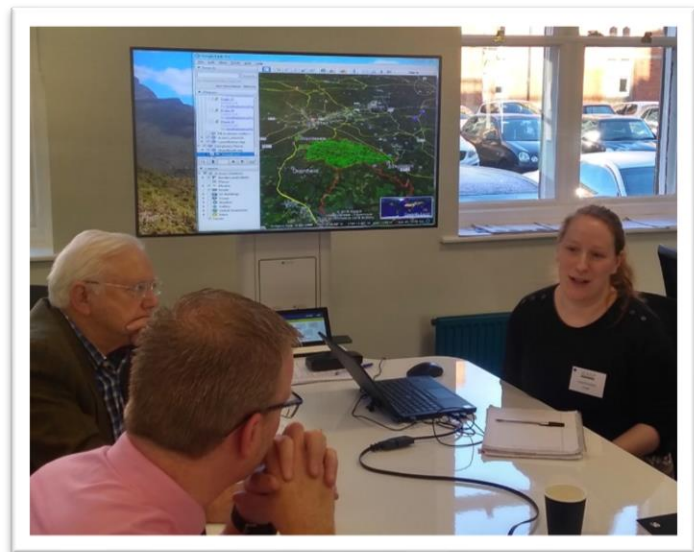
“Stand out thing about iCASP is the good, well respected hard science. It’s a trusted organisation”. – Nabil Abbas – NT

“The reputation of trust and independence of the iCASP team has been well earned and well known now. The culture iCASP has created is very positive. It’s encouraged people to be involved.” - Steve Wragg – CoYC - Flood Risk Manager

“Having iCASP to facilitate discussions has been very positive and tactical, they are a trusted, neutral intermediary, which tends to reach a more positive outcome. There’s a huge benefit in that relationship, for communications and moving projects forward”. – Rashid Mahmood – KC – Head of Major Projects

“There’s never any doubt that iCASP are the experts...and if they don’t know the answer, they know the person who does. And, it’s all peer reviewed correct evidence” – Ben Ashton – Yorkshire Water - Biodiversity Manager

“In my view the biggest benefit that iCASP brings to the region is the connections they facilitate, both between different stakeholder partners and with the academic community. Having academic input is particularly useful as they provide unbiased evidence based input. This helps strengthen bids and projects and is a real asset to stakeholders working in catchment management in Yorkshire.” - Duncan Fyfe – EA – S.U.N.O.W Catchment Co-ordinator



ITF Dr Janet Richardson running a GIS workshop as part of the ‘Hidden Heritage Secret Streams’ project.

This improved connection between stakeholders and academia has been mutually beneficial, with academic input supporting £334M worth of business cases. £53M of new research grants and fellowships have been unlocked using the iCASP network of 325 organisations.

“Prior to iCASP, engaging with universities was limited to new research projects. Now there is a much bigger appetite across the LA to work with universities as a partner organisation on delivery projects. It has provided access to unique skills and outputs that consultants don’t provide. It’s an entirely new way of working and having academics in the room has given weight and credibility to new business cases, which has unlocked new funding” – Jonathan Moxon - LCC Flood Risk & Climate Resilience Executive Manager

“The broader network that iCASP has built has helped me connect to new organisations and develop new partnerships. This is reflected, for example, in the regional partnership working embedded into the ECOMIX project, part of the NERC programme on Understanding Changes in Quality of UK Freshwaters.” – Prof. Colin Brown – UoY – iCASP WS2 lead

“The network that iCASP has created has been extremely helpful in terms of connecting me to new partners and organisations, that I would not of otherwise had the opportunity to engage with. It has given me invaluable contacts within the local authority, regional environmental consultancies and the EA national Operations Assets & Programme Management and regional Flood and Coastal Risk Management teams, the latter of which I am now working with at the national NFM demonstrator site”. – Dr Megan Klaar – UoL

The higher visibility of iCASP academics and our reputation as a centre of catchment management experts has led to several invitations to sit on both regional and national panels, such as:

- Defra’s Water Targets Expert Advisory Group to advise on targets included in legislation.
- Yorkshire West Local Nature Partnership Executive Board advising on the Local Nature Recovery Strategy.
- NE’s Social Science Expert Panel providing advice on NE’s science, evidence and evaluation strategies.
- The global re/insurer [MS Amlin’s](#) academic advisory panel giving insight on risk analysis and modelling.

We have found that impacts from individual projects can sometimes have significant lag times. Ensuring momentum is maintained, stakeholders remain engaged, and outputs can speak to new

arising opportunities requires a dedicated resource over multiple years. How iCASP has achieved this is best visualised in [Figure 7](#), which shows how the programme team took outputs from one initial project and used them to develop a large portfolio of cross cutting projects, all learning and building on the project before it. This snowball effect ensures that the collective impact of our work is greater than the sum of its parts. It also ensures that outputs constantly evolve to meet the arising demands of the user community. This post project impact support is time consuming but is considered unique and highly regarded:

“Pressures on academic time make it difficult to follow up on impact opportunities, which is where iCASP’s dedicated team is so valuable. Having a resource that has the time to engage with partners and tailor products to meet their needs means that my research is able to have impactful benefits to the environment and society.” – Dr Megan Klaar – UoL

“A big positive of working with iCASP was its longevity. The iCASP team are able to ensure that projects findings can be embed and make sure good things happen. Having a continuity of staff resource within the programme team made collaboration much easier, which isn’t often the case with normal grant funded projects.” – Jonathan Moxon - LCC Flood Risk & Climate Resilience Executive Manager

“With traditionally funded projects engagement often ends once the project is complete, meaning that the impact derived from the work is often not captured. Having a team dedicated to building an engaged network, understanding user needs and track, record, and evaluating impact has been extremely helpful, especially as impact occurs over long time scales.” – Prof. Colin Brown – UoY – iCASP WS2 lead

“iCASP supported me in getting my research into the hands of those who needed it through access to impact translation fellows. They assisted in embedding my research into practice by helping translate recommendations to match users’ needs and objectives. The iCASP model of co-designing projects with partners has been extremely rewarding” – Dr Paola Sakai – UoL

To date we have employed 165 different people to deliver projects and support the programme. The skills developed, connections made, and lessons learned are now being embedded in their current roles:

“The framework iCASP developed to evidence impact to make improvements to the way in which the EA’s Environment Programme (EP) records and reports on its work to internal and external partners – helping to promote the wider benefits from the programme. The EP is now looking to include reporting measures in its annual report that consider the wider influence and impact of its work and not just value of projects funded. Some of our catchment partners are similarly looking to improve how they report on the wider impact of the value added by existing catchment partnerships.” - Duncan Fyfe – EA – S.U.N.O.W Catchment Co-ordinator

“Working on this iCASP project not only allowed me to advance the application of my research but also my research-led teaching. I use this case study to show my MSc students (200 per year) how research can be applied and the importance of building climate resilience in businesses.” - Dr Paola Sakai – UoL

“From the six iCASP projects I have been involved in each one connected me to new partners, many of whom I still engage with via MSc and Undergrad placements and projects. These placements would not have existed if it weren’t for the trust built up through the iCASP projects. This was an unexpected impact of working with iCASP, one that my students really value as it has enabled them to communicate their research better and understand how it can have real world benefits. Students that have engaged in these placements have also gone on to secure jobs in the sponsor organisation.” – Prof. Mark Trigg – UoL



Prof. Mark Trigg and Dr Tom Willis measuring a leaky dam as part of the Backstone Beck project.

8. Sustainability model

Originally iCASP was funded for five years, but thanks, in part, to the additional funds (£5.3M) secured through contracted work and other research and impact grants that have been built on the iCASP team and network, the programme was extended for a further two years.

8.1 Examples of contracted work

In addition to the Defra funded [Test & Trial](#) and [Pathfinder](#) projects we have also been contracted to work on the £2.5M National Trust [Skell valley Project](#), which was funded thanks to the results arising from a previous iCASP project on the [River Skell](#).


Two contracted projects (£50k and £62k), which are part of the larger programme funded by the National Lottery called ‘[Healthy Land, Healthy River](#)’, aim to reduce flood and sediment risk to the UNESCO World Heritage site of Fountains Abbey and Studley Royal. In one project, iCASP and the NERC recognised Sorby Environmental Fluid Dynamics Laboratory are monitoring sediment and water flows at a catchment-scale over several years, and establishing a baseline to assess the benefits of NFM interventions. In a parallel project, iCASP have created both land-owner approved and aspirational opportunity maps, and monitoring protocols for nature-based solutions. Along with three workshops (experts, farmers, stakeholders), the arising information is being used to develop a [prototype Payment by Results](#) (PbR) manual for catchment managers to help unlock investment for farmers and landowners to install and maintain NFM and land management practices in the catchment. The long-term aim is to roll out these learnings to other catchments.

“It’s been great working with iCASP because they’re providing the scientific evidence to demonstrate the impact of the work that we do.” – Nabil Abbas – NT

Discussions are ongoing with the NT regarding sustainable investment in long-term catchment-wide monitoring for sediment erosion and water levels within the Skell valley. The monitoring programme would be continued by iCASP in a collaborative partnership with Yorkshire-wide PbR schemes such as Ousewem and the scheme developed in the Healthy Lands Healthy Rivers Project. The monitoring would feed into multiple projects and will likely be a condition of participation in a PbR for which contracts will be awarded on long-term basis (5-15 year renewal terms). The experience and expertise established in initiating catchment and farm-scale monitoring of NFM interventions and land management changes is leading to follow-on work in other catchments, and sharing knowledge of feasibility via the iCASP NFM CoP. This demonstrates the lasting legacy, and organic growth, of the iCASP programme.



8.2 West Yorkshire Flood Innovation Programme (WYFLIP)


Thanks to iCASP's track record for delivering high quality knowledge exchange workshops, many of our partners have approached us to design and deliver facilitated events on their behalf. These events cover a range of topics such as creating policy briefs, evaluating flood schemes, catchment wide opportunity mapping and local nature recovery strategy design. This paid for service is best demonstrated through WYFLIP.

iCASP co-ordinated a joint submission, with five lead local flood authorities in West Yorkshire, EA and WYCA, for FCRIP funding. Although this application was unsuccessful, the EA and LA members saw the value of working together across administrative boundaries with academic input. As such, further bids were made to Research England and the YRFCC, securing £228k of funding to develop a roadmap and initial phase of delivery. iCASP were commissioned to manage this programme and develop the [WYFLIP roadmap](#) , which outlined a governance structure and framework for coordinating the development of new business cases on five distinct themes:

1. Property Flood Resilience – led by CBMdc
2. Nature-based Solutions – led by CC
3. Community Voluntary Sector – led by KC
4. Integrated Water Management Systems – led by LCC
5. Enhanced Flood Warning Systems – led by WC

WYFLIP has the twin benefits of academics being able to access funding pots typically reserved for LAs, and LAs being able to be heavily involved in traditional research funding opportunities (e.g. UKRI / EU). YW also joined the WYFLIP in 2023. The YRFCC cited the early success as a major reason for further investment, providing funding for a further two years of WYFLIP management (£160k local levy funding total). To date, iCASP has helped WYFLIP submit ten successful bids with a value of over £1M. In many instances, iCASP can support delivery of the work which often builds on and enhances the NERC-funded iCASP project findings, for instance:

- £187k of local levy funding to operationalise the PFR Assured tool (that was developed through the [iCASP PFR project](#) ) for West Yorkshire's Local Authorities. This online GIS tool will identify communities and properties that would benefit from PFR and demonstrate its readiness to roll out nationally (see [Figure 13](#)).
- £310k from WYCA's Shared Prosperity Fund for the [Accelerator project](#)  in which iCASP will integrate the findings from the GB Health, EWSFF and SUIM projects, to deliver a suite of six integrated projects looking at enhanced warning systems, green social prescribing, green financing, climate resilience, nature-based solutions and integrated land management all with a flooding perspective.

The WYFLIP has provided a platform for innovative flood mitigation methods to be discussed, both with academics and between practitioners who previously worked in isolation. It has enabled best practice and learnings to be shared and is highly regarded by members – [summary video](#) 

“There's just a difference in our collective ability to do innovation and positive things in West Yorkshire as a result of having WY FLIP. There are some real tangible examples of things that just wouldn't have happened if we didn't have this programme. I think it's giving us the energy and enthusiasm to do more of that. The model is working and that additional capacity in the region just wouldn't have been there and we're seeing the benefits of that already but there's a lot more to come.” – Jonathan Moxon - LCC Flood Risk & Climate Resilience Executive Manager

“Partnerships such as this are really important. When we have different people from different groups with different specialisms, different experiences and knowledge bases working together on a common aim it always advances the innovation, outputs and understanding of whatever it is. That’s the beauty of something like WY FLIP” – Steve Wragg – CoYC - Flood Risk Manager

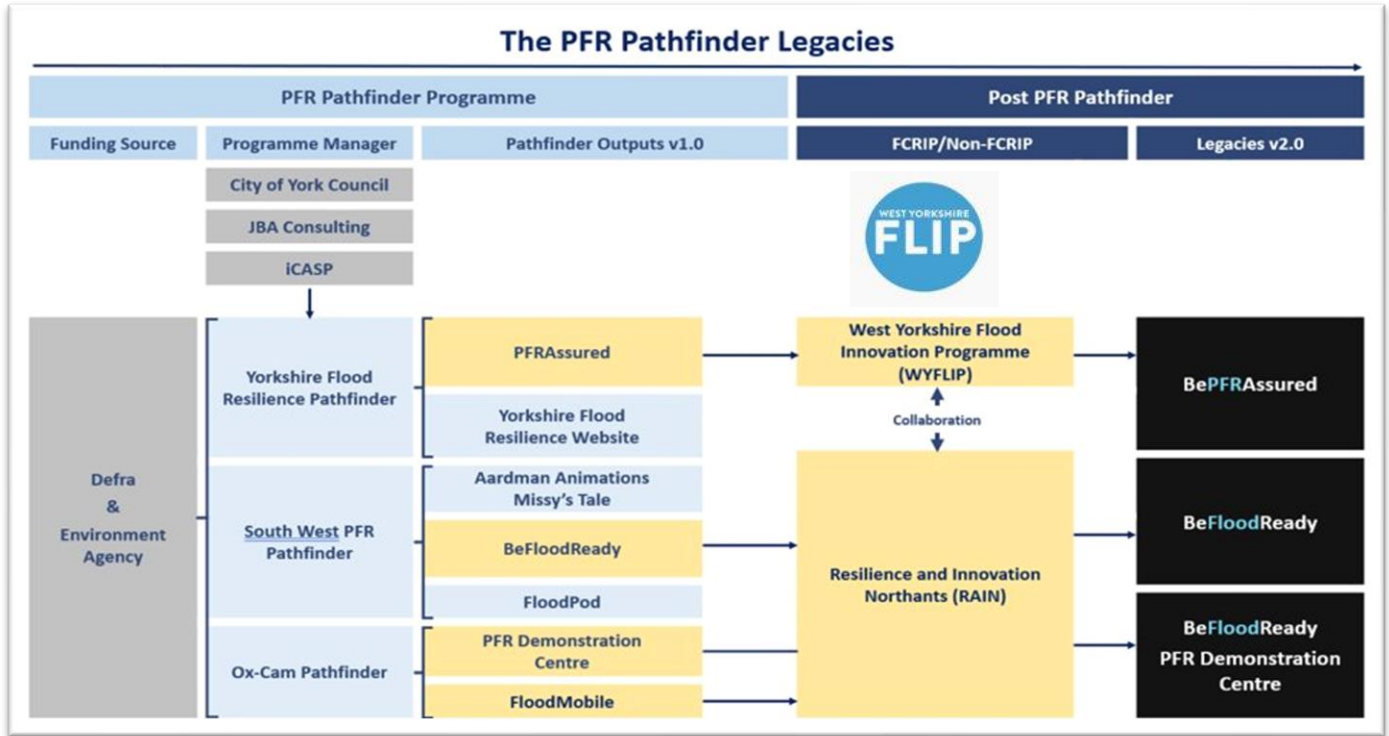


Figure 13. Example of how WYFLIP is supporting the national roll out of the iCASP PFR Assurance tool as part of the BeFloodReady campaign.

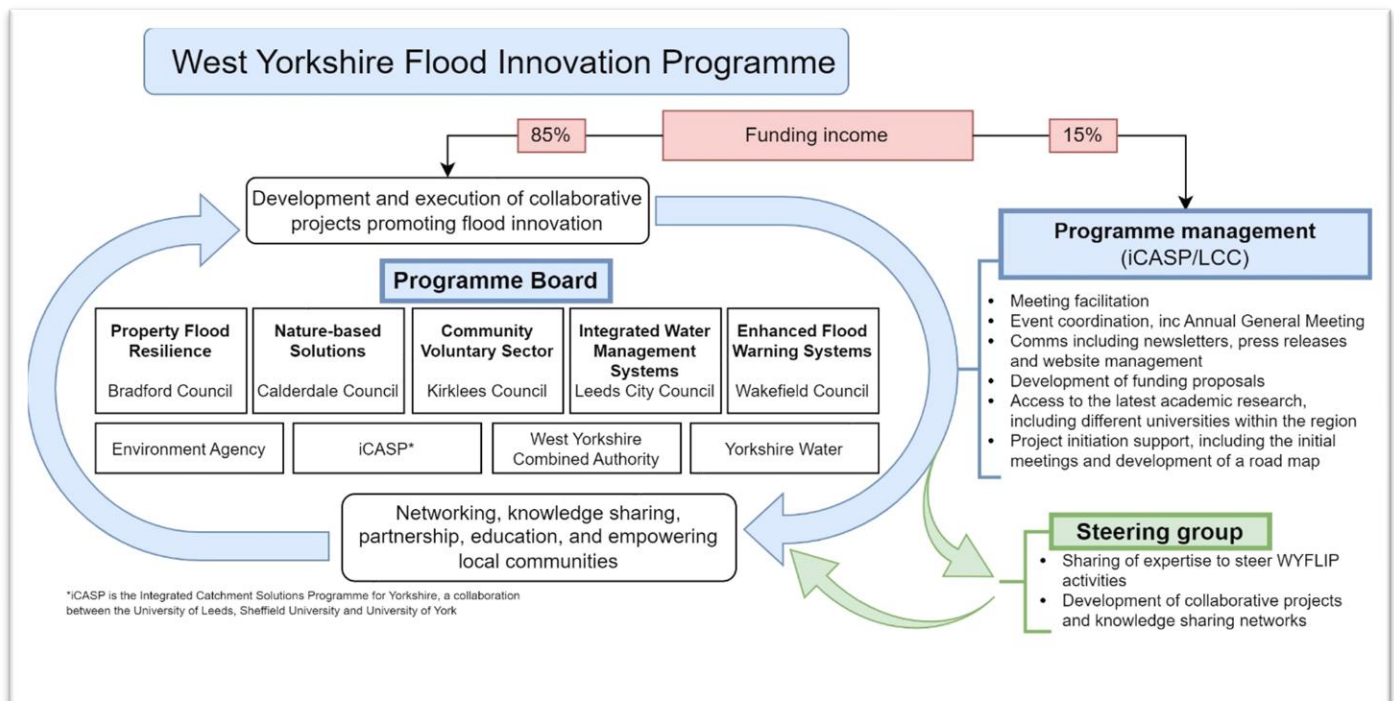


Figure 14 – WYFLIP Sustainability Structure

As of April 2024, WYFLIP have completed two projects, with eight ongoing, two bids under review (total value £1.4M) and three more ideas in development. The added value that iCASP brings to this programme has been recognised and a new novel funding arrangement has been agreed. 15% of funds unlocked through WYFLIP bids will be used, in part, to pay iCASP for the ongoing management of the programme (see [Figure 14](#)).

8.3 Future of iCASP

With the completion of the NERC-funded element of the programme, iCASP is now benefiting from the fantastic reputation and goodwill we have built up amongst our vast network of partners, through the provision of paid work via different mechanisms exemplified above. This is enabling iCASP to remain as a regional resource for stakeholders and help deliver an updated and more ambitious mission statement. This ensures NERC-funded iCASP project outputs can continue to have impact, and iCASP can strive towards achieving its new ambition of unlocking £1Bn of investment into the region, as reflected in the new mission statement below.

Revised ICASP Mission Statement

The Yorkshire Integrated Catchment Solutions Programme seeks to drive transformational environmental and social benefits in Yorkshire, and influence **£1Bn of investment by 2030**. To achieve our vision, iCASP will:

- Continue to drive partnership working and embed innovation and cutting-edge environmental science into projects to shape sustainable integrated catchment solutions.
- Shape interdisciplinary approaches that benefit innovation around water, soils, climate, nature recovery and landscapes.
- Focus on Yorkshire while exploiting opportunities to drive broader change via national and international policy, regulator, business and NGO partners.
- Advocate for Yorkshire to receive national and international funding investment in world-leading catchment solutions.
- Through partnerships, enhance the value of investments in catchment solutions.

9. Annexes

For further information, included the Annexes referenced within this report, please contact iCASP@leeds.ac.uk



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