sweep Impact Report

Full version - January 2023

Annexes are available upon request from sweep@exeter.ac.uk

B.1 SWEEP Ambition

B.1.1 Objectives

The overarching objective of the South West Partnership for Environment & Economic Prosperity (SWEEP) Project (2017-2022) was to: **help deliver economic and community benefits to the South West, whilst also protecting and enhancing the area's natural resources**.

SWEEP was funded by the UK Research and Innovation (UKRI) as part of the Natural Environment Research Council's (NERC) Regional Impact from Science of the Environment (RISE) programme which is: "*dedicated to bringing research organisations together with businesses, policy bodies and other actors contributing to economic development specific to their location, to deliver significant regional impact from NERC environmental science.*"[1]

Using contemporary research, SWEEP helped to champion the adoption of the Natural Capital Approach (NCA) across the South West. By placing the environment at the heart of decision making, SWEEP aimed to improve the South West's economy and benefit society, whilst at the same time restoring, improving or protecting nature or making it more resilient to change.

Natural Capital refers to our environmental assets (i.e. the ocean, land, freshwater, air, the species and habitats they contain) and the processes and functions that occur within them which provide value for people. The **Natural Capital Approach** captures the various elements of this complex environmental-economic relationship, by bringing environmental considerations into decision-making (**Figure 1. The Natural Capital Approach: overview**).[2]

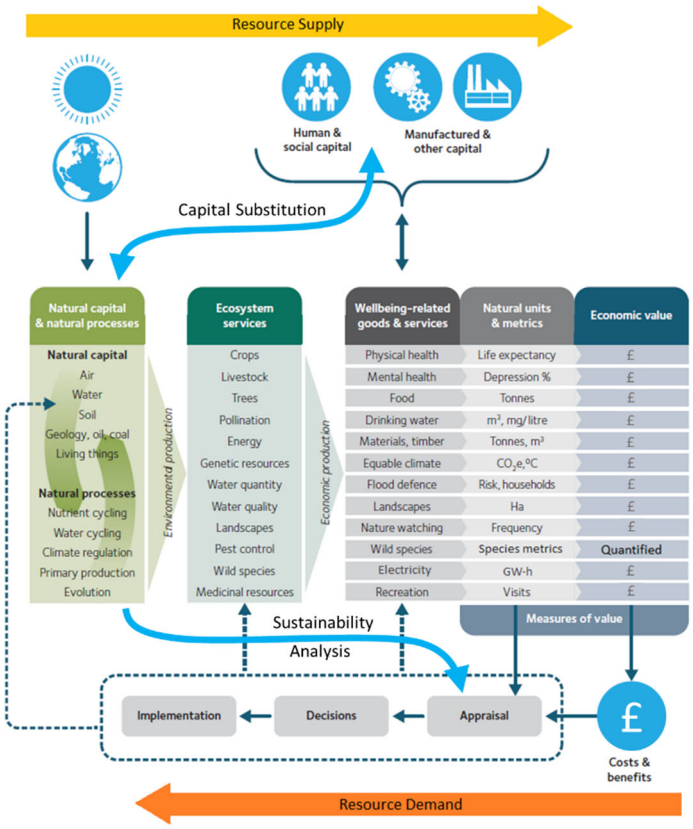
It is now widely recognised that the natural environment and the economy are two complex systems which are inextricably bound together. The economy is a subset of the environment, and is wholly dependent upon its inputs. In turn the economy affects the quality of the environment. It is essential to transition to a form of decision-making which recognises this inter-dependence.

The Natural Capital Approach is explained in detail in the **SWEEP Manual.**

[1] https://www.ukri.org/what-we-offer/browse-our-areas-of-investment-and-support/regional-impact-from-science-of-the-environment/

[2] Bateman, I.J. and Mace, G.M. (2020) The natural capital framework for sustainably efficient and equitable decision making, Nature Sustainability https://doi.org/10.1038/s41893-020-0552-3

Figure 1. The Natural Capital Approach: overview



Source: Adapted from Bateman & Mace (2020).

SWEEP's high-level ambition, as set out in the original funding proposal, was to use NERC-funded science as a springboard from which to:

- Provide a national exemplar for natural capital-led economic growth, social gains and environmental improvements.
- By adopting a whole systems approach to transform a culture of decision-making that has too often focused on improving one economic sector, only to result in unintended negative consequences for others.
- And to deliver transformative, regional economic and social impacts, new products and services, create new jobs and safeguard existing ones.

Through a collaboration between three major South West research institutions (University of Exeter, University of Plymouth and Plymouth Marine Laboratory), SWEEP aimed to deliver on these key objectives by:

- Bringing world-leading academics and a team of Impact Fellows together, with forward-thinking businesses and policymakers primarily in the South West to deliver a set of 'Impact Projects', co-designed with committed partners to meet real world needs.
- Being strategically guided by a business-led Impact Advisory Panel to direct SWEEP and enable continual co-creation with partners.

B.1.2 Policy and economic context

Over the last decade there has been a growing sense of urgency to change the way we value, view and interact with our natural environment and the goods and services with which it provides us.

- In 2015 the Natural Capital Committee, the Government's independent and influential body reporting to HM Treasury, of which SWEEP's Director was a member (2013-20), called for a new 25 Year Environment Plan (25YEP) to address the urgent need to stem the ongoing decline in the country's natural capital.[3]
- The 25YEP was approved in 2018 with an aim to reverse natural capital decline, improve resource resilience and increase economic prosperity and wellbeing by setting out a long-term plan for improving the environment based on natural capital principles.
- The Agriculture Act 2020 adopted a new system to replace the inefficient allocation of farm support payments under the EU's Common Agricultural Policy (CAP) based on the principle of 'public money for public goods'.[4]
- The Environment Act 2021 set legislation to improve air and water quality, tackle waste, increase recycling, halt the decline of species, and improve our natural environment.[5]
- The Dasgupta Review on the Economics of Biodiversity, commissioned by HM Treasury and published in 2021, called for a fundamental change in how we think, act and measure economic success to protect and enhance our prosperity and the natural world.

  "Our economies, livelihoods and well-being all depend on our most precious asset: Nature."
  The Dasgupta Review[6]

The South West has faced unprecedented challenges in recent years from Brexit, the Covid19 pandemic and the more recent cost of living crisis. A recent review of the economic impacts of the Coronavirus pandemic on the region[7] confirms that the South West is in the midst of a profound economic shock, and that its dependence on many of the shutdown sectors (tourism, leisure etc.) suggests that this region will be particularly hard hit.

There are huge opportunities for the South West to adopt new strategies to recover its post Covid19 pandemic economy, and also 'level up' with other parts of the UK. Regional policymakers have already identified the natural environment is a key driver of prosperity and wellbeing, with regional development strategies around environmental, clean and inclusive growth[8,9,10].
The RISE programme and timing of SWEEP's ambition, to help deliver transformative change in the South West region through natural-capital led growth, could not have been more timely in terms of the policy and economic context.

[3] Natural Capital Committee (2017). Advice to Government on the 25 Year Environment Plan. Sep 2017. https://www.gov.uk/government/publications/natural-capital-committee-advice-on-governments-25-year-environment-plan
[4] UK Agriculture Act, 2020. https://www.legislation.gov.uk/ukpga/2020/21/2021-01-01
[5] UK Environment Act, 2021. https://www.legislation.gov.uk/ukpga/2021/30/contents/enacted
[6] Dasgupta, P. (2021), The Economics of Biodiversity: The Dasgupta Review. Abridged Version. (London: HM Treasury). https://www.gov.uk/government/publications/final-report-the-economics-of-biodiversity-the-dasgupta-review
[7] Review of the economic impacts in the Heart of the South West and Cornwall & the Isles of Scilly LEP areas, 4th May 2020, University of Exeter, Innovation Impact and Business Dept.
[8] Heart of the South West Local Enterprise Partnership, Local Industry Strategy Progress Statement 2, August 2019.
[9] Cornwall & Isles of Scilly Local Enterprise Partnership (2012) The natural place to grow great business: Economic Growth Strategy for Cornwall & Isles of Scilly 2012 – 2020, CIoS LEP.
[10] Cornwall & Isles of Scilly Local Enterprise Partnership, Vision 2030, Oct 2018.

Seaweed farming, Porthallow Bay, Cornwall

B.1.3 Transforming the South West

The SW is the ideal location to trailblaze natural capital-led growth. It is rich in natural capital, with 850km of spectacular coastline,[11] more than a quarter of its land area is within National Parks or Areas of Outstanding Natural Beauty[12] and includes the North Devon UNESCO Biosphere, one of only 7 Biospheres in the UK. The region is particularly reliant on its abundant natural assets – and the ecosystem services that derive from them – to power economic growth.

Its coastline, moorlands and countryside make it among the top destinations for domestic tourists. The region is home to the UK's first National Marine Park at Plymouth Sound, protecting marine diversity, to help the ecosystem better withstand the effects of climate change[13] and a world surfing reserve at North Devon, an international designation that recognises the areas' outstanding beaches[14]. (Note: SWEEP work supported both the first National Marine Park and World Surf Reserve status being awarded.) The Cornwall mining landscape is a UNESCO World Heritage Site in recognition of its role as the centre of one of the world's first specialised industrial economies[15].

The South West is home to the three largest fishing ports in England[16], 25 designated shellfish fisheries and the largest offshore rope cultured mussel farm in Europe[17]. Employment in sectors that depend directly on natural capital, such as agriculture and fisheries, is proportionately higher than any other UK area, with 21% of agricultural labour in England in the South West[18], and fishing and aquaculture industry accounting for the second largest regional contributions in the UK[19].

Despite this wealth of natural capital and related economic activity, there is a clear divide between Devon and Cornwall and the rest of the UK in terms of productivity. Cornwall and the Isles of Scilly has the lowest

[11] Lonely Planet, Devon and Cornwall, 2022 https://www.lonelyplanet.com/england/devon-cornwall-1341739
[12] Devon County Council, National and UNESCO destinations https://www.devon.gov.uk/environment/landscape/national-and-unesco-designations;
[13] www.plymouthsoundnationalmarinepark.com
[14] Savethewaves, 2022
[15] Cornwall AONB, Cornwall's Nationally Protected Landscape https://www.cornwall-aonb.gov.uk/
[16] UK Fisheries Administrations, Sea Fisheries Statistics, 2020
[17] www.Offshoreshellfish.com
[18] House of Commons, Farming and Food Statistics: South West England, 2021
[19] House of Commons, UK Fisheries statistics, 2022, 1.2 pg 7

productivity of any UK subregion – 32% below the national average and Devon, is the seventh lowest productivity area in the UK.[20]

Additionally, dependence on its natural capital makes the South West particularly vulnerable to environmental decline, as a result of interacting environmental, economic and social pressures. Population growth trends are increasing in South West; by 7.8% (2011-2021) above the national average rate. [21] [22] [23] Further challenges come from increasingly frequent natural hazards such as storms and flooding, exacerbated by coastline erosion.

The region's geography already makes the South West a prime candidate to become the greenest economy in England. Devon, Cornwall and South Somerset have already expressed plans to become the "carbon-basket" of the UK as they seek to advance in greener energy, carbon capture, agriculture and food production, and marine technologies[24]. There is more potential for increasing economic benefits from natural capital than in any other region[25],[26].

SWEEP's footprint in the South West, could not be better placed given the crucial dichotomy between the region's dependence on its natural assets, and the opportunities they provide for transformative economic growth and improvements in the health and wellbeing of the region's population.

B.2 SWEEP Approach and Impact Journey

B.2.1 SWEEP approach

The benefit of taking an integrated, comprehensive and long-term approach to protect and enhance natural landscapes and habitats was recognised in Defra's 25 YEP.[27] The 'Wholescape Thinking' approach further develops this concept by recognising that the integrated management of land and rivers, the coasts and the

[20] Pennon – Levelling Up the Great South West: A G7 Legacy, 2021
[21] Devon County Council (2016) Demographics 2013 – 2033
[22] Cornwall Council (20181) Demographic Evidence Base. Population Projections
[23] ONS Census 2021, ONS, London
[24] TUC – A better recovery for the South West, 2020, 13
[25] Cornwall and the Isles of Scilly Local Industrial Strategy 2022
[26] The Heart of the South West LEP (2013) Strategic Economic Plan 2014-30
[27] Defra. (2018) A Green Future: Our 25 Year Plan to Improve the Environment.

open seas is most effective when supported through partnerships. By bringing together partnerships and partnership working practices, 'Wholescape Thinking' seeks to:

> *"integrate these ways of working with the need to work at larger spatial scales - combining landscapes, coastal zones and seascapes. It offers an opportunity to underpin best practice for managing the natural environment sustainably, making best use of its natural capital."*[28]

SWEEP adopted an integrated, 'whole systems' approach (illustrated in **Figure 2. Illustration of SWEEP's whole systems approach**) to transform a culture of decision-making that has too often focused on improving one economic sector, only to result in unintended negative consequences for others.

Figure 2. Illustration of SWEEP's whole systems approach

A series of integrated impact themes were co-designed between the SWEEP team and partners from business, government and civil society organisations. The themes focused on aspects of safeguarding and restoring natural capital, making it more resilient, integrating policymaking for natural capital-led growth, boosting the business sector, delivering benefits economic and social benefits and adding value to public and private sector decision-making by mainstreaming the Natural Capital Approach.

The themes were intended to improve business and policy decision-making, guide smarter investment, ensure more efficient public spending and develop new natural capital markets and incentives for more sustainable use of the environment. Focusing on the Heart of the South West (HotSW) and Cornwall and

[28] Maltby E, Acreman M, Maltby A, Bryson P, Bradshaw, N. (2022) Wholescape thinking guidance note: Towards integrating the management of catchments, coast and the sea through partnerships. www.naturalcapitalinitiative.org.uk/wholescapes

Isles of Scilly (CIoS) Local Enterprise Partnership (LEP) regions, the intention was to work in partnership, collaboratively across conventional boundaries, disciplines and sectors.

SWEEP's adoption of this co-creative approach to developing impact projects evolved over the five-year programme. The route to impact is not always certain at the start of a project. Whilst it can be mapped out and to some extent planned for, SWEEP's most successful projects were able to work flexibly and in an agile co-creative and collaborative way with partners to identify the key issues and plan approaches to how best to tackle them. They were also able to capitalise on new, unforeseen or unexpected opportunities along the way.

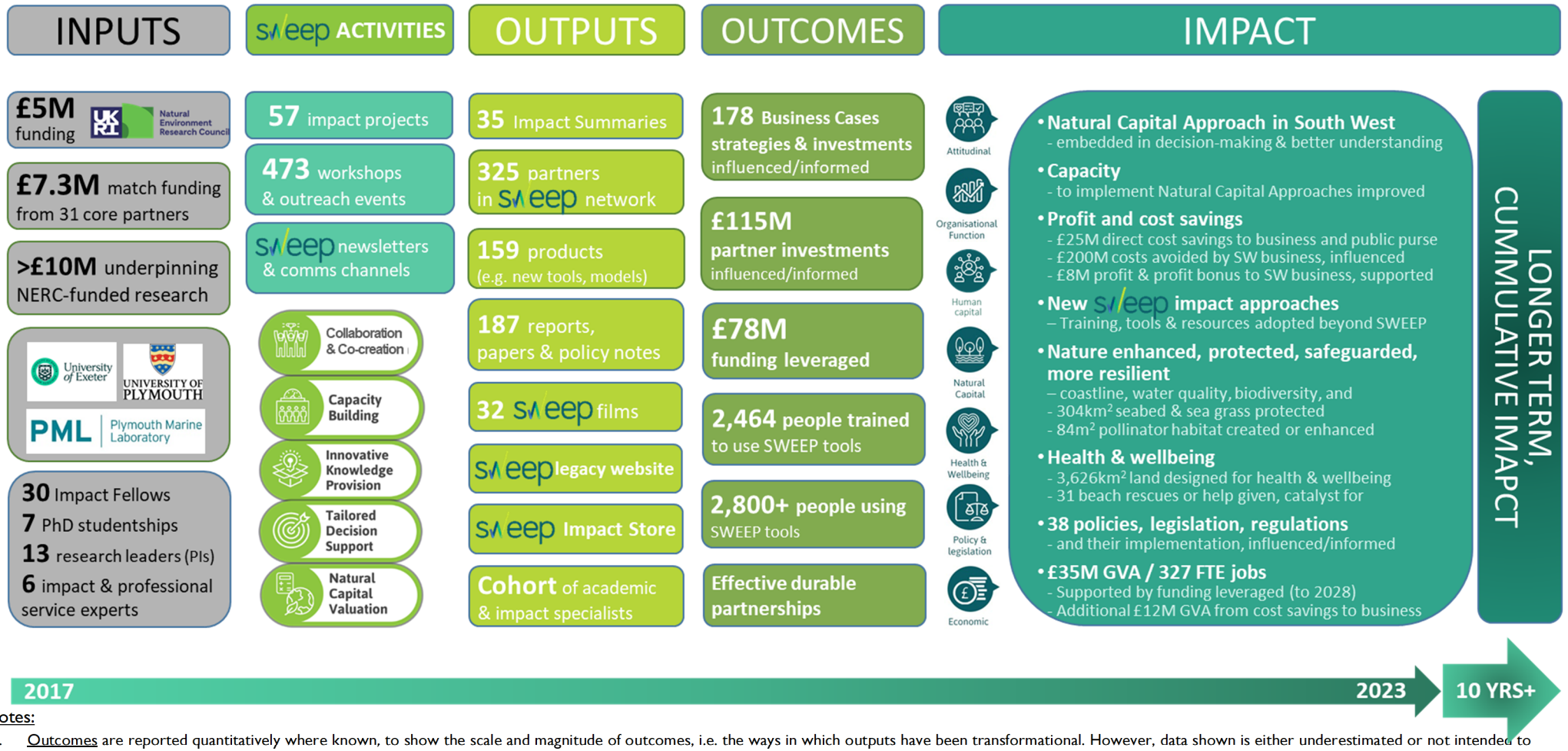
Figure 3. Partnership work in action – Marine Ecosystem Research Programme workshop, North Devon

B.2.2 SWEEP journey: inputs to impact

The SWEEP journey from inputs to impact is set out at a very high level in **Figure 4. The SWEEP journey: inputs to impact**. Modelled on the logical framework approach, this figure sets out the relationship between the: (1) key inputs to the project; (2) range of activities and approaches; (3) outputs delivered (i.e. tangible work products); (4) outcomes (i.e. the ways in which these work products were used); and finally (6) impact delivered (i.e. the benefits derived from use of the outputs and the outcomes).
It is important to note that impact achieved by December 2022 (since SWEEP began in July 2017) reflects relatively short-term benefits; it is anticipated that more impact will accumulate in the 10 years beyond SWEEP.

Table 1. Data sources and related confidence levels: inputs to impact describes the data shown in Figure 4 in more detail, and provides a review of the source for each set of data recorded and the confidence with which it is reported, covering issues such as availability, attribution, scale and confidence.
The following sections (B.2.3 Inputs, B.2.4. Outputs, B.2.5 Outcomes and B.2.6 Impact) provide more detail on each stage shown in **Figure 4. The SWEEP journey: inputs to impact**

Figure 4. The SWEEP journey: inputs to impact



Notes:

1. Outcomes are reported quantitatively where known, to show the scale and magnitude of outcomes, i.e. the ways in which outputs have been transformational. However, data shown is either underestimated or not intended to be wholly attributable to SWEEP. For example, SWEEP activities and outputs did not exclusively bring about £150M of partner investments. They did, however, influence or inform these investments. Please see **Table 1. Data source and confidence: inputs to impact** for details on data confidence, partiality and under-reporting.
2. Impact provides a high-level summary of short-term impacts (i.e. those achieved to Dec 2022). The majority of SWEEP impact is 'attitudinal' or 'organisational function', so providing the foundation needed to deliver transformational longer-term change, to 'policy & legislation' and beyond to tangible change in 'natural capital', 'health and wellbeing' and 'economic' impact. 'Human capital' impacts reflect SWEEP's effect on the project team and beyond through benefits delivered via training and sharing of impact approaches, delivery and evidencing resources. **Table 1** shows details on confidence, partiality and under-reporting.
3. Quantified impacts are shown where data is available, and impacts can be proportionately attributed to SWEEP activities and outcomes. Some impact types are best expressed **qualitatively** and (e.g. 'attitudinal', 'policy & legislation', natural capital, health & wellbeing, and human capital) due to issues with data availability and attribution. This is done via interview testimony and using other qualitative sources.
4. Whilst SWEEP delivered a considerable amount of impact to December 2022, it is anticipated that longer-term benefit will accumulate into the future, especially changes to nature itself, the South West economy and the health and wellbeing of its population and visitors. These longer-term impacts take time to grow. SWEEP activities and outputs have laid the foundations for this to happen.
5. Whilst SWEEP delivered a considerable amount of impact to December 2022, it is anticipated that longer-term benefit will accumulate into the future, especially changes to nature itself, the South West economy and the health and wellbeing of its population and visitors. These longer-term impacts take time to grow. SWEEP activities and outputs have laid the foundations for this to happen.

Table 1. Data sources and related confidence levels: inputs to impact

Category	Description	Data source	Confidence (green=high / amber=medium)	
INPUTS / ACTIVTIES / OUTPUTS				
• All data	Data on inputs, activities and outputs is complete record	SWEEP project teams	Complete record	
OUTCOMES				
• 178 Business Cases strategies & investments – influenced/informed	Informed by SWEEP activities and outputs. Scale of influence ranges from material to modest influence.	SWEEP project team / partner testimony	Complete record, but varying scales and levels of attribution from direct to partial.	
• £115M partner investments - influenced/informed	Shows magnitude of partner activity which SWEEP has influenced to varying degrees.	Partners or secondary source	Partial record, due to data availability and attribution issues.	
• £78M funding leveraged	New funds leveraged as a direct result of SWEEP activities.	SWEEP project team / partner testimony	Complete record	
• 2,464 people trained to use SWEEP tools	Training provided directly by SWEEP teams or training videos.	SWEEP records	Complete record	
• 2,800+ people using SWEEP tools	No. people using, or registered to use, SWEEP tools.	SWEEP records / Google Analytics	Likely underestimate, data incomplete.	
• Effective durable partnerships	Evidenced through leveraged funding and ongoing activities.	SWEEP project team / partner testimony	Complete record	
IMPACT				
• ATTITUDINAL: NCA embedded in SW decision-making & improved understanding	Shifts, changes and embedded understandings of NCA at organisation level.	Testimony / survey	Complete record, from partners	
• OPERATIONAL FUNCTION: Capacity improved to implement NCA	Organisation capacity improved in terms of training or access to SWEEP tools or outputs.	Testimony	Complete record, from partners	
• OPERATIONAL FUNCTION: Profit & cost savings to SW business/organisations	Net income and cost savings to SW organisations as a direct result of SWEEP activities and outputs.	Testimony / partner correspondence	Likely underestimate. Issues with data availability and attribution.	
• HUMAN CAPITAL – SWEEP impact approaches - training & resources adopted beyond SWEEP	Where SWEEP impact approaches have been adopted or training given beyond SWEEP. And human capital enhanced.	Testimony	Complete known record	
• NATURAL CATPITAL: Enhanced, protected, safeguarded, more resilient	Scale (area, length, tonnes, etc.) of natural capital assets or ecosystem services affected.	Testimony / project team	Partial record, due to data availability and attribution issues. More expected long-term.	
• HEALTH & WELLBEING: Health and wellbeing outcomes enhanced	Scale affected or other attribute affected.	Testimony / survey	Partial record, due to data availability and attribution issues. More expected long-term.	
• POLICY & LEGISLATION: policies, legislation, regulation & implementation - influenced/informed	SWEEP activities or outputs informing/influencing new policy & legislation or its implementation.	Testimony / secondary source	Complete record, from partners	
• ECONOMIC - 61 FTE jobs created or safeguarded	Known new jobs created or existing ones safeguarded.	Testimony	Complete record, from partners	
• ECONOMIC - £35M GVA and 327 FTE jobs	Regional economic accounts modelling of Leveraged Funding.	Modelling	Economic modelling analysis	

- **Green** We believe these data to be a near complete record and/or fully attributable as a direct outcome or impact resulting from SWEEP activities and outputs.
- **Amber** We believe these data to be a partial record, underestimate or only partially attributable to SWEEP activities and outputs or to reflect magnitude being influenced.

B.2.3 Inputs

The SWEEP project was awarded £5M from the NERC RISE programme. It began in July 2017 and ran to the end of January 2023, including a no-cost extension of six months.

SWEEP's primary aim was to build transformational impact in the South West building on underpinning NERC-funded research. The work products and findings of NERC research grants (valued at more than £10M) formed the building blocks used by SWEEP projects to develop new resources, tools and knowledge of use to partners to help then provide solutions to real-world challenges.

SWEEP connected a wealth of academic expertise within the Universities of Exeter and Plymouth and Plymouth Marine Laboratory, with a large group of highly-engaged regional businesses, policy makers, NGOs and community partners. An initial group of 31 Core Partners was identified at the proposal stage.

Over the duration of SWEEP, project partners contributed £7.3M Match Funding, comprised of a combination of cash (£1.2M) and in-kind contributions (£6.1M), mainly of staff time and data.

The SWEEP project developed a cohort of 30 skilled Co-Investigators, Impact Fellows and Impact Associates to deliver on the project's ambition. Their skillsets ranged from natural-systems modelling, GIS mapping, data and policy analysis, socio-ecology, environmental valuation and stakeholder engagement. Seven PhD studentships were appointed, and the research teams were led by 13 Principle Investigators, all leaders in their fields of research.

A team of six Professional Service staff was assembled including Project Manager and those with skill sets in Impact Delivery and Evaluation, Communications and Finance. SWEEP's governance and management structures were designed to maximise the delivery of impact, and impactful ways of working embedded throughout SWEEP activities in a collaborative approach founded on mutual respect across the partnership.

B.2.4 Activities

Impact projects

Between 2017 and 2022, SWEEP delivered a wide-ranging programme of work based around a series of impact projects of differing scales and foci, and including the seven SWEEP-affiliated PhD studentships. In total, 57 technically discrete strands of impact work were delivered.

Projects and team sizes and durations differed ranging from a single Impact Fellow and Principal Investigator working for a few months with a single focus, to a team of over 12 Impact Fellows working with three senior academics at different times over several years and on multiple foci.

Outreach events

In addition to 'regular' in-project meetings, a total of 473 additional outreach events, workshops and focus groups were held. Compared to SWEEP's original target of holding 30 such events, this represents a near 16-fold increase on the target amount.

Communications

External communication channels were established through a regular series of SWEEP Newsletters reaching a total cumulative audience peaking at 1,426 people. The SWEEP website had over 24,564 visitors[29] and a Twitter following of nearly 600. Compared to the target of reaching an external audience of 1,500 people, this represents a more than 16-fold increase on the target.

SWEEP activities

SWEEP project teams and Impact Fellows worked with partners in a wide range of ways, delivering a variety of skillsets. **Table 2. SWEEP activity categories** highlights the most common thematic ways in which teams worked with partners. These categories were created following analysis of project activities and partner feedback given via impact evaluation interviews.

Table 2. SWEEP activity categories – ways of working

	**Collaboration & Co-creation -** Creating firm foundations for real change through joint decision-making with external practitioners.
	**Capacity Building -** Boosting organisational capacity through training, upskilling and consensus building.
	**Innovative Knowledge Exchange -** Generating new opportunities through the two-way sharing of state-of-the-art academic research findings and techniques, and industry working practices.
	**Tailored Decision Support -** Investing in time to develop bespoke tools and services that respond to need and enhance decision-support capabilities.
	**Natural Capital Valuation -** Bringing the value of environmental goods and services into the heart of organisational decision making, as a core pillar of SWEEP's Natural Capital Approach.

[29] Due to issues with the website and hosting service this data was not available beyond Oct 2021.

B.2.5 Outputs

Partner network

The initial group of 31 core partners, identified at the proposal stage, rapidly grew over SWEEP's six years. By December 2022, the total number of partners in SWEEP's network had risen to 325 organisations. The wide range of stakeholder groups, partners and individuals we worked with is illustrated in **Figure 5. Logo cloud of SWEEP partner organisations**. Compared to the proposal stage target of engaging with 80 new organisations, 294 newly-engaged partners represents a 3.5-fold increase above that target.

Two-fifths of the 325 partner organisations were from the private sector (42%), a third from the public sector (33%) and one-fifth civil society organisations (22%). Four Local Enterprise Partnerships (LEP) were additionally engaged with, including that for Cornwall and Isles of Scilly, Heart of the South West, Dorset and Yorkshire. A number of individuals not representing a particular organisation, e.g. farmers, fishers, members of the public, were also engaged with.

SWEEP Project 'Impact Summaries' and written outputs

The range and diversity of impact projects has been written up as a series of 28 accessible, public-facing Project Impact Summaries and seven SWEEP-affiliated PhD Impact Summaries (35 summaries in total). The series is set out and can be accessed via hyperlink here or in **Annex 1 - SWEEP Project Impact Summaries**. Each Impact Summary contains a high-level, succinct overview of the project's rationale, activities and outputs, and the impact and benefits delivered. They conclude by looking to the future, explaining how the work is continuing and include references to the most relevant underpinning NERC research.

Further detail on each project can be found **Annex 2 - SWEEP Project Final Reports**. These reports are more detailed documents, prepared for the SWEEP Management Board and NERC. They also include additional information, for example, about interactions between SWEEP projects teams and Lessons Learned.
An additional set of Case Studies and written resources can accessed via hyperlink here or in **Annex 3 - SWEEP case studies and other written resources.**

Details of written reports and publications produced under SWEEP can be found in **Annex 4 – SWEEP publications and reports.**

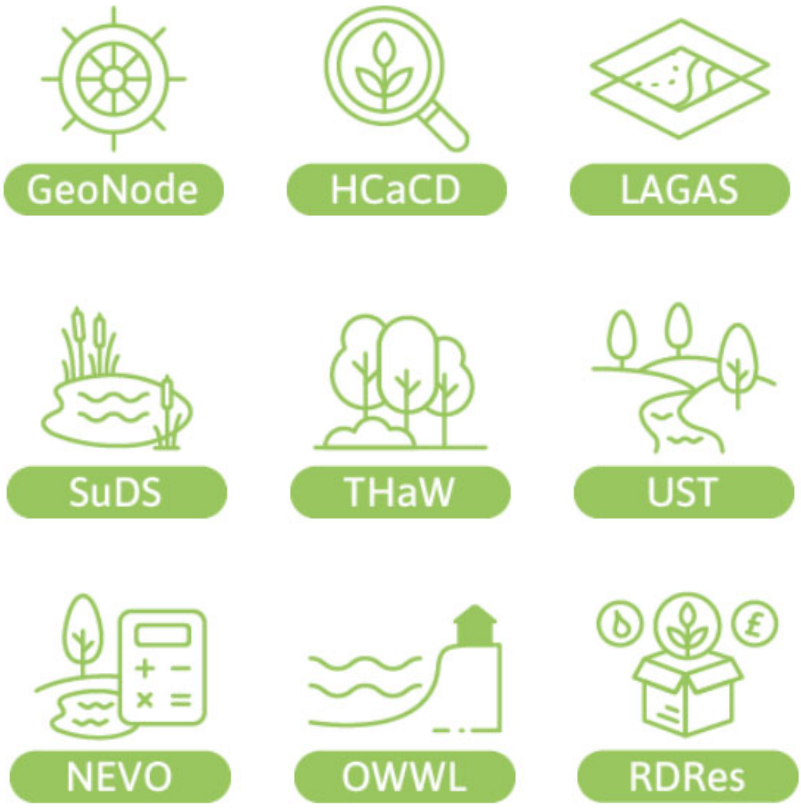
Newly created products

In total, 159 separate tools, services, products & protocols were created by SWEEP teams and designed to help meet the needs of partners. The breadth and variety of SWEEP products is set out in **Annex 5 –SWEEP products, i.e. tools, services, products & protocols** and includes a range of bespoke guidance, modelling and mapping tools. Compared to the proposal stage target of developing 24 new tools, this represents a 6.5-fold increase above that target.

A number of tools developed or extended under SWEEP projects (including Lagas, developed in collaboration with the SWEEP-linked Tevi project) are free and available to the public. **Figure 6. Public-facing SWEEP tools** shows this set of nine tools and includes hyperlinks to their home on the SWEEP legacy website - Tools.

Figure 5. Logo cloud of SWEEP partner organisations

Figure 6. Public-facing SWEEP tools



Films

Our communication and impact team generated a series of 32 SWEEP films, available at our SWEEP YouTube Channel and via the SWEEP legacy website. This series of films ranged from the showcase film played to delegates and officials at the COP26 conference in Glasgow, 2022 (SWEEP as an Exemplar of the Natural Capital Approach in the South West*)* to the film focusing on the role of SWEEP Impact Fellows *(*Putting the Natural Capital Approach into Practice*).* Films were also created to provide more detail about specific project work including a film outlining the Wildflowers Business Case: Lost Gardens of Heligan and the most recent film made in conjunction with the RNLI on SWEEP work helping to improve beach hazard safety at Crantock beach *(*Beach Hazard Forecasting in Crantock Beach, Cornwall*).* A series of presentations and training sessions, filmed at our SWEEP 2020 Expo, and a series of Health & Wellbeing project webinars are also included.

The full set of films can be viewed on the SWEEP legacy website at Films. Compared to the proposal stage target of developing 10 films, this represents a near 3-fold increase above that target.

Legacy website

A legacy website **https://sweep.ac.uk/** has been created to home SWEEP resources and reporting for the next five years to 2028. It contains key information about the SWEEP approach, impact information across our set of projects, and easy access to SWEEP's public-facing tools. It also includes an interactive map which allows users to search for SWEEP Projects by four themes: (1) Natural Systems; (2) Technology and Approaches; (3) Impacts and Benefits; and (4) Regions and Administrative Areas.

Impact Store & SWEEP impact resources

The SWEEP Impact Store was designed to primarily manage information within the SWEEP programme about project activity, impacts achieved and to store impact evidence. It was subsequently developed as a project management aid with 'live' Logic Chains helping teams to plan for impact, navigate changes, track progress and ensure teams developed common understandings of project objectives.

A number of SWEEP impact resources were also developed, particularly as mechanisms for gathering impact evidence or developing impact including:

- partner interviews pro-formas
- letters of testimony guidance
- policy and briefing note guidance
- short impact reporting templates
- SWEEP impact categories
- definitions for Key Performance Indicators and Key Success Measures

Full details of these legacy outputs can be found in **Section C – SWEEP Manual** which includes information about:

- The Natural Capital Approach
- Generating and delivering impact in environment projects
- Stakeholder engagement and management
- Impact & information management – the SWEEP Impact Store
- Evidencing and evaluating impact
- Impactful communications
- Governance and management for impact

B.2.6 Outcomes

An outcome is defined here as an intermediate stage between an activity and outputs being delivered and impact, or benefit, accruing. Outcomes can be thought of as things we can influence or the uptake of outputs, e.g. the way in which outputs have been used, adopted, adapted, applied, trialled or tested.

Business Cases, strategies and investments influenced

SWEEP activities and outputs informed or influenced 178 Business Cases, strategies and investments of a range of organisations, from large private sector business (e.g. South West Water and Wessex Water), to small business (e.g. Lost Gardens of Heligan and Sylvawood Seeds), to a range of public sector and government bodies

and civil society organisations. The total value of these Business Cases, strategies, and investments (where data was available) was £115.4M, with a further £7.8M anticipated in 2023.

As reported in the notes accompanying **Figure 4. The SWEEP journey: inputs to impact,** SWEEP activities and outputs did not exclusively bring about these partner investments, although in some cases the influence was considerable. The value of these outcomes which SWEEP has influenced or informed, to varying degrees, is reported to indicate the scale of decision-making in the South West which SWEEP has impacted.

Please also refer to **Table 1. Data sources and related confidence levels: inputs to impact** for details, and relevant sources, of the level of confidence in data reported on outcomes and impact, in terms of its completeness, availability and knowledge of level of attribution.

Leveraged funding

Leveraged projects from SWEEP were valued at £78.4M and projects affiliated to SWEEP were valued at £26.3M. Definitions of these types of funding are:

- **Leveraged funding**: where working with SWEEP has helped an organisation or others (not limited to Project Partners) secure new or additional funding.
- **Affiliated Funding:** existing or new projects or funding which has clearly defined links to SWEEP (e.g. co-branding of outputs, etc.); or where SWEEP assistance has been given or vice versa or there has been a sharing of resources.

When considering Leveraged Funding (£78.4M) in combination with Match Funding (£7.3M – see Inputs section for details) and comparing them to NERC's original SWEEP investment of £5M, the total **return on investment from SWEEP is 17 to 1 (to end December 2022).**

Training and tools

The number of people trained in the use of SWEEP tools stands at 2,464 as at December 2022. This includes in-person training, as well as viewings of training videos produced to support newly created SWEEP products. A further 2,807 people are known to use SWEEP products, being SWEEP service subscribers or registered tool users.

Effective, durable partnerships

One of SWEEP's strongest outcomes is the creation of effective, durable partnerships, which can be evidenced by the following examples:

- Influenced marine policy and implementation nationally and in North Devon

  The networks developed through SWEEP have engendered lasting relationships with key external partners, fostering a basis of credibility and trust in the academic community. SWEEP Co-Is have developed additional collaborations that take forward SWEEP methods and achievements. A key example is the £2.4m UKRI NERC funded Centre for Doctoral Training in Sustainable Management of UK Marine Resources (CDT SuMMeR).

  Led by SWEEP Co-I Prof Mel Austen, the CDT has significant levels of support from external partners (as co-supervisors, co-funders and trainers) and is training 48 PhD students over three cohorts to be the next

generation of innovative, transdisciplinary researchers, solution providers and practitioners needed to support the government and non-government sectors who must deliver sustainable management of our precious marine resources.

- Driving innovative opportunities for enhanced landscape-scale pollinator policies and practices
  Enhanced knowledge, skills and capacity through the completion of the Duchy of Cornwall Continuing Professional Development and Natural Capital Handbook.

  "*I see a strong appetite amongst farmers for SWEEP's Meadow Match to develop as a national scheme that offers expert's time to facilitate the creation of locally sourced species-rich grasslands. This is the kind of support farmers have been asking for during the DEFRA Environmental Land Management Scheme Tests and Trials and should be the key legacy of this work*". Jeremy Clitherow, Natural Capital Advisor, Duchy of Cornwall

- Whole Catchment Approach to Water Management - phases 1&2 combined
  The creation of the new Centre for Resilience in Environment, Water and Waste (CREWW) based at the University of Exeter, supported funding by South West Water (£10.5M) and Research England (£21M).

  "*The process of engaging with SWEEP strengthened our relationship with the University of Exeter. It helped shape our thinking around data handling, laboratory capacity and analysis, which ultimately led to our investment in, and the development of, the Centre for Resilience in Environment, Water and Waste (CREWW).*" David Smith, Upstream Thinking (UST) Programme Manager, South West Water.

B.2.7 Impact

Definitions

The SWEEP definition of impact is: "*an effect on, change or benefit to the economy, society, culture, public policy or services, health, the environment or quality of life, beyond academia*."

SWEEP impact includes, but is not limited to, an effect on, change or benefit to:

- activity, attitude, awareness, behaviour, capacity, opportunity, performance, policy, practice, process or understanding;
- of an audience, beneficiary, community, constituency, organisation or individuals
- primarily in the South West (for SWEEP purposes) but also could extend to any geographic location whether locally, regionally, nationally or internationally.

Impact includes the mitigation, reduction or prevention of harm, risk, cost or other negative effects.

Impact typology and timelines

SWEEP delivered a range of impact to its partner network. A series of six common impact types benefiting partners were identified from analysis of partner evaluation interviews: Attitudinal, Organisational Function, Policy & Legislation, Natural Capital, Health & Wellbeing and Economic. A seventh category developed (Human Capital) covering the benefits to the SWEEP team itself and to those benefiting from resources and learnings relating to the SWEEP Approach. These impact categories are described in **Table 3. SWEEP impact categories**.

It is important to consider the length of time impact can take to accrue. Some forms of impact can be achieved relatively quickly, depending on the circumstances and existing momentum for change. Other forms can take much longer, for example, to be delivered and even longer to measure, for example, benefits to Natural Capital, Health & Wellbeing and Economic. This point is particularly relevant to impact work in the environment sector, where benefits from tree planting, for example, may take 30 to 50 years to fully accrue and measure.

Table 3. SWEEP impact categories

Attitudinal	Changes in perception, attitude and understanding
Organisational Function	Impact types at the organisation level: - Business cases, strategies and investments influenced - Costs avoided or saved, or new income earned - Capacity/productivity improvements, e.g. training, strengthened networks - Jobs created / safeguarded
Policy & Legislation	Contributions to the development or implementation of new legislation, Local Plans, Planning Advice Notes and Regulations (i.e., entities with a legal bearing, as distinct from organisation's strategy, for example)
Natural Capital	Natural Capital benefits realised through its creation, enhancement, protection, safeguarding, or being made more resilient to change
Health & Wellbeing	Improvements to an individual's mental or physical health and wellbeing
Economic	Benefits to economy in terms of Gross Value Added, jobs created, or skills sets developed
Human capital	Reflects the positive effect on the SWEEP team's professional development from being involved with an impact-focused project, and the extended benefit to those outside of SWEEP who adopted and learned from our approaches

The SWEEP impact typology is set out in **Figure 7. SWEEP impact categories and timelines** which also explains the timeline progression and linkages between impact types, some of which can take a long time to be realised. This is especially the case with Policy & Legislation, Natural Capital, Health and Wellbeing and Economic impacts. Some gains can be achieved in the short to medium term, depending on the activity, the context within which the activity took place, and how aligned the timing was to 'moments of change', e.g. the point of decision-making or being able to capitalise on momentum for change already built up.

However, sometimes the work has to start at the beginning of the impact journey. For example, by initially seeking to change attitudes and perceptions, which then leads to organisations changing the way in which they operate and function, before the mid- to longer-term impacts can be achieved. Example of which are policy changes, and manifest benefits to nature, people and the economy.

Key findings from SWEEP impact work are:

- **Impact success depends on the timing of an activity, its context and existing momentum for change.**
- **Planning for impact is as important as capitalising on new opportunities are they arise.**

Figure 7. SWEEP impact categories and timelines

Impact attribution, measurement and evaluation

Attributing change to specific activities or outputs can be challenging. The ability to identify causal relationships between SWEEP work and products, outcomes and impact can be difficult for a number of reasons, not least identifying causal relationships where many other influences are at play. Counterfactual analysis helps isolate the influence of alternative explanations to reveal the net impact. Though, in cases where a 'next-best alternative' is available, net impact must be measured against the alternative, as compared to the status quo (CSIRO, 2015[30]). The CSIRO Impact Evaluation Guide provides a comprehensive review of approach and issues to research impact evaluation, including treatment of impact pathways, attribution, adoption and valuation (of market and non-market goods).

Reed et al (2021)[31] provides a typology of research impact evaluation designs and a methodological framework to guide evaluations of the significance and reach of impact that can be attributed to research. Five types of impact evaluation design are identified: i) experimental and statistical methods; ii) textual, oral and arts-based methods; iii) systems analysis methods; iv) indicator-based approaches; and v) evidence synthesis approaches. The guidance allows users to design an impact evaluation system "*tailored to the aims and context of the evaluation"* and choosing between designs which establish whether the research was a "*significant contributing factor amongst many"* or the *"sole, direct cause of impact".* (p1, Reed et at, 2021).

Given SWEEP's close working relationship with partners, it was decided that impact evaluation and evidence gathering would be best satisfied by the impact team carrying out a series of evaluation interviews with partners directly. This also made sense, given SWEEP's diverse range of partners and topics worked upon, as it relieved the academic project teams of the process of conducting the interviews and gathering the required information, which is a specialist role and one to which academics are not always best suited.

[30] Commonwealth Scientific and Industrial Research Organisation (CSIRO), Impact Evaluation Guide. November 2015.
[31] M.S. Reed, M. Ferré, J. Martin-Ortega, R. Blanche, R. Lawford-Rolfe, M. Dallimer, J. Holden, Evaluating impact from research: A methodological framework, Research Policy, Volume 50, Issue 4, 2021, 104147, https://doi.org/10.1016/j.respol.2020.104147

Between 2019 and 2022, therefore a series of 40 evaluation interviews were conducted with partners creating a rich web of project information, impact evidence (both quantitative and qualitative) and evaluative understanding. Questions relating to attribution, adoption and the counterfactual were asked explicitly revealing the causal relationship between SWEEP work, outcomes and impact.

These interviews often revealed new impact and opportunity which had not previously been known about. They also helped to strengthen the relationship between SWEEP project teams and partners, developing a level of feedback and dialogue which had hitherto not had a channel for outlet.

The following sections review impact across SWEEP by category and highlight a few examples under each. Full details across the entire SWEEP work programme can be found in our series of 35 Project Impact Summaries, as set out in Annex 1 and including hyperlinks to each.

Attitudinal

Attitudinal impacts were reported in every SWEEP project. The following quotes provide examples, and also reflect the journey that partners went on from experiencing attitude and perception shifts, particularly around the understanding and potential adoption of the Natural Capital Approach, to one of change in organisational strategy or policy.

- Influenced marine policy and implementation nationally and in North Devon - "*Without going on that journey with SWEEP and the decision-makers, I don't think we would have reached the point of thinking about having a Marine Natural Capital Plan*." Aisling Lannin, Marine Management Organisation.
- Accelerating Local Planning Authority ambitions to deliver Coastal Change Management Area (CCMA) work - "*The SWEEP approach was invaluable in bringing together all key stakeholders, including the Environment Agency and Natural England, to shape and move the CCMA work forward and increase our confidence in this area*." Ian Rowland, Senior Planning Policy Officer, Torridge District Council.
- Improved stakeholder knowledge and shifting attitudes of land management for pollinators - "*Visualising the impact of establishing certain habitat types via the Bee-Steward model reports brings the process of land management for pollinators to life, greatly helping discussions with our farming tenants*. Jeremy Clitherow, Natural Capital Project Adviser, Duchy of Cornwall
- Changing perceptions of benefit of nature for health and wellbeing - *"The SWEEP health and wellbeing webinars and resources offer valuable insights into the latest evidence on the benefit of nature for health and wellbeing and how to deliver and evaluate more effective interventions in this space. This is helping to enhance understanding and change perceptions amongst senior leaders during the formation of our new local authorities which should help ensure a better provision for nature-based health funding and programmes going forward".* Rupert Lloyd, Healthy Places Project Coordinator, Public Health Dorset
- Development of a unique wholescape water quality modelling application to support growth of the South West mariculture sector - *"The work could help develop thinking around shellfish sector development in other regions by providing a template that others can build on and develop further.* Keith Jeffery, Principal Aquaculture Scientist, Cefas
- Local Natural Capital Accounting – examples from Dartmoor and Exmoor National Park Authorities – "*It's really useful to see research like this from the ground. The SWEEP work will add to the body of evidence that helps to inform Defra on how to implement the recommendations of the Glover Landscapes Review, in particular integrating better nature and climate targets, and natural capital accounting, into protected*

landscape management plans." Amy Chadwick, Team Leader, Environmental Outcomes in Protected Landscapes, Defra.

"*It's widened our horizons. It's a game changer for us. The tools, and the experience of co-creating them with SWEEP, has made us think more ambitiously and innovatively about what we can do rather than continuing with how we've always done things*". Ally Kohler (Dartmoor Park, Director of Conservation and Communities)

- South West Water catchment management - "*The SWEEP team helped us look at our data in a new, and really valuable, way. We benefited from their academic perspective and best-available mapping, data analysis and processing skills… and became much better-informed about the natural environment in the South West river catchments.*" David Smith, UST Programme Manager, South West Water.
- Supporting Local Planning Authorities in making sustainable development decisions along the South West's changing coastline. "*SWEEP's work galvanised us into action, really helping Natural England to up its game and be a better advisor. It provided us with the confidence to have more informed CCMA conversations with our stakeholders across the South West, as well as on a wider, national platform - conversations that would not be possible right now without SWEEP."* Corine Dyke, Lead Advisor, Natural England

Organisational Function

Impact at the organisation level was broken down into four categories, with each being summarised in turn.

Business cases, strategies and investments influenced or informed

The number of Business cases, strategies and investments (178) influenced or informed by SWEEP work is reported on previously in the Outcomes section of this report, along with an *indication of their scale* provided by the value of those for which information is available (£115.4M). Here we provide examples to illustrate the wide variation in scale and application and timescales, along with supporting statements from partners indicating SWEEP's level of influence.

- Ben Balmford PhD - Enhancing the design of ground-breaking market-based Payments for Ecosystem Services (PES) schemes:
  Launched in 2019, the Forestry Commission's £50M Woodland Carbon Guarantee online auction scheme was the UK's first auction for carbon, and is helping to deliver on Net Zero 2030 ambitions by incentivising land-owners to plant particular types of trees which lock in carbon.

  "Ben provided invaluable insights into the design and application of reverse auctions for a new policy initiative, the Woodland Carbon Guarantee. This advice was instrumental in giving us the confidence to carry out the auction. We subsequently ran five auctions under the Guarantee, helping drive woodland creation in England, which would not have otherwise happened, by incentivising future CO_2 removals at a significantly higher carbon price than previously. The Forestry Commission considered this to be a very successful outcome and one that had also impressed HM Treasury." Pat Snowdon, Head of Economics, Scottish Forestry

- Whole Catchment Approach to Water Management - phases 1&2 combined
  Phase 1 work (2017-2019) supported SWW and their Upstream Thinking (UST) Delivery Partners in planning for the PR19 business case submission, helping South West Water (SWW) achieve coveted Fast Track Status business plan approval and £15M investment in catchment management approaches.

"*SWEEP work helped secure over £15M of new funding from Ofwat for the 2020-2025 period… It was vital in demonstrating quantitatively the benefits of catchment management to our customers and the environment. This also helped us achieve an 'exceed expectations' from Ofwat on our Water* Resources Management Plan."
Stephen Bird, Managing Director, South West Water

- One Coast project - creating a Cornish coastal corridor for nature and people
  This SWEEP project developed rich environmental and economic datasets, and a review of finance mechanisms, to support the National Trust and other key partners, in identifying delivery mechanisms for this ambition, with a potential £7.8M of investments outlined for Cornwall under the government's new Shared Prosperity Fund and other funds.

  "As we emerge from the pandemic and explore significant opportunities to deliver nature's recovery in Cornwall, and new financing models for delivery across the county, the NT team believe there will be other opportunities to share the SWEEP outcomes, for example, with the team developing the Cornwall Habitat Bank as a Natural Environment Investment Readiness Fund project." Sarah O'Brien, External Affairs Advisor, National Trust

New income earned, costs avoided or saved

Partners reported a range of financial impacts including new income generated, cost savings and costs avoided as a result of SWEEP work. It was not possible to build up a complete picture of these kind of financial impacts due to difficulties in accessing data from partners, but the following examples illustrate the range and scale where data was available.

- Driving innovative opportunities for enhanced landscape-scale pollinator policies and practices
  Gross income generated by sales of wildflower seed (from that planted following SWEEP advice) at the Lost Gardens of Heligan was estimated at approximately 18K in yr. 1, with an estimated potential gross income over 5 years of £90K, and the higher visitor footfall generating a further £3K pa in income. Sylvawood Seeds' diversification of seed products benefited from new partnership deals with the RSPB and National Trust with a 38% increase in revenue forecast.

- Tackling pollinator decline in Cornwall through enhanced natural capital management policies and practices
  Bespoke SWEEP 'Bee-steward action plans', have saved landowners money across the region through costs avoided from hedgerow management (£3,380pa), cover crop planting (£29,337pa) and the provision of £2,000 of wildflower seed. They also supported four successful Countryside Stewardship applications providing financial returns for the next five years.

- Protecting the South West through improved coastal hazard forecasting
  The development of the Operational Wave and Water Level model (OWWL) influenced an attitudinal shift at the EA around the importance of having an overtopping tool as part of their national forecasting strategy and informed a national-level strategic review of the EA's coastal forecasting strategy. This led to £20m of Defra funding being ear-marked for future, enhanced real-time coastal forecasting plans. The SWEEP OWWL model also influenced EA operational practices as South West local Environment Agency flood warning officers use the daily live OWWL wave overtopping forecast to more accurately predict coastal flooding and more effectively target resources.

  "*This improvement in resource targeting [as a result of the OWWL model] will have saved the EA thousands of pounds during each of the six largest storms over the last two winters by being able to be more targeted in our working, and reducing unnecessary trips and deployments*."Nick Ely, Environment Agency Coastal Modelling & Forecasting Manager

- Whole Catchment Approach to Water Management - phases 1&2 combined
  It is anticipated that SWW and customers will benefit from reduced water treatment costs in the long-run under their award-winning Upstream Thinking catchment management programme 3.

  "*The SWEEP work on catchment management impacts is helping us reduce operation costs and improve reliability. At Wendron water treatment works we have seen shut downs reduce from 19 to zero over a two month period… On this site alone, this is a saving in two months in the order of £50K in lost productivity*."
  Stephen Bird, Managing Director, South West Water

  SWW's PR19 submission was awarded coveted Fast Track Status business plan approval by Ofwat for innovation, and around its adoption of the SWEEP Natural Capital Approach contributed to this success. This delivered a £200M cost saving due to SWW being able to make early planning decisions and gaining access to preferential borrowing rates.

- Ben Balmford PhD - Enhancing the design of ground-breaking market-based Payments for Ecosystem Services (PES) schemes:
  Wessex Water/EnTrade's Poole Harbour Nitrate reduction auction enabled farmers to bid to plant cover crops that reduce the amount of nitrogen run-off entering rivers. Ben's PhD research findings directly informed a change in auction design, resulting in a cost saving of 30% as compared to under the previous auction rules. Moreover, removing that quantity of nitrogen through a built infrastructure/traditional approach would have cost £11.45M. An estimated 275 tonnes of nitrogen was prevented from entering Poole Harbour as a result of the re-designed auction schemes informed by Ben's research findings.

- Enabling more sustainable landscape management through the co-creation of novel remote-sensing tools
  SWEEP's co-created novel, remote sensing tools for mapping and monitoring key woodlands, moorlands, and habitats are estimated to be saving our partners at least £750k/per 5 year in costs by, for example, reducing the need for commercial mapping and ground surveys and enabling better allocation of resources to priority areas. The tools will play a key role in enabling North Devon realise approximately £40m in natural capital-related benefits and safeguarding or creating an estimated 700 jobs by 2030, through better woodland creation and management.

Capacity/productivity improvements, e.g. training, new tools, improved productivity

Many partners from all sectors reported impacts in terms of capacity and productivity improvements as a results of staff training, or access to new tools or ways of working.

- Driving innovative opportunities for enhanced landscape-scale pollinator policies and practices
  "*SWEEP's input has been a real game changer. I am now thinking more strategically about new product ideas and communicating more confidently about how my business helps boost biodiversity and deliver health and wellbeing benefits. The reputation and growth of my business has benefitted, such as from a new three year partnership with the RSPB*". Matt O'Connell, Managing Director Sylvawood Seeds."

- Enhancing access to NEVO – the Natural Environment Valuation Online Tool
  As part of a wider Defra project, an Environment Agency project sought to review the nutrient impacts from diffuse sources in freshwater catchments that drain into the Solent European Protected Sites, as well as the Itchen SAC.

"*The NEVO tool was instrumental in helping our consultants (Wood Group UK Ltd) demonstrate the costs and values of the broader benefits associated with land use change (e.g. conversion of grassland to woodland), whilst also taking forecast future trends in farming practices and yields into account, with the principle aim being to reduce excessive nutrient inputs into the water environment.*

One of the key challenges we have with enabling improvements to the environment is justifying values. For decision makers, fiscal value is an essential component, both in practical and strategic terms." Jonathan Garland, Senior Environmental Planner, Environment Agency

- Enabling more sustainable landscape management through the co-creation of novel remote-sensing tools
  SWEEP's co-created novel, remote sensing tools for mapping and monitoring key woodlands, moorlands, and habitats are helping to enhance the South West's natural landscapes. These tools are already supporting quicker, less costly and more effective decision-making by providing land managers with bespoke, accurate and repeatable landscape-scale habitat data, benefitting a wide range of work including nature recovery, Biodiversity New Gain, natural flood management, Defra's Environmental Land Management Schemes, carbon storage interventions, woodland protection, restoration and creation.

Jobs created / safeguarded

In total SWEEP created or safeguarded 61 FTE jobs. This figure reflects job creation and safeguarding through SWEEP itself or information given to us by our partners directly.

Note: Regional economic accounts modelling was undertaken to support SWEEP's evaluation of impact delivered. This indicates the level of Gross Value Added and employment supported by SWEEP's leveraged funding. This work is reported in the section on ***Economic impacts*** *and full details are available in* ***Annex 6****. The information presented here in* ***Jobs created / safeguarded*** *compliments this more detailed modelling which provides a more robust and broader analysis of employment impacts.*

The SWEEP project itself has led to the creation of 9 FTE PhD studentships and employed staff in 21 FTE SWEEP positions, as Impact Fellows and Professional Service staff.

SWEEP work with partners directly led to the creation of 13 Full Time Equivalent (FTE) jobs being additionally created, with a further 18 FTE jobs being safeguarded, amongst partner and project-related organisations. It is anticipated that a further 230 FTE jobs will be created from 2023, and 460 FTE safeguarded, as part of the Woodlands back into Management scheme at the North Devon Biosphere Reserve.

- Sustainable Drainage Solutions (SuDS): Developing 'landscape-scale' approaches in the South West
  "*Working with SWEEP made a significant contribution to the skills development, technical capabilities and confidence of three of our early career technical specialists. We mustn't forget to put a value on that, not only to WRT, but also to their individual careers and where they end up professionally*." Nick Paling (Westcountry Rivers Trust, Director of Evidence and Impact)

- Enhancing seafood labelling schemes that support sustainable fishing practices

SWEEP's research strengthened Cornwall Wildlife Trust's 'Cornwall Good Seafood Guide', which provides new opportunities for local fishermen in Cornwall and contributes to its vision of a more sustainable marine environment.

"*The report was invaluable in helping us get the project accepted as a core piece of work within the Trust. It enabled us to go down that route of employing someone to take on a one-on-one advisory role. We're focussing on one area for now, as a kind of trial, but hopefully will roll out to a wider area over time*." Cornwall Wildlife Trust

- Whole Catchment Approach to Water Management - phases 1&2 combined
  Approximately 15 FTE jobs in South West Water's Upstream Thinking (UST) programme were safeguarded during 2020-2025 through their £15M investment in catchment management supported by SWEEP and embedding of the Natural Capital Approach into their business plan.

  "*The UST programme and Farming Advisory Service is delivered by around 40 people in different organisations… The SWEEP work helped us deliver more environmental improvements through natural solutions, supporting jobs within the environmental sector and water industry*." David Smith, UST Programme Manager, South West Water

- Protecting the South Wales coastline - extending the impact of OWWL
  SWEEP work enabled the Welsh Coastal Monitoring Centre (WCMC) to better support coastal authorities with more localised, accurate forecasting data, leading to more effective coastal management decisions that enhance coastal safety, and reduce damage, disruption, and costs. This contributed to the WCMC successfully leveraging £300k over 5-years to extend its work, supporting 2 FTE jobs and employment contracts for more than 5 survey companies per year.

  The collaboration with SWEEP and the extension of the OWWL model to South Wales was invaluable in helping WCMC showcase what the centre could do in terms of delivering added value around coastal flooding management data. We're delighted that this has contributed to funding success with our next five year phase'. Gwyn Nelson, Programme Manager WCMC.

- Supporting Local Planning Authorities in making sustainable development decisions along the South West's changing coastline
  "*SWEEP work allowed us to successfully make a case to include CCMAs in our Devon, Cornwall and Isles of Scilly team plan. On the back of this, we are currently recruiting a new lead advisor for our coastal work, including CCMAs.*" Corine Dyke, Lead Advisor, Natural England

Policy & Legislation

SWEEP work contributed evidence in support of the implementation of 38 policies, pieces of legislation or regulations, with a legal underpinning, and also helped delivered new laws. Examples include:

- Influenced marine policy and implementation nationally and in North Devon –
  SWEEP has influenced more than 17 governance policies and programmes across a range of local-level plans to national policies. For example, by playing a fundamental role in the delivery of the North Devon Marine Pioneer (NDMP), SWEEP scientists underpinned the final Marine Pioneer recommendations report. Led by the Marine Management Organisation (MMO) the report informed the 25-year Environment Plan and is expected to significantly influence the use and implementation of NC approaches by government agencies such as DEFRA, Natural England and the Environment Agency.

The SWEEP Asset and Risk Register has been described in government guidance as the 'key foundation of the evidence base' when adopting a NC approach to management (Defra et al., 2019). Key characteristics of the SWEEP approach, such as the need to take a holistic approach to marine management, have been recognised in the 'Nature Recovery Green Paper: Protected Sites and Species'.

"*SWEEP outputs were the fundamental basis upon which all of the rest of the work was done in the (North Devon) Marine Pioneer. It would have been next to impossible to do a lot of the other work without that basis"*. Aisling Lannin, Head of Evidence and Marine Pioneer Programme Lead, MMO

The SWEEP team also evaluated how 'Net Gain', previously only considered for developments on land, can be applied to the marine environment and provided strategic advice directly to MMO and Defra. SWEEP research was referenced in a Defra consultation document on the Principles of Marine Net Gain, the responses to which will help inform more detailed policy development. The consultation was also informed by the Natural Capital Committee and SWEEP academic Prof. Mel Austen, the only marine expert on the NCC panel.

"*We want to develop a big case study on the application of natural capital approach and if we decide to look at offshore wind as a potential area, we would hope to build on the work done by (the SWEEP Team)*". Sofia Stoyanova, Defra at time of comment – Oct 2021

- (Roger Auster PhD) Renewed Coexistence: Human dimensions of reintroducing the Eurasian beaver (Castor fiber) into England

  The social research was an integral part of the final The River Otter Beaver Trial Science and Evidence Report to Defra, which led to a land-mark Government decision - to allow England's first wild breeding population of beavers for 400 years to be given the permanent right to remain in and spread naturally from their East Devon river home.

  Peter Burgess, Director of Conservation at Devon Wildlife Trust described this decision as: *"the most ground-breaking government decision for England's wildlife for a generation*".

- Strengthening nature-based decision-making capacity in Cornwall

  13 major regional policies and strategies were informed by SWEEP-produced landcover and ecosystem service provision maps, accessible through the new 'Lagas', the new SWEEP-Tevi designed natural capital intelligence platform. This information is shaping a raft of Cornwall Council's statutory development plans & strategies including:

  - Environmental Growth Strategy (2020-2065) – adopted alongside Cornwall's LNP, providing a long-term framework to conserve and grow nature.
  - Biodiversity Net Gain (BNG) Planning Tool – helping to locate delivery of c.£6.5BN of 2010-2030 Local Plan housing need and biodiversity offsets.
  - Cornwall Nature Recovery Network maps – providing a spatial prioritisation for nature and opportunities for habitat (re)creation.
  - Climate Change Action Plan - adopted following Cornwall's Climate Emergency declaration in 2019.

  "(SWEEP-Tevi designed) *Lagas is absolutely fundamental to delivering on the ground-breaking Environmental Growth Strategy for Cornwall. For the first time, (we can) adopt a very ambitious, genuine, spatial allocation for nature within the planning system. The work involved in delivering this environmental Intelligence platform will positively impact nature protection and regeneration and will encourage environmental growth for years to come*." Philippa Hoskin, Cornwall Council

Natural Capital

SWEEP work has led to the creation of a number of natural capital impacts, even in the relatively short time frame from 2017-2022. It is confidently expected that there will be a significant additional amount of natural capital creation and protection delivered in the future, as the strategic decisions, policies and legislation play out.

To date, SWEEP activity has directly contributed to:

- Underpinned legal protection of 304km^2 of seabed to restore kelp forest, now being protected from near-shore trawling under new legislation
  "*Information compiled in the* (North Devon Marine Pioneer) *Assets and Risk Register provided useful guidance on how we can assess conditions, ecosystem services etc. We were able to lift and adapt this for our area to inform the evidence-base to underpin the rational for the management. This is a fundamental change to a more holistic fisheries management approach*". Erin Laws, Sussex Inshore Fisheries Conservation Authority

- Supporting Local Planning Authorities in making sustainable development decisions along the South West's changing coastline
  "*SWEEP work allowed us to successfully make a case to include CCMAs in our Devon, Cornwall and Isles of Scilly team plan. On the back of this, we are currently recruiting a new lead advisor for our coastal work, including CCMAs.*" Corine Dyke, Lead Advisor, Natural England

- Supporting Local Planning Authorities in making sustainable development decisions along the South West's changing coastline
  115km of north and south Devon coastline is being better supported under planning in event of coastal erosion under climate change under this project working with local government to develop Coastal Change Management Areas.

- Ben Balmford PhD - Enhancing the design of ground-breaking market-based Payments for Ecosystem Services (PES) schemes:
  Wessex Water/EnTrade's Poole Harbour Nitrate reduction auction enabled farmers to bid to plant cover crops that reduce the amount of nitrogen run-off entering rivers. An estimated 275 tonnes of nitrogen was prevented from entering Poole Harbour as a result of the re-designed auction schemes informed by Ben's research findings.

  Furthermore, Ben's research findings, shaping the design of the Forestry Commission's Woodland Carbon Guarantee scheme, helped to move the carbon market price in the direction of the government's current estimated values per tonne of carbon required to meet climate change targets, and led to an expected net reduction in carbon of 0.6M tonnes, offering a cost saving to the public purse for carbon bought of £6.2M.

- Driving innovative opportunities for enhanced landscape-scale pollinator policies and practices
  Innovative approaches to wildflower meadow creation have led to the creation of more than 215 acres (87 rugby pitches), with a further potential 38 acres from seed sold, enhancing ecosystem services such as pollination and carbon sequestration. The novel Meadow Match scheme has 18 'donor' and 23 'receptor' sites.

  "*We now have over 40 hectares of new species-rich wildflower meadow restoration in progress on Duchy of Cornwall land. This is a significant area and, along with our Plantlife partners, SWEEP was instrumental in making this happen*". Jermey Clitherow, Natural Capital Advisor, Duchy of Cornwall

Economic

SWEEP work has contributed to the South West's economy through boosting business and embedding Natural Capital Approaches into policy and its implementation, throughout SWEEP's range of impact projects.

An example of SWEEP's impact on the regional economy comes from the work of the SWEEP marine team in North Devon:

- Underpinning regional economic development plans in North Devon for the marine and aquaculture economy

  SWEEP co-produced the world's first Marine Natural Capital Plan, for North Devon. This work underpinned £1.37M of new investment into North Devon through the Government's Community Renewal Fund (CRF), the largest green economy award allocated nationally. The opportunities for sustainable growth in the maritime sector under the CRF, as calculated by SWEEP researchers, offer the potential for significant job creation with a long-term ambition to create 1,000 new jobs and an investment potential of more than £30M in private funding.

  SWEEP researchers directly contributed to the bid and played a key role in delivering the Blue Biosphere element of the project relating to investments in blue carbon habitats and opportunities to recover, restore or create blue carbon habitats. This approach provides a model which can be replicated in other coastal communities around the UK. The long-term legacy of the SWEEP work will be significant investment in new sustainable industries, new jobs and skills development for local people. It will redirect private investment into the area, while contributing to mitigation measures to address the climate and ecological emergency.

  The CRF also led to a new project with Siemens to launch and globally scale the critical market infrastructure for nature-based solutions to address climate change. The Biosphere Reserve will benefit from technology licenses, Siemens development and management input, and global marketing support to assist in scaling and roll out.

  In addition, a £15m bid has been submitted to the Levelling Up fund for a maritime research hub at Appledore dockyards in North Devon as a direct result of the CRF work. It is focused on: (i) clean propulsion; (ii) marine environmental intelligence, and (iii) aquaculture in the Middle Dock area. The work on marine environmental intelligence and aquaculture will build on SWEEP work. This bid was successfully funded in Jan 2023. https://www.torridge.gov.uk/article/21311/Success-for-Global-innovation-project-in-the-heart-of-Appledore-with-award-of-15-6-million-in-Government-Funding

  Related SWEEP work also enabled the identification of a 25km^2 aquaculture investment zone that could support seaweed, scallop and mussel farming, generating a potential £280M each year in the South West and creating 4,025 new jobs for the harvesting of 280,000 wet tonnes of seaweed.

  "A lot of the work done in the Community Renewal Fund built on SWEEP outputs, such as the Geonode. The Marine Pioneer provided a first critical step in delivering Natural Capital approaches, by providing a cogent and cohesive knowledge base for the Biosphere Reserve to build on. In the long term we're expecting to generate a ~£12.5 million private investment fund for marine projects. We are hoping to secure a further £15 million for investment into middle dock from the Levelling Up fund. Hence the long-term impact of the Community Renewal Fund will be significant investment and innovation." Andy Bell, UNESCO World 'North Devon' Biosphere Reserve Co-ordinator

An estimate of the wider regional economic impact of SWEEP's 'drawn-in' funding to 2028 was commissioned. The approach utilised a regional economic impact model to specify 'what if' scenarios to evaluate the impact of 'drawn-in' funding on employment and Gross Value Added.

It is important to note that this analysis does not reflect the wider impact (economic, environmental, social) impact of the SWEEP activities themselves. Full details of the modelling approach, assumptions and findings can be found in **Annex 6. Estimating the wider regional economic impacts of SWEEP's drawn-in funding**.

As noted before, SWEEP activity directly leveraged an estimated £78.4M of new funding. Additionally, SWEEP activities and outputs informed or influenced 178 Business Cases, strategies and investments of a range of organisations. The total value of these investments influenced to date was £115.4M.

The impact of SWEEP's Match funding, Leveraged funding and a portion of Investments influenced, with the strongest associations to SWEEP work, were modelled to 2028.

Matched funding:
Based on the scale of matched funding cash contributions (£1.2M) captured by the SWEEP impact team, it was estimated that this may have supported a further c7.5 FTE jobs in the wider regional economy over the period to 2024 – equivalent to c£0.8m GVA.

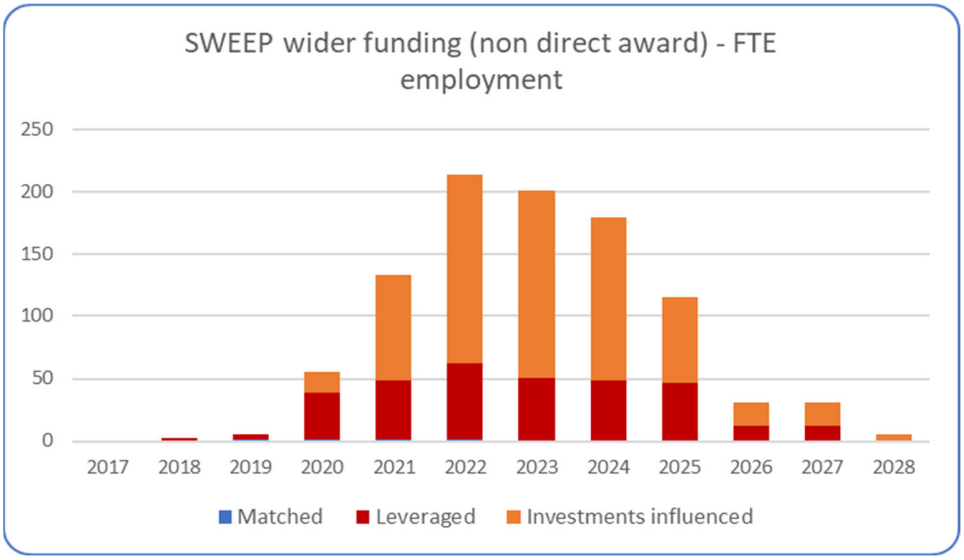
Leveraged funding:
Based on the scale of leveraged funding captured by the SWEEP impact team it is estimated that this may have supported c320 FTE jobs in the wider economy (beyond those jobs directly supported through the SWEEP funding) over the period to 2027 – equivalent to c£34.4m GVA.

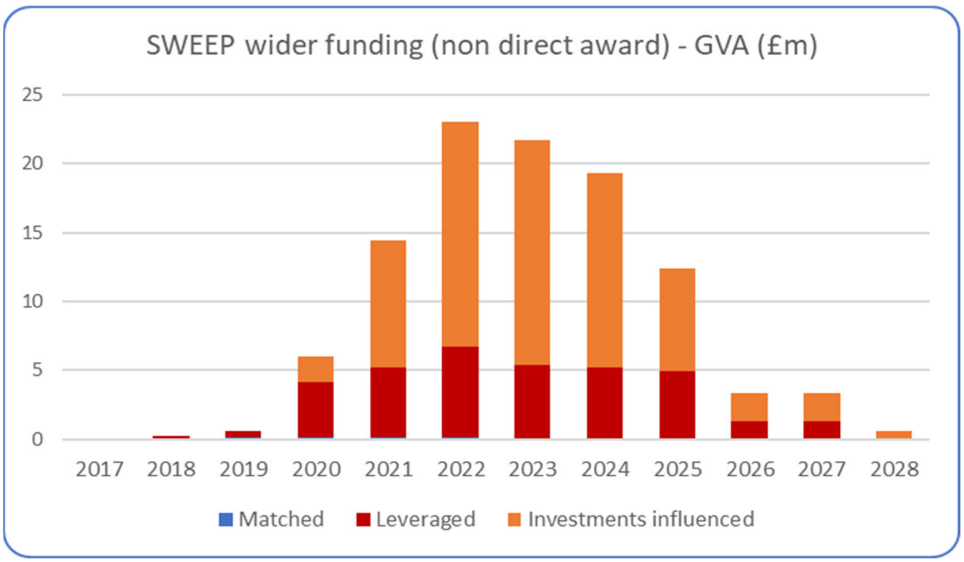
Investments influenced:
Based on the scale of that portion of investments influenced, with the strongest association to SWEEP activities, captured by the SWEEP impact team it is estimated that this may have supported c649 FTE jobs in the wider economy (beyond those jobs directly supported through the SWEEP funding) over the period to 2027 – equivalent to c£69.8m GVA."

Combined impacts:

The combined impacts of the associated investment/funding are set out below – showing the profile of estimated impacts. The charts show a build-up of impacts to a peak in 2022, supporting c214 FTE jobs and c£23.0m GVA in that year – although this largely reflects the potentially significant impact of investments influenced. By 2028 this wider drawn in funding may have supported a c£105m GVA, with a good proportion occurring within the SWEEP programme area. It is important to highlight/reiterate that this encompasses both direct, indirect and induced impacts. When considered on a direct impact only this would be equivalent c£82m GVA.

The charts below highlight the important role of leveraged and wider investments influenced in supporting ongoing impact beyond the project delivery period.





Health & Wellbeing

SWEEP has delivered Health and Wellbeing impacts in a variety of ways including the following:

- Strengthening investments in nature for human health and wellbeing in the South West and beyond
  SWEEP delivered innovative resources and approaches which strengthened a large network of cross-sectoral partnerships in the South West and influenced more robust and equitable investments in nature, and policy and practice, for health outcomes. More than seven business cases and interventions were influenced, five jobs secured, £2.43M in funding influenced and increased profits for business delivered. Regional and national policy

and strategies were strengthened with SWEEP-evidence including Cornwall Council's 2023-2028 Social Prescribing Strategy, Dorset LEP's strategic policy development, and the Wildfowl and Wetland Trust's contribution to Somerset's new 6,140 hectare 'super' National Nature Reserve. Health and wellbeing benefits for local populations and visitors will be generated through engagement with the nature-based health interventions delivered across an area of 1402 square miles.

"One of the key benefits of SWEEP's work has been to keep the latest evidence and ideas at the forefront of our thinking. This is improving conversations, both on the ground and at senior level, fostering greater understanding about how best to bring together the many different, often fragmented, strands of work, and stakeholders, to deliver more effectively". Rupert Lloyd, Healthy Places Project Coordinator, Public Health Dorset

- Driving innovative opportunities for enhanced landscape-scale pollinator policies and practices
  This project pioneered new research-based tools and services to tackle the decline of pollinators delivering a legacy of impact around policy, landscape-scale management, new business opportunities and environmental leadership. Over 250 acres of wildflower meadow were created or restored delivering a potential £209K per annum economic value from pollinator services.

- Saving lives through enhanced hazard forecasting and public messaging at Crantock beach
  Working closely with the RNLI, Crantock Steering Group and wider community groups, the SWEEP team delivered daily hydrodynamic and peak bathing hazard forecasts for Crantock Beach. This lead to the development of new innovative digital public-facing beach hazard warning signage being installed in Crantock's car park.

  SWEEP's work at Crantock contributed to the fast-tracking (delivered in 6 months, following 5 years of discussion) of this ground-breaking intervention delivering public-facing, digital beach hazard messaging for safer use of the sea. The establishment of the Surf School and Crantock Surf Club WhatsApp Group contributed to 31 'out of hours' rescues and assists, and 91 'out of hours' advisories during the Crantock 2021 season.

  "*The SWEEP forecasting outputs have provided us with an exciting new opportunity to deliver public-facing digital beach hazard messaging at Crantock, particularly when lifeguards aren't on duty. This has been ground-breaking work and as far as we know, a world first*." Steve Instance, RNLI SW Water Safety Lead

Human Capital

Information about SWEEP's Human Capital impact is included in **Section B.4. SWEEP Human Capital impacts**

Figure 8. Illustration of the SWEEP footprint in the South West (Source: Illustrative Science)

B.3 Impact by Theme

SWEEP's significant impact can be considered thematically. This helps to show the value-added from the way in which SWEEP work themes have developed over the six years and the web of interconnections between projects. In addition to impact themes, key lens used to explore SWEEP's connectivity are: Wholescapes and whole systems thinking, Co-created tools, resources and techniques and Place-based economic development.

The searchable map on the SWEEP legacy website can be accessed here and its filters allows users to narrow down their field of enquiry based on one of more of these themes represented as: (1) Natural Systems; (2) Technology and Approaches; (3) Impacts and Benefits; and (4) Regions and Administrative Areas.

B.3.1 Wholescapes and whole systems thinking

SWEEP adopted a **Wholescape and Whole systems thinking** throughout its programme of work to transform a culture of decision-making that has too often focused on improving one economic sector, only to result in unintended negative consequences for others. This approach was adopted across the evolution of SWEEP's projects and across all the natural capital sectors and landscapes in which we worked.

The following examples illustrate the inter-connections between our SWEEP projects and their work strands in terms of wholescapes and whole systems thinking. This way of working has helped SWEEP to embed the Natural Capital Approach more widely, strengthen existing partnerships and develop new ones, boost impact, and create the momentum and move towards the positive tipping points needed to deliver real change.

For example, in the context of developing the mariculture sector, the wholescape approach addresses linkages between freshwater waters, estuarine and coastal waters in terms of their water quality status, the key pressures they face both locally and from up-stream, and the impacts that arise from these pressures. To date knowledge concerning these linkages has been limited by a lack of integrated assessments across the land-sea interface.[32] A wholescape approach for joining up decision-making on land and at sea is now laid out in Marine Planning Policy and Integrated Coastal Zone Management, addressing the importance of land-sea interactions.[33]

The full set of SWEEP's projects are included in **Table 4. SWEEP projects by wholescapes theme** and, in this example of cross-thematic working, are shown in relation to one of six whole system themes: Catchment management, Developing the mariculture sector, Valuing the marine environment, Coastal zones and wetlands, Managing terrestrial landscapes and Connecting people with nature.

[32] HM Government (2018). South Inshore and South Offshore Marine Plan July 2018. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/726867/South_Marine_Plan_2018.pdf

[33] https://catchmentbasedapproach.org/learn/wamm/

Table 4. SWEEP projects by wholescapes theme

Catchment management	Developing the mariculture sector
➢ Developing an integrated 'whole-catchment' approach to water management – building evidence to support investment ➢ Developing an integrated 'whole-catchment' approach to water management – mechanisms for monitoring and evaluation ➢ Sustainable Drainage Solutions (SuDS): Developing 'landscape-scale' approaches in the South West ➢ Supporting the sustainable expansion of aquaculture in the South West: Future land use scenarios affecting water quality ➢ Transforming leak detection capabilities using landscape modelling and drone thermal imaging ➢ Ben Balmford PhD - Enhancing the design of ground-breaking market-based Payments for Ecosystem Services (PES) schemes ➢ Roger Auster PhD - Renewed Coexistence: Human dimensions of reintroducing the Eurasian beaver (Castor fiber) into England ➢ Cara Patel PhD - Antimicrobial Resistance Research: An interdisciplinary approach to studying the impact of pollution on antimicrobial resistance (AMR) at the river catchment scale	➢ Supporting the sustainable expansion of aquaculture in the South West - Water quality modelling from source to sea - Establishing stakeholder perspectives on importance of WQ to sustainable mariculture - Positive Tipping Points Framework for mariculture sector - One Health lens - Offshore faecal pollution investigation - Marine Protected Areas & mariculture development ➢ Pioneering marine Natural Capital Approaches to enable a new way of considering, valuing and managing the marine environment in the South West and beyond - North Devon aquaculture investment zone ➢ Sophie Corrigan PhD - Maximising environmental benefits of South West seaweed farming potential

Valuing the marine environment	Coastal zones and wetlands
➢ Integrating Natural Capital Approaches into marine management and beyond - Marine Natural Capital Asset & Risk Register - Integrating NC values into Sustainability Appraisals ➢ Enhancing seafood labelling schemes that support sustainable fishing practices ➢ Pioneering marine Natural Capital Approaches - new ways of considering, valuing and managing the marine environment, e.g. - Developing marine governance policy and practices at South West, other local and national levels. - Underpinning regional economic development plans in North Devon for aquaculture and the marine economy. - Increasing marine and coastal environmental resilience in North Devon, Isles of Scilly, other parts of UK and its overseas territories ➢ Exploring economic and natural-process perspectives on managed saltmarsh realignment - in the North Devon Biosphere Reserve ➢ Strengthening the climate change science behind marine planning to deliver economic, social, and environmental benefits to the South West	• Protecting the South West through improved hazard forecasting (OWWL model) • Boosting businesses and protecting the coast through improved bespoke, localised forecasting (OWWL model) • Protecting the South Wales coastline • Strengthening business decision making in Lyme Bay, Devon • Strengthening the wave energy sector - Bombora Wave Energy, Pembrokeshire, Wales • Enhancing South African coastal management and beach safety through improved hazard forecasting • Coastal Change Management Areas (CCMAs) - Strengthening sustainable development decisions for SW coastline • Enhancing beach safety, coastal biodiversity and management, through the application of cutting-edge science. • Tackling the climate crisis by scientifically-underpinning seagrass restoration in the Isles of Scilly • Australia - Protecting the Australian coastline via a coastal erosion Early Warning System • Saving lives through enhanced hazard forecasting and public messaging at Crantock Beach • Josie Alice Kirby PhD - Application of CCMAs for in SW England

Managing terrestrial landscapes	Connecting people with nature
➢ Local Natural Capital Accounting - Dartmoor & Exmoor National Park Authorities ➢ North Devon Biosphere Landscape Pioneer – farming futures ➢ Developing tools and information to support the delivery of Cornwall Council's 'Environmental Growth Strategy' and boosting the region's Circular Economy ➢ Tackling pollinator decline in Cornwall through enhanced natural capital management policies and practices ➢ Enhancing access to NEVO – the Natural Environment Valuation Online Tool ➢ Driving innovative opportunities for enhanced landscape-scale pollinator policies and practices ➢ Enabling sustainable landscape management through novel remote-sensing tools for mapping woodlands, moorlands and key habitats ➢ Exploring public preferences around the implementation of Biodiversity Net Gain & Environmental Net Gain ➢ (Ben Balmford PhD) Developing PES schemes: Woodland Carbon Guarantee Scheme ➢ (Matt Holden PhD) Can productive agriculture also enhance soil, water and pollinator natural capital?	➢ Enabling Dartmoor National Park Authority to prepare for future population growth and the increasing impacts of recreation ➢ One Coast project - creating a Cornish coastal corridor for nature and people ➢ Driving innovative opportunities for enhanced landscape-scale pollinator policies and practices • Sylvawood Seeds Impact Case Study. Boosting local business in the South West, that enhances biodiversity and delivers health and wellbeing benefits. • Wildlfowl and Wetland Trust (WWT) Impact Case Study. Enabling a more robust and evidence-based approach to the economic assessment of health and wellbeing benefits being delivered from WWT's wetland sites and programmes. ➢ Saving lives through enhanced hazard forecasting and public messaging at Crantock beach ➢ (Hannah's Forbes PhD) Investigating the health and wellbeing benefits of blue prescribing

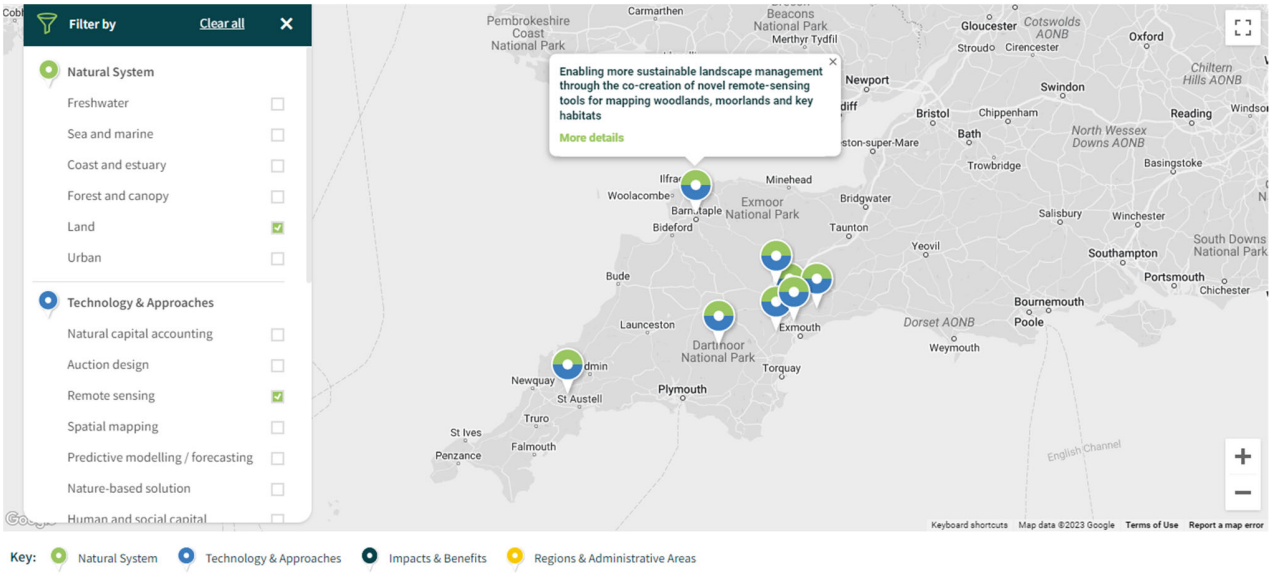
B.3.2 Co-created tools, resources and techniques

Another lens through which to view SWEEP's projects and activity is that of the technologies and approaches used. The SWEEP searchable map here allows for Impact Projects to be searched according to the following Technologies and Approaches categories:

- Natural capital accounting
- Auction design
- Remote sensing
- Spatial mapping
- Predictive modelling / forecasting
- Nature-based solutions
- Human and social capital

For example, a search by the Natural System filter *Land* and by Technology & Approaches filter *Remote sensing* provides the following map and highlights these projects:

- ❖ Enabling more sustainable landscape management through the co-creation of novel remote-sensing tools for mapping woodlands, moorlands and key habitats
- ❖ Strengthening nature-based decision-making capacity in Cornwall
- ❖ Transforming leak detection capabilities using landscape modelling and drone thermal imaging



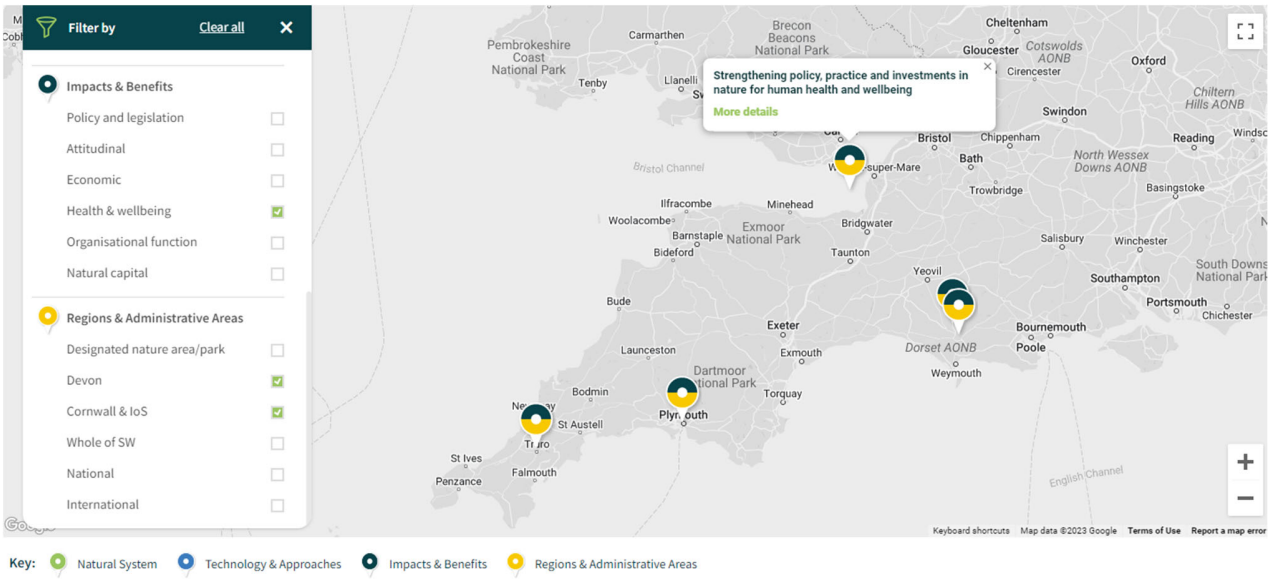
B.3.3 Place-based economic development

A further way to view SWEEP's projects and activity is based on the following Regions & Administrative Areas:

- Designated nature area/park
- Devon
- Cornwall & Isles of Scilly
- Whole of SW
- National
- International
-

For example, a search by the Impact and Benefits filter *Health and Wellbeing* and by Regional and Administrative Areas *Devon* and *Cornwall and Isles of Scilly* provides the following map and highlights activity in five sperate locations for two projects, namely:

- Strengthening policy, practice and investments in nature for human health and wellbeing
- Driving innovative opportunities for enhanced landscape-scale pollinator policies and practices



In addition to delivering benefits in the South West region, SWEEP tools and methodologies are also delivering benefits nationally and internationally, with examples being:

- SWEEP's OWWL wave forecast model has provided the University of New South Wales with best practice insight. Their researchers are working with the Australian Bureau of Meteorology to develop a novel coastal erosion Early Warning System for the entire coastline of Australia. Australia - Protecting the Australian coastline via a coastal erosion Early Warning System
- Working with the South African Weather Service, SWEEP created a version of OWWL for the Cape Town coastline to better predict hazardous storm events. The SWEEP team also delivered a pilot rip current forecast system, which will be used to generate public-facing warnings to increase beach safety. Enhancing South African coastal management and beach safety through improved hazard forecasting
- Sustainable Drainage Systems (SuDS) tools were used in flood risk assessments and landscape management analyses in Yorkshire, the USA and Australia. In Melbourne, SWEEP's SuDS screening tool identified decentralised rainwater capture as the best strategy for limiting the impact of extreme intensity rainfall events. Sustainable Drainage Solutions (SuDS): Developing 'landscape-scale' approaches in the South West
- NEVO is being used by 1,460 people from a wide range of UK organisations; including local councils, national parks and commercial consultancies to investigate the effect of potential land-use change on carbon sequestration, water quality and biodiversity. Enhancing access to NEVO – the Natural Environment Valuation Online Tool
- SWEEP researchers contributed to a Natural Capital Assessment for the Ascension Islands, which informed the designation of a new Marine Protected Area. They also embedded SWEEP methods in a process to raise awareness among coastal communities in Indonesia, Vietnam, Malaysia and the Philippines of the value of their natural capital. Within the UK, SWEEP informed the understanding of marine Natural Capital in Sussex, Tyneside and Yorkshire. Pioneering marine Natural Capital Approaches - new ways of considering, valuing and managing the marine environment

B.4 SWEEP 'Human Capital' impacts

The real-world benefits developing from SWEEP are impressive and accelerating rapidly across a broad range of partners and sectors. The scale of SWEEP's impact would not have been possible without innovative approaches adopted and the human and social capital built up over the project's lifetime. This was recognised in the University of Exeter's Knowledge Exchange Awards 2022, where SWEEP won Knowledge Exchange Team of the Year (see photo below and video here: https://youtu.be/YFdeDg8_UKU).

Internally, within the SWEEP core partners, UoE, UoP and PML, SWEEP has improved the impact culture, and delivered significant benefits to human capital, including:

- Progression for staff - 15 Impact Fellows and other staff and students have secured further employment and/or been promoted, both in academic and industry, examples include:
  - Roger Auster and Ben Balmford completed their PhDs under SWEEP, and are now post-doctoral Research Assistant and Research Fellow at UoE, respectively.
  - Dr Michela Faccioli is now Senior Researcher and Lecturer, University of Trentino, Italy.
  - Dr Tara Hooper was an Impact Fellow on SWEEP and is now a senior Marine Natural Capital specialist at Natural England.
  - Jen Lockett, part of the SWEEP Impact Facilitation Team, has been promoted to Head of Integrated Research, Impact & Support Services at PML.
  - Dr Sian Rees received a promotion during her work in SWEEP, and is now an Associate Professor at UoP.
  - Dr Dawn Scott, SWEEP Programme Manager, is now Senior Impact Partnership Development Manager, UoE.
  - Dr Diana Tingley, SWEEP Impact Development and Evaluation Manager, is now Project Manager and Business Fellow, UoE.
  - Dr. James Webber was an Impact Fellow on SWEEP, and has now secured a lecture position at UoP.
  - Dr Sara Zonnevald is now Senior Consultant in Ornithology at GoBe Consultants, Exeter.

- Unlocking 9 new PhD studentships
- Leveraged funding for a Centre for Doctoral Training in Sustainable Management of UK Marine Resources CDT SuMMeR) led by Prof. Mel Austen, influencing the next generation of scientists and practitioners (see here for more info).
- Internal training for impact fellows, on topics such as impact evaluation, how to write a policy brief, and innovation and entrepreneurship
- 6 REF 2021 Impact Case studies as set out in the table below:

Ref Impact Case Study Title	SWEEP staff involved	REF Unit of Assessment
Shaping UK environment and agriculture policy and embedding environmental valuation within H.M. Treasury guidance	Ian Bateman, Brett Day, Amy Binner	16 – Economics (UoE)
Embedding the 'Natural Capital Approach' into public and private sector decision-making and investment	Brett Day, Ian Bateman, Amy Binner	16 – Economics (UoE)
Upstream Thinking to improve water resilience	Richard Brazier, Karen Anderson, Dave Luscombe, Naomi Gatis, Donna Carless, Ben Jackson	14 – Geography and Environmental Studies (UoE)
Building Coastal Resilience	Tim Poate, Gerd Masselink, Christopher Stokes	7 – Earth Systems and Environmental Sciences (UoP)
New tools improving policy and practice to deliver pollinator resilience, through informed land management and risk management.	Juliet Osborne, Grace Twiston-Davies	5 – Biological Sciences (UoE)
Valuing marine ecosystem benefits to inform policy and management approaches and provide evidence for the designation of protected areas	Mel Austen, Tara Hooper	7 – Earth Systems and Environmental Sciences (PML)

The work of the SWEEP team directly addresses the environmental and climate crises, the need for post-pandemic clean recovery, and the Levelling Up agenda. SWEEP is enabling a more resilient and enhanced natural environment, producing gains for business, government and society. Ultimately though, the biggest impact from SWEEP is the extent of the human and social capital it has built.

The financial impact of SWEEP is remarkable, but it is important to note that the development of SWEEP systems and processes underpin this success. The approaches adopted, and the skills developed by the SWEEP team (including our partners) have greatly contributed to the programme's success and have been key to delivering real-world change.

Below are a some illustrative of quotes focusing on the benefits of SWEEP's human capital

- *Having a dedicated Impact Officer has been a crucial part of the success of our project. Having them involved effectively as both a member of the project team, but also as a contact for partners and liaison with the wider SWEEP network meant that we all had a common understanding of what the project was doing, the complexities of the partnership and the diverse needs of different partners from different sectors.* Ben Wheeler, University of Exeter

- *I'd say having a dedicated impact officer would be essential for any future programme with (of course it needs to be the right person and we were lucky to have you on our team!) Assuming researchers/research teams have all the skills and expertise needed to do all this themselves is highly optimistic – and would end up with a lot of missed opportunities.* Ben Wheeler, University of Exeter

- *The impact officer was valuable in supporting the complicated task of building and evidencing our impact story, without which if would have been impossible to do to the same extent due to the complexities and time consuming nature of developing and running a project.* Grace Twiston-Davies, University of Exeter

- *Having someone who had an overview of the project, as well as the wider SWEEP programme agenda, also added valuable extra expertise which saved us time and enabled more profitable cross-SWEEP working and delivery.* Grace Twiston-Davies, University of Exeter

- *An impact officer helped us to plan and prioritise which impacts may provide the most comprehensive impact story and evidence. This was very important and helped towards the success of our impact project. I think having a dedicated Impact support team is essential for any future impact programme.* Grace Twiston-Davies, University of Exeter

- *Having a dedicated Impact Officer has made it possible for the academic team to focus primarily on developing impact from their work (doing what they do best) and for the Impact Officer to focus on documenting and evidencing the impact (doing what they do best). Bearing in mind that the role of an Impact Officer lies in project management, programme evaluation, big picture thinking and social science research skills (to evaluate impact). This is quite a different skill set from a traditional Research Fellow/Post-Doctoral research role.* Sian Rees, University of Plymouth

- *In a transition from an academic to an impact career pathway, I don't think any of the Impact Fellow team would have made the huge leap in skills required to both deliver impact from NERC research AND document and evidence this impact, based on the differing skill sets mentioned above. It has been a co-learning approach and Impact Fellow and Impact officers have relied on each other. All future projects should have Impact Officers embedded with teams.* Sian Rees, University of Plymouth

- *The SWEEP impact development and evaluation approaches have been exemplary and have helped to raise the bar in terms of reporting. I've recommended the method to our design and impact team, particularly in relation to accounting for policy advocacy impact.* Sarah Young, UK Seascapes Programme Manager, WWF

Annexes

For further information, including access to information within the Annexes referenced, please contact sweep@exeter.ac.uk