

Pioneering marine Natural Capital Approaches to enable a new way of considering, valuing and managing the marine environment in the South West and beyond

sweep

Impact Summary

SWEEP has collaborated with multiple partners in the South West of the UK, to co-create innovative tools and approaches that are changing the way the marine environment is managed. This impact summary showcases the full 5-year SWEEP marine project, which builds on and encompasses Phase 1 work.



17 governance policies and programmes strengthened



£50m new funds and investments influenced;
£28m more anticipated



New marine Natural Capital approach engendered;

embedded within:

6 partner organisations

3 European Marine sites



Ways of Working



Why it mattered?

The marine environment is an incredibly diverse biological resource providing a wide range of benefits and services to society. It supports more than 29,000 jobs in the South West region and delivers direct impact Gross Value Added (GVA) of £1.4bn and aggregate GVA (including sector multipliers) of £3.6bn¹. The marine environment influences the region's culture, shapes coastal communities and benefits human health and wellbeing. Marine habitats have the potential to mitigate climate change by storing carbon, supporting sustainable marine industries and underpinning a blue economy. However, this marine's natural capital (NC), with a national estimated value of £211bn², is threatened by human activities, population growth and climate change.

With increasing government investment and policy aiming to better protect and manage the marine environment, the SWEEP marine team have pioneered a new holistic approach to marine management, for the first-time producing asset and risk registers of marine habitats in their current conditions to strengthen

decision making at local and national level. This science-backed Natural Capital approach enables a whole ecosystem view that considers the functioning of the marine environment and all of the environmental, economic and societal assets and services it provides.

Defra set up its Marine Pioneer Programme to test approaches to delivering the 25 Year Environment Plan (25YEP), specifically testing of new tools and methods as part of applying a natural capital approach in the marine environment.

SWEEP tools and services facilitated the success of this new approach, underpinning the outcomes and recommendations the Pioneer produced. The Pioneer programme and its SWEEP work fed directly into the UK Government's marine Natural Capital Ecosystem Assessment, providing foundational evidence for the approach going forward.

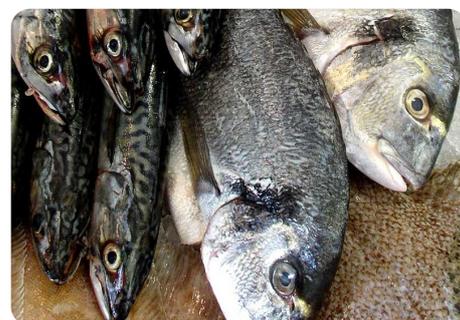
SWEEP outputs underpinned the World's 1st Marine Natural Capital Plan, designation of the UK's first World Surf Reserve and fed directly into the development of fisheries management plans for North

Devon, which are now informing national processes. The tools were replicated in other areas, including two other European Marine Sites, and informed the development of the UK's 1st National Marine Park. Application of SWEEP outputs to fisheries underpinned legal protection of 304km² of seabed to restore kelp forest and provided key evidence for an Isles of Scilly byelaw review.

SWEEP has continued to inform academic publications and project design, such as through the £6.5m Stronger Shores project in the North East, as well as national level programmes. Hence, the impact of SWEEP will continue for some time with long-term implications for marine policy, practice and investment.

¹ [The economic contribution of the UK Maritime Sector. Cebr report \(Apr 22\).](#)

² [Marine accounts, natural capital, UK \(2021\)](#)



What we did

During phase 1 (Feb 2017 - March 2019), SWEEP provided the scientific underpin for the North Devon Marine Pioneer (NDMP) Key to this success was the co-development of 3 novel assessment tools and approaches: the [NC Asset and Risk Register](#) (the first published example of a methodology for an asset register developed in the context of English marine policy), [a framework for integrating NC values into sustainability appraisals](#), and options for the application of marine net gain.

During phase 2 (April 2019 – Dec 2022) the SWEEP team – Dr Sian Rees, Dr Matthew Ashley, Prof Mel Austen, Prof Martin Attrill and Tom Mullier (University of Plymouth) – built on this success by applying and extending the impact of their tools and methods both within the North Devon Biosphere Reserve (NDBR) and to other regions in the South West. Working with the NDBR, SWEEP outputs, particularly the [Geonode](#) and [Asset & Risk Register](#) were used to co-produce the UK's 1st [Marine Natural Capital Plan \(MNCP\)](#). Additional funding enabled the team to develop detailed business cases relating to Blue Carbon, Aquaculture and no-take and harvest, to guide strategic development and planning towards a blue economy.

For the first time, a natural capital approach was taken to develop a sustainability appraisal and applied to the MNCP with the methodology shared through a [public report](#). A peer-review paper was produced on '[Developing policy and practice for marine net gain](#)'. The principles were applied to a case study to test the applicability of offshore wind farm ecological monitoring data to net gain and natural capital frameworks and the treatment of socio-economic issues within environmental impact assessment for offshore wind to provide lessons for the future application of natural capital and net gain frameworks.

Working with the Inshore Fisheries and Conservation Authority (IFCA) on the Isles of Scilly, SWEEP developed a [Natural Capital Asset and Risk Register to Inform Management of Isles of Scilly Fisheries Resources](#). Alongside this, '[An evaluation of the social and economic impact of a Marine Protected Area on commercial fisheries](#)' was published to provide insight into the spatial use and economic performance of a fishery, and linked fisher wellbeing across economic, social and health domains, over a 12-year timescale pre- and post-Marine Protected Area (MPA) designation.

SWEEP NC approaches were integrated into management plans on the Exe (through a report on '[Enabling an Ecosystem Service and Natural Capital Approach](#)') and Tamar Estuaries and the emerging governance framework for the Plymouth Sound National Marine Park. In Cornwall,



Plymouth Sound National Marine Park



Puttsborough beach, North Devon

working closely with Cornwall and Isles of Scilly Local Nature Partnership (CloSLNP), the Marine Liaison Committee and Cornwall County Council, SWEEP co-defined a marine Nature Recovery Strategy.

Beyond the region, SWEEP collaborated with: Sussex IFCA to undertake a NC assessment as part of a trawling byelaw review; Tyneside Council to integrate SWEEP learning into an outline business case for a six year coastal resilience project on the North East Coast; the Yorkshire Marine Nature Partnership to develop understanding of NC.

At a national scale, SWEEP produced guidance on '[Developing policy and practice for marine net gain](#)' that has directly contributed to the development and delivery of the UK Government's [marine Natural Capital and Ecosystem Assessment \(mNCEA\)](#) programme, advising the lead delivery bodies (e.g., MMO, Defra, EA) on the planning of evidence collection to integrate the NC approach. SWEEP continued to input to emerging plans for a sustainable finance mechanism and a [Blue Impact Fund](#); and contributed to public outreach including [WWF films](#) and a [Blue Carbon artist in residence](#).

At an international scale, SWEEP contributed to '[A report for Ascension Islands-Natural Capital Assessment](#)' and embedded SWEEP methods into the £5.8m [Blue Communities](#) project, funded from the UK Government's Global Challenges Research Fund.

Contributing to SWEEP's influence has been the significant roles key researchers and partners have performed e.g., Prof. Mel Austen was the first and only marine representative on the Government's Natural Capital Committee (NCC), feeding SWEEP knowledge into national level decision-making processes, and is Chair of the North Devon Biosphere Partnership. Dr Sian Rees is a member of the Cornwall and Isles of Scilly Marine Liaison group and the Heart of the SW local Enterprise Partnership.

At a national level SWEEP researchers contributed to the Defra Marine Natural Capital Ecosystem Assessment Advisory Group, Codeveloping marine net gain working group with Defra and the MMO, Defra Science Advisory subgroup: Biodiversity Targets, and the Environment Bill Targets workshops.

The team have produced more than 44 academic publications, including '[A marine natural capital asset and risk register - Towards securing the benefits from marine systems and linked ecosystem services](#)' (Rees et al 2022) along with accessible reports, infographics and presentations.

Impacts & benefits delivered

The impacts of this work have been far reaching; informing and enhancing marine policy and management, the economy and perceptions at local to international scales.

<p>Influenced £50m new funds; plus >£28m anticipated</p> <p>Capability for new jobs in North Devon 1,000</p> <p>Underpinned ~£75m BLUE IMPACT FUND</p> <p>Secured Investment</p>	<p>Laid foundations for MARINE NET GAIN</p> <p>Implemented a natural capital approach to Sustainability Appraisals</p> <p>Strengthened Planning</p>	<p>Influenced governance policies & programmes >17</p> <p>marine Natural Capital Asset & Risk Register 1st</p> <p>Provided key evidence for DEFRA Marine Pioneer & £38m marine Natural Capital Ecosystem Assessment</p> <p>Informed Policy & Practice</p>	<p>Strengthened investment potential in BLUE CARBON (>£1m) & AQUACULTURE (€325m pa)</p> <p>Co-produced world's 1st MARINE NATURAL CAPITAL PLAN</p> <p>Underpinned designation of UK's 1st WORLD SURF RESERVE</p> <p>Invested in North Devon</p>
-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

A NEW WAY OF CONSIDERING, VALUING AND MANAGING THE MARINE ENVIRONMENT

© Illustrative Science 2022

<p>Redefined Management</p> <p>Established a new whole-ecosystem approach</p> <p>Embedded the new approach within 3 European Marine Sites</p> <p>Informed £6.5m project to restore habitats on UK's Northeast Coast</p>	<p>Shifted Perceptions & Cultures</p> <p>>200 individuals & 62 organisations directly engaged</p> <p>Engendered a Natural Capital cultural shift; >6 organisations changed their approach</p> <p>44 Academic publications & a rise in social science positions</p>	<p>Increased Environmental Resilience</p> <p>Strengthened management of MARINE PROTECTED AREAS</p> <p>Informed NATURE-BASED SOLUTIONS & blue carbon debate</p> <p>Enhanced international MANAGEMENT & CONSERVATION efforts</p>	<p>Strengthened Fisheries Management</p> <p>Informed new government guidance on fisheries management</p> <p>Underpinned legal protection of 304km² of seabed to restore kelp forest</p> <p>Provided key evidence for Isles of Scilly BYELAW REVIEW</p>
----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Impact delivered by SWEEP Marine Team. Published December 2022.

Image credit: Illustrative Science 2022



Policy & Legislation

Informed Policy and Practice: SWEEP has influenced more than 17 governance policies and programmes to date 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

"SWEEP outputs were the fundamental basis upon which all of the rest of the work was done in the 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

"We are seeing the SWEEP thinking, approaches and learning feeding into government projects, it's clear it is continuing to influence and feed into how people think about Natural Capital and how they take things forward."

Tara Hooper, Natural England

management, have been recognised in the ‘Nature Recovery Green Paper: Protected Sites and Species’, which states “We cannot achieve the level of nature recovery we want with site-based protections alone: we need to look after nature across our entire sea area”.

SWEEP research has fed into a wide range of reports, policies and programmes including [Natural Capital Committee](#) advice to government; [Cornwall Environmental Growth Strategy](#); the [Cornwall Local Nature Recovery Strategy \(Pilot\)](#) which is informing national Marine Nature Recovery networks; more than 4 government reviews and consultations; and been critical to both the development of the £38m [marine Natural Capital and Ecosystem Assessment \(mNCEA\) programme](#), the methods proposed and its delivery. There are currently 47 mNCEA coastal projects, most of which have been informed by SWEEP, either directly through expert adviser roles, or indirectly through the Pioneer outputs and/or SWEEP reports. The long-term impact of this activity will be that NC approaches are embedded in key government department processes, based on SWEEP research and outputs.



Natural Capital

Invested in North Devon NC: The North Devon NC Asset & Risk Register provided the basis for the world’s first [Marine Natural Capital Plan \(MNCP\)](#) for the North Devon Biosphere Reserve. As well as underpinning the plan, SWEEP supported the funding bid to the European Maritime and Fisheries Fund (EMFF) to create it. The plan aims to draw partners together to invest in North Devon’s marine natural capital and improve how it is managed, to drive the future use of the marine environment, such as, through fisheries management, mariculture and conservation.

The MNCP has underpinned a £1.37m investment in North Devon through the Government’s Community Renewal Fund (CRF), the largest green economy award allocated nationally. SWEEP researchers directly contributed to the bid and played a key role in delivering the Blue Biosphere element of the project inputting to structured business plans for investment in North Devon marine NC and the involvement of statutory agencies. The SWEEP team identified areas for investment in blue carbon habitats, providing evidence on the opportunities to recover, restore or create blue carbon habitats and how related investment potential for carbon credits can be developed, which are estimated to run into millions of pounds. This approach provides a model which can be replicated in other coastal communities around the UK.

SWEEP work enabled the identification of a 25km² aquaculture investment zone that could support seaweed, scallop and mussel farming opportunities. The business case identified a potential value of €325m p/a to the SW sector, based on the €1bn European market, and the creation of 4,025 new coastal jobs harvesting 280,000 wet tonnes



The mNCEA came about because of the Marine Pioneer, which was also directly linked to SWEEP and we are looking at producing asset and risk registers as part of mNCEA.”

Sofiya Stoyanova, Defra



I do think the marine NCEA is actively trying to change and transform and do something a bit different, it is trying to make a really strong thread between the policy, the place, the ambition, the outcome we want and what we need to do.”

Aisling Lannin, MMO



The SWEEP tools have been at the core of the development of the MNCP and critical to understanding what needs to be managed better within our marine environment. We’re using it as a basis to comment on development proposals, such as cable installations, to inform decisions and support local stakeholders.”

Andy Bell, UNESCO World Biosphere Reserve Co-ordinator



North Devon coast

of seaweed. They also discovered significant environmental and social mobility benefits for investment in a sustainable blue economy.

The long-term legacy of this work for North Devon will be significant investment in new sustainable industries, new jobs and skill 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 has 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.

In June 2022 North Devon won a prestigious accolade becoming the UK's first World Surfing Reserve (WSR), only the 12th in the World. SWEEP researchers played a key role in developing the nomination and reside on the steering committee to inform its delivery. The designation, awarded by the Save the Waves Coalition, covers approximately 30km of coastline and recognises the high quality and diversity of surf breaks, but also the unique natural beauty of the surroundings, North Devon's deep-rooted and historic surf culture, and its importance to the wider community. It is hoped the evolving delivery strategy will boost the already considerable value of surfing in North Devon, which is estimated to be in excess of £52.1m per annum (Abell & Mallett, 2008), attract investment for new facilities and encourage more children to take up the sport. A similar designation in East Devon (Jurassic Coast) is thought to influence ~£100m a year in economic activity.



Knowledge/Capacity

Redefined management: One of the key characteristics of SWEEP is taking a holistic approach to marine site management. SWEEP researchers informed the development of management plans for the Exe Estuary and for the Tamar Estuary (under development), which intersects with the UK's 1st National Marine Park, and. This marked the first applications of natural capital into the management of European Marine Sites, accredited for their conservation importance. The continued development of these approaches is increasing the utility of the data and will minimise the need for academic input thus ensuring site managers can use the tools independently with limited additional support for maximum application.



A lot of the work done in the CRF built on SWEEP outputs, such as the Geonode. The marine pioneer provided a first critical step in delivering NC approaches, by providing a cogent and cohesive knowledge base for the Biosphere Reserve to build on, that has led to significant further investment and innovation."

Andy Bell, UNESCO World Biosphere Reserve Co-ordinator



SWEEP has provided expert input to the management of the Plymouth Sound and Tamar Estuaries Marine Protected Area (MPA) and the development of the National Marine Park (NMP), which has been instrumental in providing the scientific evidence underpinning for much of our work."

Kaja Curry, Natural Infrastructure Officer, Plymouth City Council

An additional £95k of funding has been secured for carbon mapping and to investigate risks to sea grass beds in Plymouth Sound. This will build on SWEEP work through a partnership of Plymouth City Council, the Ocean Conservation Trust, Finance Earth and Plymouth University and is being complimented by a new PhD research project, supervised by Prof. Mel Austen, to monitor the ascendancy of intertidal seagrass and create a monitoring tool.

While SWEEP has been a Southwest focussed project, the reach has been much broader with the tools developed shared with other coastal management groups. Through presentations at a stakeholder workshop, SWEEP fellow Tara Hooper shared learning with the Yorkshire Marine Nature Partnership (YMNP). 93% of participants stated that the workshop had helped them to understand the benefits of using the NC approach and 100% said it had increased their understanding of the NC approach. Building on the workshop, YMNP have led the grant-funded project, [Connecting the Dots](#), which expanded on initial NC work to commission a feasibility study and create 'explainer' films. They are also in talks with Natural England around using the site as a case study in the mNCEA.

SWEEP fellow Dr Sian Rees contributed to the outline business case for a £6.5m [Stronger Shores](#) project based on SWEEP methods and activities. Stronger Shores will fulfil the evidence gap to improve understanding of the costs and benefits of kelp, seagrass and native oyster habitats with regard to coastal erosion, flood risk, climate change, biodiversity management and wider benefits for the Northeast Coast (Lindisfarne, Northumberland to Skinningrove, North Yorkshire). The output of the project will provide a mechanism for incorporating nature-based solutions in future coastline management strategies through a transformative natural capital/ecosystem services framework.



Organisational Function

Strengthened Planning: The SWEEP team 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 NCC and SWEEP fellow Mel Austen, the only marine expert on the NCC panel. Mel drew on SWEEP research in the development of NCC reports, including [Advice to Government on Net Environmental Gain](#), which informed the consultation. A key aspect of this was the recommendation that net gain should be marine as well as terrestrial.

SWEEP researchers have created novel tools to enable NC values to inform decision making in relation to the benefits and risks of new plans and developments. £155k additional funding was secured from Defra to improve understanding at a UK Government level on how the natural capital approach can be applied to the marine environment



The academic input provided by SWEEP has meant that the Exe Estuary Management Plan 2022-2027 has been informed by not only the latest natural capital approaches but also the real ecosystem benefits provided by the different habitats of the estuary. We plan to build on this approach and integrate habitat values and NC approaches into estuary management decisions going forward."

Stephanie Harper-Chung, Exe Estuary Officer



The SWEEP presentations really helped us to establish some foundational knowledge and frame the natural capital approach within our wider discussions. It has inspired our work going forward and allowed us to access additional funding to carry out further feasibility studies and engage wider stakeholders in the conversation."

Heather Davison-Smith, Yorkshire Marine Nature Partnership Development Officer



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 Tara & Matt."

Sofia Stoyanova, Defra



In terms of net gain, Tara has pretty much done all of that herself. So, that's an obvious, huge impact. You know, I think single-handedly, she has moved that thinking on"

Aisling Lannin, MMO

and how this links to UK national policy, particularly in terms of assessing trade-offs and value for money in monitoring, protection and rebuilding of marine assets.

The SWEEP report is one of the selected biophysical data sources, tools and evidence under the Marine Environment tab of Defra's "Enabling a Natural Capital Approach" (ENCA). ENCA is recommended for use by HM Treasury's Green Book: appraisal and evaluation in central government (2020) and represents supplementary guidance to the Green Book. The government's Nature Recovery Green Paper plans to review environmental impact assessment, offering new opportunities for SWEEP approaches to impact policy in the future.

Responding to stakeholder needs, SWEEP created practical methods to integrate NC values into local decision-making processes. The approach, that had never been attempted for either marine or terrestrial environments before, was developed primarily for sustainability appraisals. However, the application principles can be applied more broadly to impact assessments of new plans and development proposals.

SWEEP has demonstrated how these methods can be applied by regional planners in local area plans in collaboration with North Devon Council; provided suggestions for straightforward and practical ways the statutory Sustainability Appraisal for the South West Marine Plan could adopt a natural capital approach and created a sustainability assessment for the North Devon Marine Natural Capital Plan, ensuring it is a proof of concept for what a marine plan can be. Ongoing discussions are underway between Natural England and the MMO with regard to using a natural capital approach to sustainability appraisal under the mNCEA.

Strengthened Fisheries Management:

As part of the NDMP, SWEEP worked with Devon and Severn IFCA to create a survey to collate comprehensive social data from the fishing industry. The results led to the development of five Fisheries Research and Management Plans (FRMPs). The North Devon Marine Natural Capital Asset and Risk Register provided evidence on which to build further knowledge and potential interventions for the FRMPs. FRMPs have since become a recognised tool that has been included in the Fisheries Act as the process used to manage fisheries collectively and the official guidance for writing FRMPs has been informed by the experience in North Devon.

With input from the SWEEP team, Sussex IFCA replicated the SWEEP methodology to create an Impact Assessment that highlighted the need for a trawling byelaw in West Sussex. Approved by Defra in 2019, the byelaw protects 117 square miles (304 square kilometres) of coastal seabed to allow for the regeneration of underwater seaweed forests. It is hoped that through protection of the area, kelp beds will be rejuvenated providing vital habitats and feeding grounds, which will help to support both wild and commercial stocks. The kelp can also help



Higher Town Bay, St Martins, Isles Of Scilly, Cornwall



Seaweed farming, Porthallow Bay, Cornwall

“ The FRMP will include both scientific and local anecdotal information and consider a broader range of activities than would typically be included in a fisheries management plan, as a first step towards a local application of the Ecosystem Approach. The approach has a strong social and economic component that is informed by SWEEP activities.”

Dr James Stewart, Senior Environment Officer D&S IFCA



Fishing boats, Plymouth

to reduce carbon levels, improve water quality and reduce coastal erosion. As the first fisheries byelaw to be based on an Impact Assessment of the NC it demonstrates that Defra recognise the credibility of this method, setting a precedent for future applications.

Following the byelaw and inspired by SWEEP work, Adur District & Worthing Borough Councils secured £79k for the [Sussex Kelp Restoration Project](#). The grant will help restore almost 200 square kilometres of kelp forest that have been lost to trawling and create a blue carbon bank to support and sustain the restoration of a large kelp forest in the new Trawler Exclusion Zone.

The [Isles of Scilly Asset and Risk Register](#) was used to underpin a fisheries Impact Assessment, informing a proposed new byelaw to prevent the use of mobile gear in sensitive habitats, which is under review with DEFRA. SWEEP researchers worked with the IFCA to secure a £71k grant to map natural capital for fisheries management on the Isles of Scilly and deliver the [SCILL-E Project](#) (Site Classification to Inform Sustainable Lives and Livelihoods for Fisheries and Ecosystems).

The Sussex byelaw and Isles of Scilly proposed byelaw are documented as real-world marine management case studies in the JNCC report '[Case studies on the natural capital approach in marine decision making: The development of fisheries management byelaws](#)'.

Increased Environmental resilience:

Drawing on SWEEP outputs, partners WWF developed a new tool for evaluating the effectiveness of Marine Protected Areas (MPAs) and tested it on the MPAs in North Devon. The [Compass tool](#) identifies weaknesses and supports future planning for MPAs, and wider marine governance and management. It has been used in other areas in the UK, such as Argyll and Flamborough Head and there are plans to use it to assess two MPAs along the Yorkshire coastline.

SWEEP researchers provided expert input to the '[Benyon review into Highly Protected Marine Areas](#)' which concluded that Highly Protected Marine Areas (HPMAs) are an essential component of the Marine Protected Areas network and should be introduced. The review culminated in 25 recommendations covering what HPMAs are and how they should be identified and managed. Five candidate sites in England inshore and offshore waters have since been identified and consulted on, with sites expected to be designated in 2023. Further HPMAs site identification is underway in Scotland with HPMAs designation expected in 2026. Marine Pioneer partners also drew on SWEEP outputs in their response to the review.

SWEEP researchers contributed to the landmark 2021 report 'Nature-Based Solutions for Climate Change in the UK', by the British Ecological Society (BES), co-authoring the marine chapter, with the North Devon Marine Pioneer included as a case study. The report offers a complete assessment of the

"Information compiled in the 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 rationale for the management. This is a fundamental change to a more holistic fisheries management approach."

Erin Laws, Sussex IFCA

"I was certainly inspired by the North Devon work. My application to NEIRF didn't directly reference the North Devon evidence base, but absolutely it is a vital milestone pointing the way. I think it's hard to quantify the impact, but clearly in the influence that it gave to the IFCA report and by extension, the framework of thinking that the IFCA report provided to local partners like us."

Paul Brewer, Director for Digital, Sustainability & Resources, Adur & Worthing Councils

"We are amongst the first to be recommending a closure to mobile gear for sensitive habitats underpinned with a justification based on ecosystem services and the asset and risk register work that Sian and her team did for us."

Tom Hooper, Isles of Scilly IFCA

"The successful outcome of the Sussex IFCA byelaw review further demonstrates that the natural capital approach is sufficiently robust to support the development of legally enforceable management measures in the marine environment. More generally, the report shows that organisations have embraced the concepts the approach encapsulates and have used them for communicating the need for, and aims and objectives of, management measures."

JNCC report

"It is the first time we have undertaken a report on this scale and we are already beginning to see the impacts in how we interact with policymakers and others. We are very grateful for the time, effort and expertise you have dedicated to this very timely report, which we are sure will have a significant impact on policy making."

Jane Memmott, President, British Ecological Society

potential of nature-based solutions in the UK for the first time. They also fed into the Parliamentary Office of Science and Technology, integrating key SWEEP outputs and text into such as the [Blue Carbon](#) and the [Climate Adaptation for Nature](#). Dr Sian Rees is specifically acknowledged as a contributor on both.

Dr Sian Rees contributed to the evidence base for the designation and management of a Marine Protect Area (MPA) for the Ascension Islands as part of the South Atlantic Natural Capital Assessment Project. Analysis that any activities which were to take place that result in abrasion, penetration and damage to the substratum, extraction or physical change of deep-sea habitats should be subject to impact assessments was included in the Ascension Island Marine Protected Area Evidence and Options Document. The document was created by the Ascension Island Government to set out the importance of Ascension Island's marine environment and provide options for an MPA, which was upheld by the UK Government in March 2019. The Evidence and Options paper underpinned a public consultation and the Management Plan for the site. Fishing is not permitted beyond 12 nautical miles of the island for any species or using any type of gear, except licensed research fishing. No mineral extraction is permitted within the MPA and all new developments are subject to an environmental impact assessment. These restrictions support the vital ecosystem services provided by the deep-sea.

Tools developed in SWEEP have been applied to coastal areas in Vietnam, Indonesia, Malaysia and Philippines through the Blue Communities project, led by Prof Mel Austen, contributing to international capacity development. The project has engaged broadly with local communities, raising awareness of the NC of the area and demonstrating these values are considered in decision-making processes.



Economic

Secured investment: Throughout SWEEP, additional funds have been secured for complimentary research by the team and in collaboration with partners. The outputs and activities have also informed a wide array of additional projects, as described in this summary, resulting in more than £50m in new funds to improve management and restoration of the marine environment. An additional £27m in funding is anticipated through developing schemes. A key component of this has been the CRF project in North Devon which has led to the development of business cases for future investment and innovation in the area. The opportunities for sustainable growth in the maritime sector, as calculated by SWEEP researchers, offer the potential for significant job creation with a long-term ambition to create 1,000 new jobs.

SWEEP research formed the baseline and evidence to support the creation of the Blue Impact Fund and contributed to the WWF sustainable finance working group that developed it. The UK Seas project, funded by WWF, investigated sustainable financing mechanisms and identified the Blue Impact Fund as having the most potential to enhance local economies. SWEEP outputs provided the basis



There were elements from the Natural Capital Assessment report that were used within the Evidence and Options paper itself, pulled out from that into the main body of the text. Then it has also been pulled through into the evidence for the management plan. It was an incredibly useful baseline and I think as they start looking and developing work, they'll come back to this again to look at where research might be focussed in the future."

Ness Smith



The Blue Communities program has driven communities to participate and get involved in coastal marine protection, conservation, and development. It has increased their faith in the power of their local ecological knowledge in research and policy initiatives. The program has also increased the coastal community's appreciation of the coast and the ocean as not only a source of their food and livelihood but also a space for recreation and better mental health."

Prof Lota Creencia, Project lead, Western Philippines University



In the long term we're expecting to generate a ~£12.5m private investment fund for marine projects. We are hoping to secure a further £15m for investment into middle dock from the levelling up fund. Hence the long-term impact of the CRF will be significant investment and innovation."

Andy Bell, UNESCO World Biosphere Reserve Co-ordinator



We couldn't have done any of the work we did on the UK Seas without Sian and the team in particular! Her intellect was the foundation and gave us an evidence-base that we didn't exist before, providing credibility."

Sarah Young, WWF

for identification of investable projects which were developed into a portfolio of investable products for the Marine Pioneer. The Blue Impact Fund has been developed into a national scheme that aims to raise > £75m to invest in sustainable enterprise models that both benefit the marine and coastal environment and can generate returns for investors. The Blue Impact Fund has been recognised in the government's [Nature Recovery Green Paper](#), which aims to raise 'at least £500m in private finance to support nature's recovery every year by 2027 in England, rising to more than £1bn by 2030'. The Green paper states "We welcome the pace of innovation in the private sector to enable more investment in nature's recovery, for example, and Finance Earth's work with WWF to create a Blue Impact Fund".

Attitudinal/Capacity

Shifted Perceptions and Cultures:

Throughout SWEEP the team have directly engaged with >200 individuals & 62 organisations through workshops, meetings, advisory roles and events. They have also contributed to public awareness raising, such as a series of 6 WWF films, [Journey to the sea](#) (>13,000 views on YouTube). The team directly engaged with 7 local authorities in the SouthWest, which collectively serve a population of more than 1.1 million people, working with them to utilize natural capital approaches to improve the management of coastal and marine spaces. An MMO survey found that >64% of respondents felt the tools produced during the Marine Pioneer presented very useful options to inform decision-making and >80% found the application of scientific research very useful.

During SWEEP, an artist has been embedded within the blue carbon research culture at the University of Plymouth. An additional ~£30k was secured through NERC Creative Commissions to ensure SWEEP knowledge informed public engagement activities in Plymouth. The project aimed to connect city residents through an immersive living arts piece (The Seagrass Walk), based at the National Marine Aquarium (NMA), with accessible and highly visible satellite installations around the City. 87,375 people interacted with the visual outputs. An independent evaluation indicated positive learning outcomes associated with understanding blue carbon and the role of biodiversity in climate change action and local ownership. NMA visitors expressed an interest in eating more sustainably caught fish after visiting the exhibition.

A highly collaborative process, the NDMP brought together statutory organisations, management and conservation bodies and local interest groups (e.g. local fishermen). SWEEP researchers played a key role in communicating the use and benefits of the natural capital approach to the other partners and wider stakeholder group. By engaging them in the academic process being undertaken they informed their views and use of the tools in their own organisations. A noticeable increase in the number of social science roles in government bodies has been seen as Natural Capital has become more and more integrated into practice and policy. A key contributing factor to this is the breadth of the mNCEA programme, which has a budget of £38m and 45 coastal projects. Led by government agencies there is a direct link between the need for practitioners and academics with an understanding of NC approaches to deliver this programme. The networks developed through SWEEP have engendered lasting relationships with key

"It [the pioneer] was transformational in bringing actors together to develop processes and outcomes and the model should be replicated"

Anonymized response data

"Meetings and workshops have been found to be valuable in developing a common understanding; for example, workshops in the North Devon Marine Pioneer area have been found to be particularly productive and well-received by stakeholders."

Independent evaluation of the 25YEP Pioneers

"All the work that SWEEP has done, and the Marine Pioneers have done is absolutely fantastic. I think what it actually has done is to translate the NC approach from something that is very abstract to something quite practical to tell us and show us how we could potentially apply the approach in practice."

Sofiya Stoyanova, Defra (SWEEP expo)

"The Marine Pioneer has driven a change in perception of natural capital by local stakeholders, particularly the fishermen who understand how it can work for them and are more engaged in fisheries management."

Andy Bell, UNESCO World Biosphere Reserve Co-ordinator

"Every organization now is getting more and more social scientists and environmental economists involved. It certainly has influenced the MMO, we've got 2 senior marine social scientists now. Our experience in the Pioneer, and working with SWEEP, helped us to make a really coherent argument for them to be employed."

Aisling Lannin, MMO

external partners, fostering a basis of credibility and trust in the academic community. SWEEP Co-Is have built on this to develop additional collaborations that take forward SWEEP methods and achievements. A key example of this 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 is training 48 PhD students over 3 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.

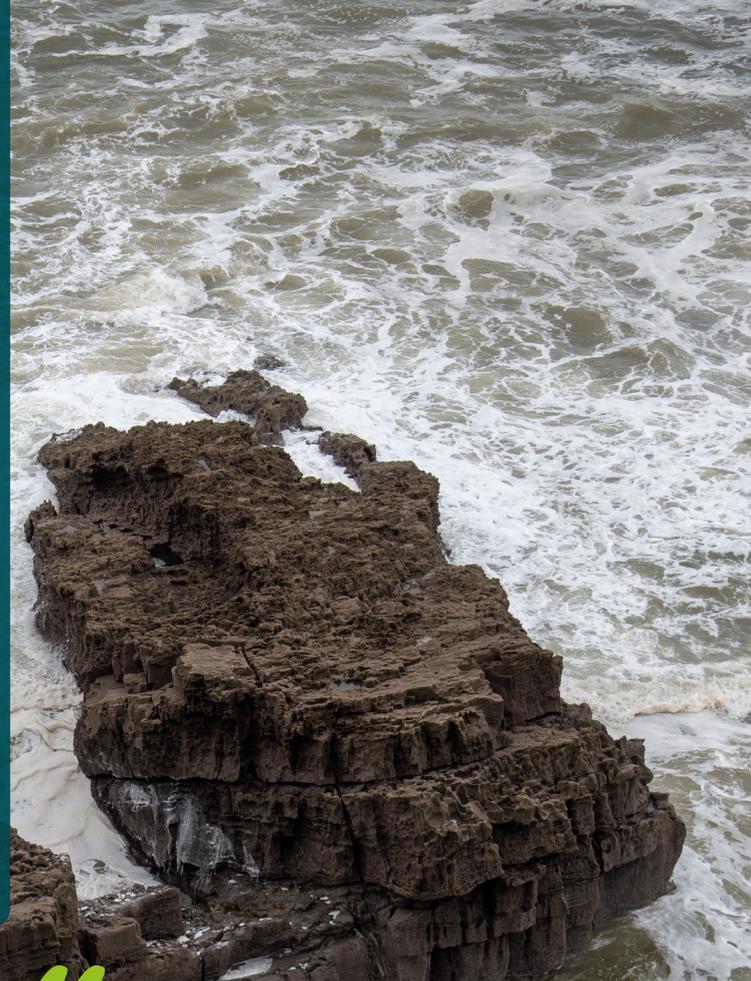


Looking to the future

On the strength of the impact that has been delivered so far, we anticipate further significant benefits will be delivered over the next 5 years through policy influence.

- Marine Net Gain, and further government departments integrating SWEEP informed approaches into their practices.
- The delivery of the mNCEA and review of UK Marine Plans will likely see the use of a natural capital approach to sustainability appraisal.
- The development of Marine Nature Recovery Networks, informed by the Cornwall pilot Local Nature Strategy and implementation of Cornwall's Environmental Growth Strategy.
- Further investment and the development of a blue carbon economy in North Devon along with the realisation of the benefits of the World Surf Reserve Designation.
- The use of SWEEP approaches in fisheries management is highly likely to continue given the success of the Sussex byelaw.
- The results of the Isles of Scilly byelaw will be made public.

For more information contact sweep@exeter.ac.uk



Being able to describe the ecological and benefits of improved MPA management helped create the frame of the Compass. Connecting this to the social and economic dimensions of management [Asset and Risk Registers] enabled a new way to measure MPA effectiveness. We would certainly recommend the Asset and Risk Register approach for people evaluating MPA success. It's a transformational approach that translates well to both government and corporate stakeholders."

Sarah Young, WWF



I drew on the Asset and Risk Register when providing advice to DEFRA on the highly protected marine areas (HPMAs) review. I pointed to the SWEEP work indicating that this is the kind of interdisciplinary evidence-base that you would want to use to help push forward HPMAs. Or, if they test any pilot sites, then including the social, environmental and benefit people (as well as the economic), would help ensure communities felt seen."

Sarah Young, WWF

Underpinning NERC Science

- NE/L003279/1 - Integrating Macroecology and Modelling to Elucidate Regulation of Services from Ecosystems (IMMERSE)

Other funding bodies

European Union (Framework Programme 7 and INTERREG), Natural England, Department for Environment, Food and Rural Affairs, Blue Marine Foundation, World Wildlife Fund, Devon & Severn Inshore Fisheries & Conservation Authority, European Maritime and Fisheries Fund, Marine Conservation Society.

About SWEEP

The South West Partnership for Environmental & Economical Prosperity (SWEEP) is a partnership between the University of Exeter, the University of Plymouth, and Plymouth Marine Laboratory. Funded by the Natural Environment Research Council and stakeholders together to solve key challenges faced by those working with our natural resources. www.sweep.ac.uk



Natural
Environment
Research Council