

An Ocean Health Index+ assessment for South West England

SUMMARY REPORT



European Union
European Maritime and Fisheries Fund



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An Ocean Health Index for South West England

What is ocean health?

A healthy ocean supports diverse ecosystems that sustainably deliver a range of benefits to people now and in the future.

This project is the first of its kind to make use of the Ocean Health Index (OHI) in the United Kingdom. The OHI¹ was developed to assess global progress towards a set of 'goals' representing the benefits brought to people by well-managed oceans, ranging from clean waters to fishing opportunities. The OHI combines social, economic, and ecological data into a single assessment of ocean health with a clear, numerical scoring system – goals are scored from 0 to 100.

The OHI approach allows a diverse range of stakeholders to understand the state of our seas, and highlights our reliance upon the marine environment for food, income, and wellbeing.

Regional OHI assessments, referred to as OHI+, enable regionally specific data to be used, helping to reflect local realities and management priorities.

This report summarises the findings of the first OHI+ assessment for South West England to provide a baseline understanding of the extent to which coastal seas deliver sustainable benefits to communities. The project was initiated to address the lack of independent assessment tools underpinning marine management, and to undertake a quantitative assessment of ocean health within the region. Outputs from the project can inform decision making to improve the management of ecosystems at the local, regional, and national level. The project also provides a tool to track and respond to changes in ocean health, while engaging people more widely in the changes that are taking place on their coastline and in their seas.

¹Halpern et al., 2012. www.nature.com/articles/nature11397



The OHI+ approach

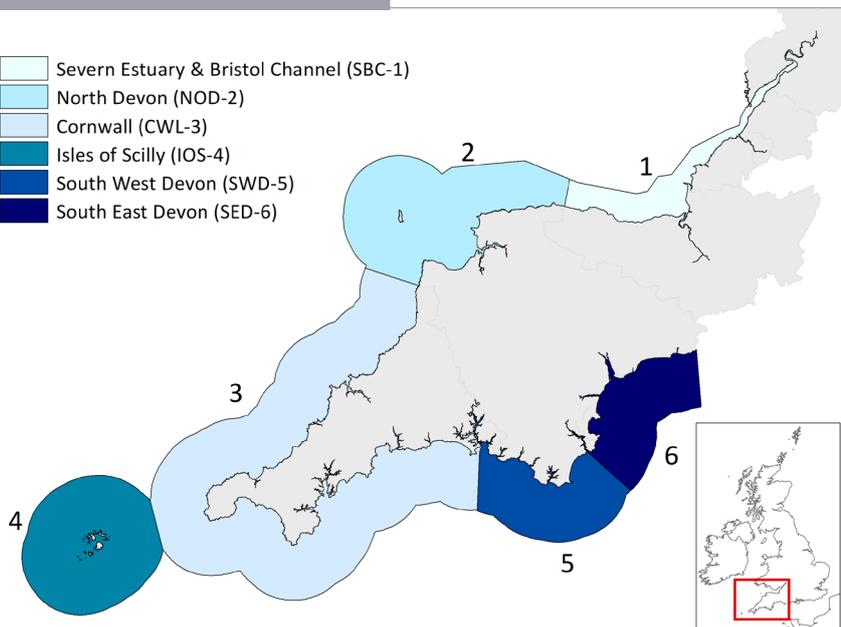
We tailored the OHI+ assessment framework to represent the cultural, social, and ecological characteristics and priorities of South West England using the best available information and knowledge. The project considers the maritime region to 12 nautical miles offshore. This maritime area encompasses the Western Approaches, English Channel, and Celtic Sea, which provide fishing grounds and recreational opportunities, and support a range of temperate habitats and biodiversity. Six geographical regions were assessed to help provide a fine scale understanding of the health of coastal ecosystems and the human activities that depend on them.

Full results, accompanying materials, and a comprehensive technical report highlighting key considerations and data gaps to improve future marine monitoring in the South West, are available to supplement this summary report: www.sustainable-seas.org.



Ocean Health Index+ Regions

- Severn Estuary & Bristol Channel (SBC-1)
- North Devon (NOD-2)
- Cornwall (CWL-3)
- Isles of Scilly (IOS-4)
- South West Devon (SWD-5)
- South East Devon (SED-6)



South West England and the OHI+ assessment regions. Each region (blue filled polygons) has a unique code.

How can the OHI+ support marine management?

The results of this assessment provide marine managers, policy makers, and the public with a visual, communicative tool to raise awareness of the health of the marine environment, identify priorities for policy, and design targeted management actions to improve ocean health.

As the OHI+ framework is transparent and repeatable over time, we anticipate results will have lasting value to a variety of ocean management initiatives including Local Nature Partnerships, environmental growth, Local Nature Recovery strategies, and marine spatial planning efforts.

To ensure the OHI+ South West England reflects local priorities, the project engaged stakeholders and was guided by an expert steering group, comprising the following partners from marine conservation and governance.

The project also compared policies of the Marine Management Organisation’s South West Marine Plan to the OHI+ goals to investigate whether future OHI+ assessment could help in monitoring progress towards these policy objectives.



What does the OHI+ measure?

This OHI+ assessment adapts the global OHI model to measure the state of South West England's marine ecosystems and the benefits they provide to coastal communities. The project collated a suite of existing social, economic, and environmental datasets to measure eight specific goals, five of which had two sub-goals:

GOAL	SUB-GOALS	MEASURE	TARGET
 Clean Waters (CW)		Measuring pollution in coastal waters.	Pollution levels are within existing policy targets or are declining in trend.
 Food Provision (FP)	Fisheries (FIS) Mariculture (MAR)	Seafood sustainably harvested for human consumption.	All wild-caught seafood is sustainably sourced; Mariculture production is stable or increasing.
 Artisanal Fishing Opportunity (AO)		Opportunities for small-scale fisheries.	The under ten-metre fleet experiences stable or positive trends in landings share, catch per unit effort (CPUE), and fuel prices.
 Livelihoods and Economies (LE)	Marine Wages, Jobs (LIV) Economic Productivity (ECO)	Jobs, wages, and revenue associated with marine-related industries.	Marine-related job numbers and economic productivity are stable or increasing, wages rise in line with Consumer Price Index.
 Tourism and Recreation (TR)		Tourism footfall and local recreational use.	Visitor numbers are stable or increasing and opportunities to access recreational activities are maximised.
 Designated Areas (DA)	Valued Landscapes (LAN) Ecological Features (ECL)	Community valued coastal systems; Environmentally regulated ecological features.	The proportion of total coastal or inshore marine areas designated to protect community valued landscapes or ecological features.
 Biodiversity (BD)	Habitats (HAB) Species (SPP)	Condition and monitoring of habitats; Conservation status of key species.	Habitats are in favourable condition and monitored every six years; Key species are in a favourable conservation status.
 Coastal Systems (CS)	Coastal Protection (CPR) Carbon Storage (CST)	The ability of specific coastal habitats to provide key ecosystem services.	Habitats are in favourable condition and monitored every six years.

Where are the data from?

For each goal, regionally-specific datasets were obtained from a range of publicly available national and regional repositories, and combined into standardised formats. This project therefore has the added benefit of building a comprehensive marine geo-database for South West England, with more than 100 marine-related datasets compiled from a range of sources. Full details of the OHI+ methods and goal datasets are available at the project website: www.sustainable-seas.org/methods.

Does the OHI measure human activities?

The OHI+ considers both the health of the diverse habitats and species found in the South West and the sustainability of human activities in the region. Certain extractive human activities, such as fishing or mariculture, can therefore score highly if they are considered to be operating sustainably. Lower scores for these activities indicate that more benefits could be sustainably gained, or that current activities are overexploiting resources or damaging the marine environment.

Are there data gaps?

Yes. The OHI+ is wholly reliant on existing open-source data. The model is therefore limited to those available open-source data along with their associated caveats. The assessment process highlights important data gaps. Some goals are underpinned by more robust data than others and these limitations require acknowledgement when interpreting results. Any recommendations for management made in this report are similarly constrained by the available data and may require further research to understand the underlying drivers of trends. This initial assessment provides a baseline understanding for the year 2018, due to the time lag in more recent datasets becoming available.

What does a score of 100 mean?

The OHI+ model calculated scores for each goal on a 0-100 scale (a score of 0 being worst and 100 being best). To facilitate comparable scores for each goal and region, each goal or sub-goal requires reference points indicating a desirable status that would attain the maximum score of 100. Ideally, reference points are drawn from existing management targets including scientific or policy objectives that can be applied across all regions. However, quantitative management targets are often lacking in marine management. In the absence of defined targets for some goals, the OHI+ South West applies a benchmark system, comparing a region's current performance against its own past performance over a 5-year timeframe. In future assessments there is scope to use longer timeseries of data if they become available.

Are the scores of each region directly comparable?

Yes and no. Each goal is scored in the same way for every region. However, where regional scores are calculated relative to past performance, comparison across regions can be difficult. For example, a region whose status value has declined over time could have a lower score than other regions, even if their most recent status outperformed those regions. However, within-region benchmarks provide a valuable approach to track declines or improvements over time within a region.

Can the scores be compared to the global OHI or other OHI+ assessments?

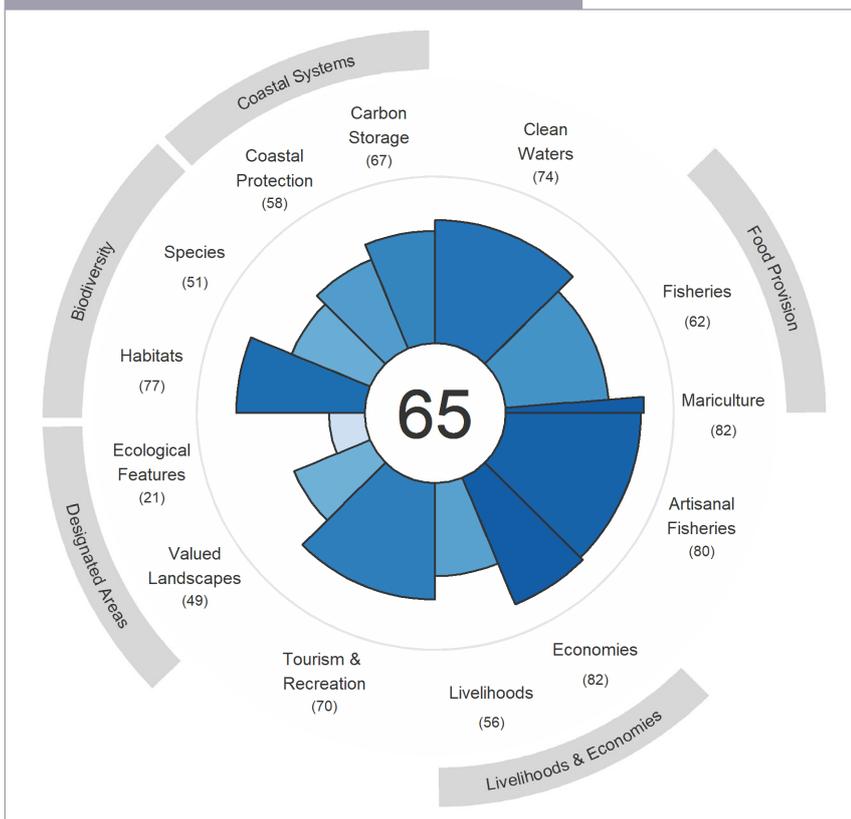
OHI+ assessments use differing data from one another and from the annual Global OHI assessment. As such, OHI and OHI+ results are not directly comparable. Caveats surrounding interpretation and comparison of scores are highlighted throughout the full report available here: www.sustainable-seas.org/report.

South West England OHI+ scores

The final South West England OHI+ score provides an overview of the extent to which coastal seas deliver sustainable social, economic, and ecological benefits to communities in the South West. The South West England central score (65) for 2018 is calculated as an equally weighted average of the surrounding goal scores. Scores for individual goals (i.e. Clean Waters, Biodiversity, etc.) are calculated as a weighted average of the six regions, accounting for differences in marine area. Sub-goals contribute equally to the overarching goal score (with the exception of the Food Provision goal, where fisheries are more heavily weighted than mariculture), which in turn inform the central score.



South West England OHI+ score for 2018



The overall score for the assessment is shown in the centre. Individual goal or sub-goal scores are shown in parentheses. Goals with sub-goals are identified by the outer grey ring. Goals are shaded based on their score (0 to 100); goals with lower scores are shorter and lighter, whereas goals with higher scores are darker and longer.

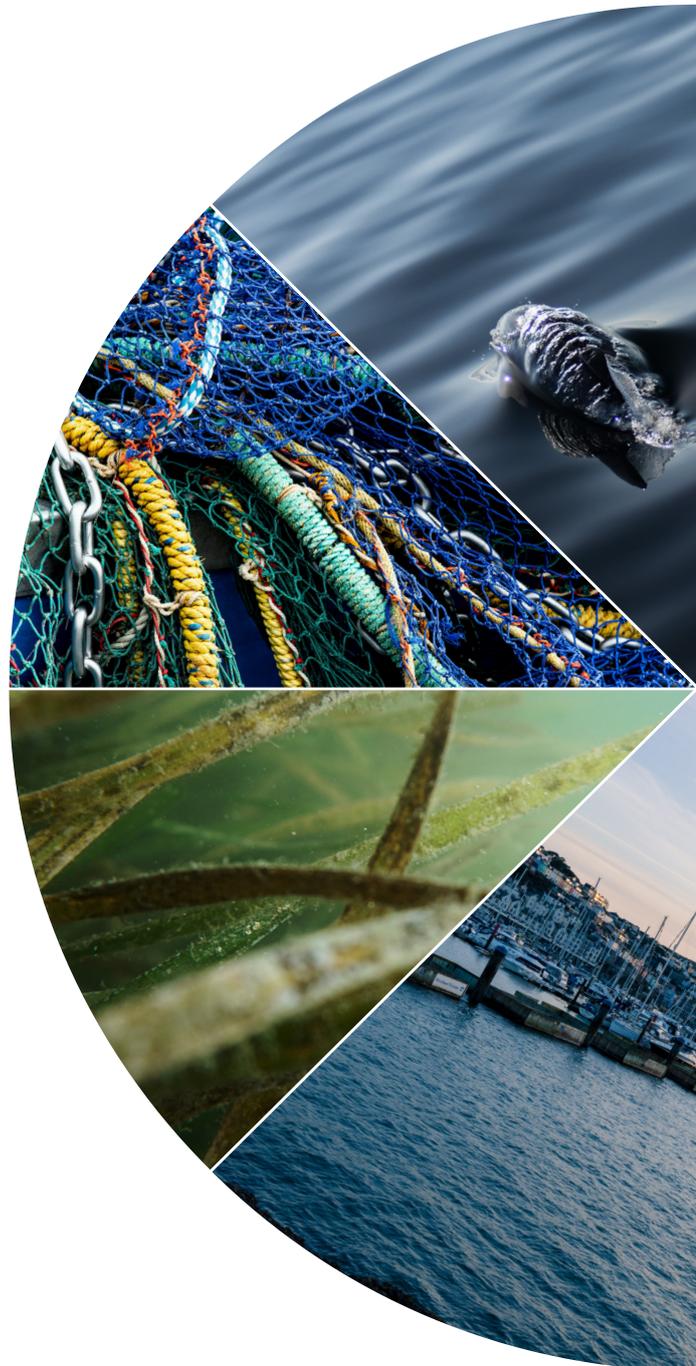
Key findings for South West England

High scoring areas:

- The *Economic Productivity* of marine industries is estimated to have increased in recent years, scoring 82 out of a possible 100.
- The *Artisanal Fisheries* goal, measuring the productivity and access opportunities for under-ten metre vessels, indicates that the small-scale fleet remained stable in most regions between 2014 and 2018 inclusive, scoring 80 of a possible 100.
- Coastal saltmarsh and mudflats, evaluated by the *Habitats* goal, are generally considered to be in a favourable condition across the South West.

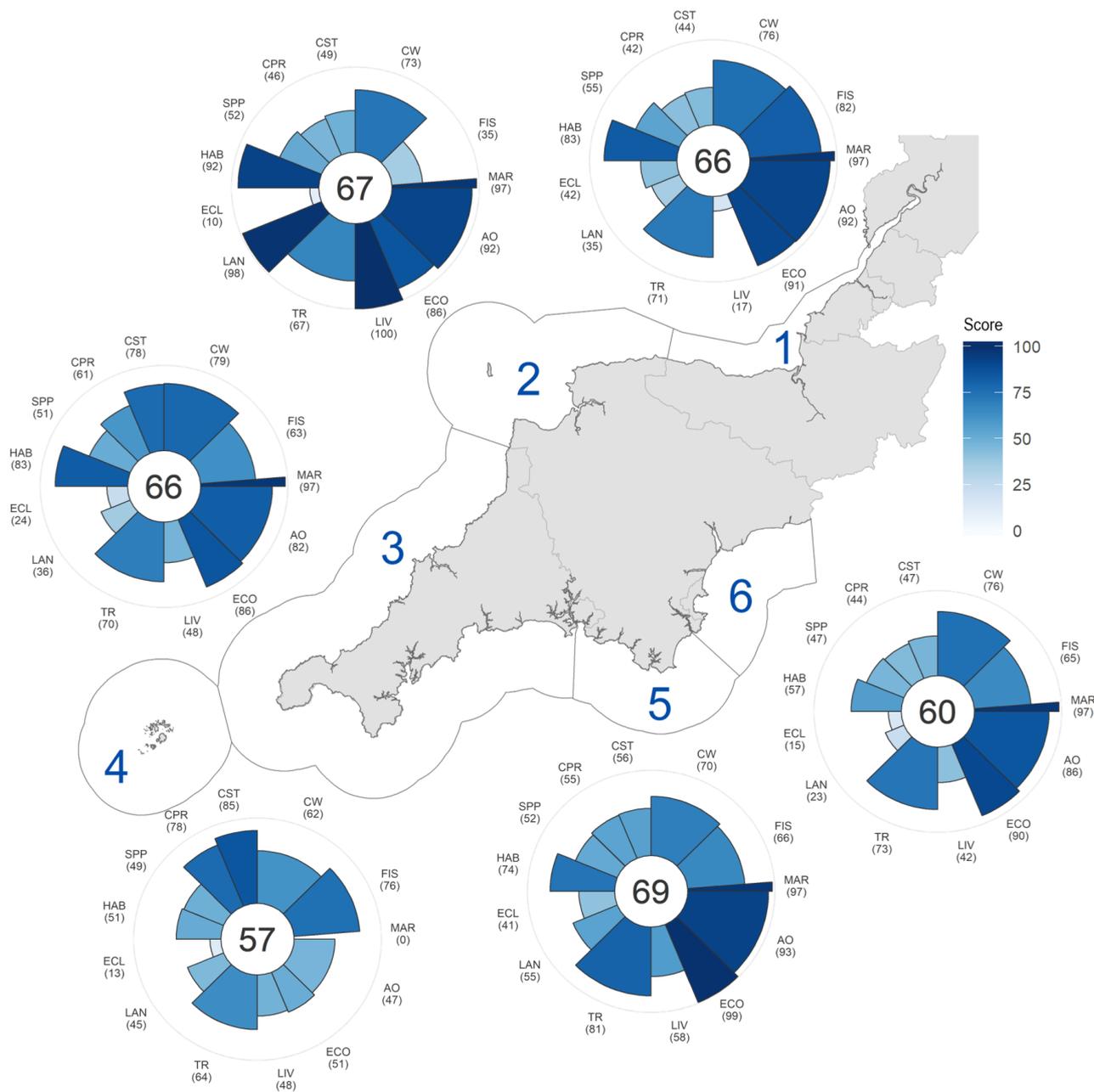
Areas requiring increased attention and management:

- Marine-related jobs appear to have declined in recent years and wages are falling behind national trends, resulting in a *Livelihoods* score of 56.
- Spatial coverage of areas designated to protect *Ecological Features* fell behind scientifically informed targets (30%²) as of 2018, with only 19% of the coastal zone (1 km inshore to 12 nm offshore) designated, although further designations have occurred since the assessment.
- Many of the marine and coastal species evaluated under the *Species* sub-goal are considered to be of conservation concern, with many lacking regular, standardised population monitoring.
- Monitoring levels of key *Habitat* types (e.g. saltmarsh, mudflats, sand dunes, kelp forests, maerl beds, seagrass) is low, with many going unmonitored or experiencing long intervals between surveys, reducing confidence in existing data on habitat condition.



² O'Leary et al., 2016. <https://conbio.onlinelibrary.wiley.com/doi/10.1111/conl.12247>

Region-specific OHI+ scores



Regional scores for the OHI+ South West England assessment for 2018

Scores ranged from highest (69) in South West Devon to lowest (57) in Isles of Scilly. Scores for individual goals are expressed on a scale of 0 to 100 and are shown in parentheses with their goal or sub-goal code: CW (Clean Waters); FIS (Fisheries), MAR (Mariculture), AO (Artisanal Opportunities), ECO (Economy), LIV (Livelihoods), TR (Tourism), LAN (Landscapes), ECL (Ecological Features), HAB (Habitats), SPP (Species), CPR (Coastal Protection), CST (Carbon Storage).

Key findings for South West regions

The Severn Estuary & Bristol Channel region received a final score of 66.

- Areas designated to protect *Ecological Features* were the highest scoring of any region, with 41% of the coastal zone designated as of 2018.
- Declines in marine-related jobs and the failure of wages to increase in line with the national Consumer Price Index (CPI) resulted in a *Livelihoods* score of 17.
- For *carbon sequestering habitats*, 20% of SSSI sites were in an unfavourable condition and only 22% had been recently monitored, suggesting further management is required.

North Devon was the second highest performing region with a final score of 67.

- The region had the largest proportion of its inshore area designated for the conservation of important cultural, aesthetic, or recreational *Landscapes*.
- *Livelihoods* scored a maximum 100, with North Devon the only region estimated to have net increases in marine jobs and wages rising in line with the Consumer Price Index.
- The sustainability of wild-caught *Fisheries* scored 35, with landings dominated by species vulnerable to fishing pressure including dog sharks, skates, rays, and whelks.

Cornwall was the joint third highest performing region with a final score of 66.

- Saltmarsh and mudflat *Habitats* had the highest monitoring levels in South West England, with 75% recently surveyed and over 90% in 'Favourable' condition. Cornwall also scored highly for other habitat-focused sub-goals: *Carbon Storage* and *Coastal Protection*.
- In contrast, only 24% of SSSI sand dune sites were found to be in 'Favourable' condition, with just 29% recently (since 2013) monitored.
- 17% of Cornwall's coastal zone (1 km inland to 12 nm offshore) was designated as a protected area for the primary purpose of *Ecological Features* conservation.



The Isles of Scilly was the lowest scoring region with a final score of 57.

- Low scores were influenced by declining trends in a number of datasets, including landings and CPUE made by under ten-metre vessels, and soft-bottom benthic habitat condition.
- Goals relating to marine industries received low scores, with no mariculture production, falling visitor numbers, and declines in workforce and viability of wages.
- Water clarity, landings by under ten-metre vessels, and soft-bottom benthic habitat condition outperformed other regions in the source data, but received low OHI+ scores due to regional declines in recent years.

South West Devon was the highest scoring region with a final score of 69.

- The region received high scores for goals relating to coastal industries including: *Economies, Tourism & Recreation, Artisanal Opportunities* and *Mariculture*.
- *Designated Areas* for both culturally important landscapes and ecological features scored highly, with 53% and 30% of the respective zones designated as of 2018.
- Carbon Storage in sequestering habitats was the only goal to score relatively poorly, with low SSSI monitoring rates and sites in the Yealm Estuary estimated to be in poor condition.

South East Devon was the second lowest scoring region with a final score of 60.

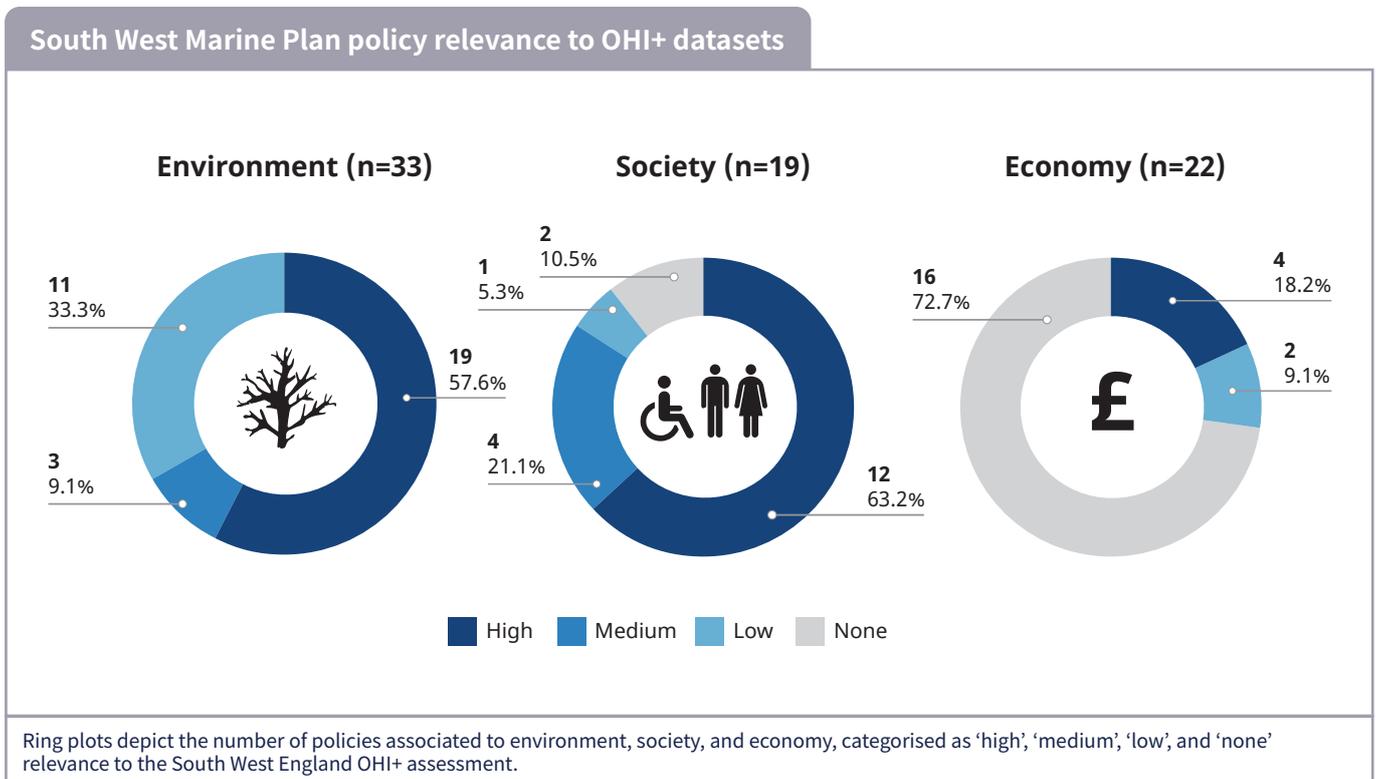
- *Designated Areas* for 'ecological' and 'cultural, aesthetic, or recreational' conservation covered just 11% and 22% of the region's coastal and inshore zones respectively.
- Coastal *Habitats* recorded the lowest monitoring rates in the South West and soft benthic habitats documented the highest levels of disturbance from bottom-towed fishing gears.
- The region's coastal *Tourism* industry recorded declines but was still estimated to have the highest visitor numbers in the South West.



Can OHI+ be used to measure existing management efforts?

To evaluate the OHI+ as a tool to assess marine management initiatives, we examined the correspondence between the OHI+ goals and Marine Management Organisation’s South West Marine Plan draft policy statements (version 3)³. The draft contained 74 policy statements, divided into three categories (environment, society, and economy), each assessed against the OHI+ using a decision tree to examine the capacity of the OHI+ assessment to reflect the breadth of issues covered in the Plan.

Of the 74 policy statements, 35 were considered to have ‘high’ relevance to the OHI+ South West assessment model. Seven policy statements were moderately relevant, 14 policy statements had ‘low’ representation, and 18 did not overlap with any aspects of the OHI+ model framework. Of the 18 policy statements that had no link to OHI+ datasets, 16 were in the ‘Economy’ category. This likely reflects the OHI+ focus on sustainable extraction of renewable resources, rather than finite resources (aggregates) or activities that are independent of well-managed oceans (e.g. cable laying). By evaluating the OHI+ against policy statements in this manner, we were able to ensure that the OHI+ contained comprehensive and relevant indicator data.



³ www.gov.uk/government/publications/marine-planning-iteration-3-engagement-for-the-north-east-north-west-south-east-and-south-west-marine-plan-areas

Recommendations

Improving data

Whilst regular time-series data covering the entire South West assessment area were available for many goals, key data gaps were identified:

- Goals relating to developing industries, such as the mariculture sub-goal, were notably data-poor.
- The assessment would benefit from a wider variety of marine social science data being incorporated. For example, the social and cultural benefits of South West fisheries (notably the small-scale fleet) and recreational engagement are rarely monitored.
- A lack of historical baseline data prevented the setting of meaningful reference points for certain OHI goals. Coastal and marine habitats notably lacked historical spatial extent data to compare against. Without these baselines, the OHI+ was reliant on more recent reference points, potentially representing degraded ecosystems and encouraging shifting baselines between OHI+ assessments.

Repeating the OHI+ assessment

OHI+ uses open source, collaborative software and data. This ensures that the OHI+ assessment can be updated with the most recent data annually, or on other management timeframes, with less effort than its initial development. Replication of this assessment in the future can address some of the data gaps identified in this baseline study and allow the OHI+ to track changes in ocean health in both space and time. There is also the potential for this OHI+ assessment to expand to other English or United Kingdom (UK) regions as most datasets were drawn from national repositories.

Implications for management

Whilst South West England is considered a relatively data-rich area, the lack of defined quantitative targets relating to marine management in the South West proved challenging. Of thirteen goals and sub-goals, five (*Mariculture, Artisanal Fishing Opportunity, Tourism and Recreation, Livelihoods: Marine Wages & Jobs and Economies: Economic Productivity*) had no applicable established scientific or policy targets, with a further two (*Clean Water and Habitats*) only possessing targets for a subset of the datasets used. Without established quantitative targets, the OHI+ was reliant on a 'within region' benchmarking system, making comparisons between regions more complex.

A lack of numerical, achievable targets in the South West hinders the ability of policy makers, management groups, and other stakeholder parties to assign resources, set objectives, track trends, and assess performance. The development of quantitative management targets for a wider range of human activities is therefore recommended.

Setting environmentally sustainable targets for certain human activities is challenging. For example, increased visitor numbers may benefit local communities and result in high *Tourism* goal scores, however, this is also likely to result in increased wildlife disturbance and litter. Similarly, high *Fisheries* scores based on maximum sustainable yield assessments do not account for the wider ecosystem effects of fish removal. Interpreting the scores for goals assessing societal benefits therefore requires caution and high scores should be considered in the context of potential environmental impacts to the detriment of other goals.

Summary

This project represents the first application of the OHI+ framework to the United Kingdom and the first attempt to holistically assess ocean health in South West England. The results provide a baseline understanding of the condition of the marine environment and the coastal communities that rely on a healthy ocean to provide livelihoods, food, and enjoyment.

The final South West England OHI+ results reveal both areas of optimism and room for improvement, with variation between South West regions evident. Full results, accompanying materials, and a comprehensive technical report highlighting key considerations and data gaps to improve future marine monitoring in the South West are available to supplement this summary report: www.sustainable-seas.org.

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