An Ocean Health Index+ assessment for South West England

REGIONAL REPORT

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OCEAN HEALTH INDEX

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OHI+ South West England: Severn Estuary & Bristol

Summary

The Severn Estuary & Bristol Channel region (SBC-4; final score 66) was the equal third best performing region within the assessment (Figure 1). The region showed relatively high variation from the South West central index for a variety of goals (Figure 2). This likely reflects the region's distinct geography, ecology, population and settlements (large, clustered), and small marine area (903 km²). The region scored notably highly for the Designated Areas: Ecological Features and Fisheries sub-goals, but poorly for Livelihoods and Carbon Storage (Table 1).

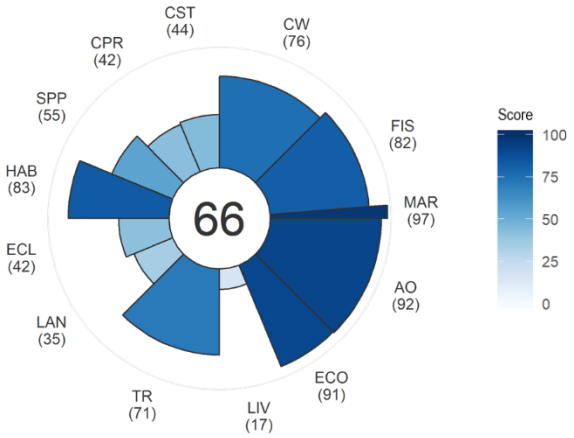


Figure 1. Severn Estuary & Bristol Channel goal † and central score.

High scoring goals and datasets

Designated Areas. The Severn Estuary scored 42 for Designated Areas: *Ecological Features* sub-goal (Table 1); twice that of the south west assessment area mean average. This high score was in part influenced by the region's small geographic area and the presence of the Severn Estuary SAC covering 51% of its marine area. This score contrasts with the *Landscapes* sub-goal, measuring designated areas for cultural and aesthetic reasons, which scored (35) lower than the South West average.

Fisheries. The Severn Estuary & Bristol Channel scored 82 for the Food Provision: Fisheries sub-goal. The region has limited fishing activity, with landings of 430 kg in 2018 comprised exclusively of crab and European lobster (*Homarus gammarus*) stocks, considered relatively sustainable. As all landings were attributed to under ten-metre vessels the Artisanal Opportunities goal also received a high goal score.

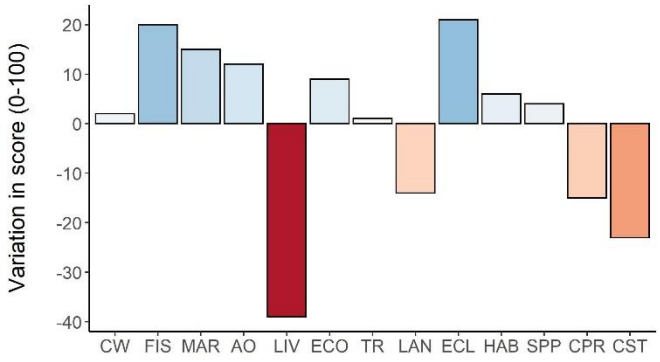


Figure 2. variation from the South West OHI+ central index score by goal. †CW (clean waters); FIS (fisheries), MAR (mariculture), AO (Artisanal Opportunities), ECO (Economy), LIV (Livelihoods), TR (Tourism), LAN (Landscapes), ECL (Ecological Features), HAB (Habitats), SPP (Species), CPR (Coastal Protection), CST (Carbon Storage).

Low scoring goals and datasets

Livelihoods & Economies. The Severn Estuary and Bristol Channel scored 17 for the Livelihoods sub-goal. The next lowest scoring region was South East Devon with 33, and a South West average of 56. The low score for the region is a result of wages in the region not increasing in line with the

national Consumer Price Index (CPI) and coupled with a year-on-year decline in marine-related jobs (i.e. boat building and repair, fish processing). This decline was the largest decline of any region, with a 50% reduction between 2014 (n=182 jobs) and 2018 (n=90 jobs). Available data represent a best estimate of marine-related jobs from registered employees and certain marine industries (see Marine Wages & Jobs), so may not capture the entire workforce.

Coastal Systems. The region performed poorly for the Coastal Systems sub-goals (Table 1). No seagrass or maerl sites occur within the region's boundaries, making the *Carbon Storage* sub-goal a direct measure of SSSI designated saltmarsh and mudflats. As much of the region is estuarine it contains extensive habitats with high carbon sequestration value. This makes the region's low score for the Carbon Storage sub-goal concerning. Only 22% sites were monitored within the last six years (2013 - 2018) and almost 20% (20 of 102 sites) assessed as being in an unfavourable condition. Extensive monitoring of these sites was conducted in 2010 but since this time monitoring has been limited, with a maximum of 22 sites monitored in a single year (2014).

Recommendations and limitation

Given the importance and size (58 km^2) of the Severn Estuary's mudflat habitats, the lack of monitoring in recent years is cause for concern. The region's SSSI littoral sediment sites should be considered a priority for future monitoring and management. In future, OHI+ assesments involving a more hollistic measure of carbon sequestration would be benecifial. The Severn Estuary region would likely see a susbtantial increase in its status score if the sub-goal directly measured the carbon sequestration budgets of each region (combining known sequestration rates (tonnes CO_2) of habitats by the total area (km^2)).

The region had limited data to inform several goals including the *Artisanal Opportunities* goal and the *Food Provision: Fisheries* sub-goal. Data scarcity likely reflects the low level of fishing effort in the region rather than missing data. Limited landings (430 kg in 2018) were only recorded at a single port, Bridgewater, and only during certain years (2017 and 2018). These low levels of fishing activity need acknowledging when comparing against other regions such as Cornwall which landed in excess of 18,600 tonnes.

Table 1. Severn Estuary & Bristol Channel best (green) and worst (red) performing goals compared to the OHI+ SW central index score.

GOAL	STATUS	TREND	PRESS.	RES.	FUTURE	SCORE	SW SCORE	DIFF.
Ecological Feat.	41	0	79	92	42	42	21	**21**
Fisheries	77	NA	38	76	87	82	62	**20**
Mariculture	94	1	81	81	100	97	82	**15**
Coastal Protection	54	-0.6	82	78	31	43	58	**-15**
Carbon Storage	55	-0.6	76	78	33	44	67	**-23**
Clean Waters	25	-1	57	69	9	17	56	**-39**

OHI+ South West England: North Devon

Summary

North Devon (NOD-2; score 67) was the second highest performing region in the assessment (Figure 3). The region had the largest proportion of its inshore area designated for the conservation of sites with cultural, aesthetic or recreational value (Table 2). It was also the only region in the South West to experience an increase in marine-related jobs and wages in recent years (2014 to 2018). North Devon's fisheries were estimated to be the least sustainable of any OHI+ region (Figure 4; score 35), due to landings dominated by species considered particularly vulnerable to over-exploitation.

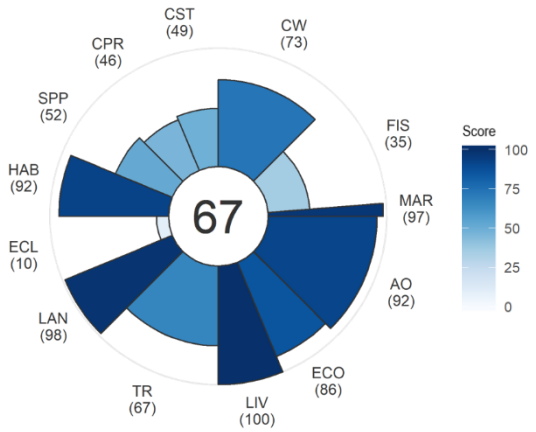


Figure 3. North Devon goal [†] and central score.

High scoring goals and datasets

Landscapes. North Devon currently has approximately 96% of its inshore area (1 km inshore to 3 nm offshore) designation for the purpose of protecting areas valued for aesthetics, culture and recreation. This is primarily due to the North Devon Biosphere (142 km^2), which accounts for 94% of the inshore zone.

Habitats: North Devon scored highly (92) for the Habitats sub-goal. The region's soft and hard benthic habitats are estimated to have experienced some of the lowest disturbance from bottom towed gears (used as a proxy for condition) in the South West, averaging 0.44 and 0.017 fishing hours per km^2 per year respectively. However, this dataset only accounts for AIS instrumented vessels (required on vessels larger than 15 meters in length) and may exclude smaller vessels deploying bottom towed gears.

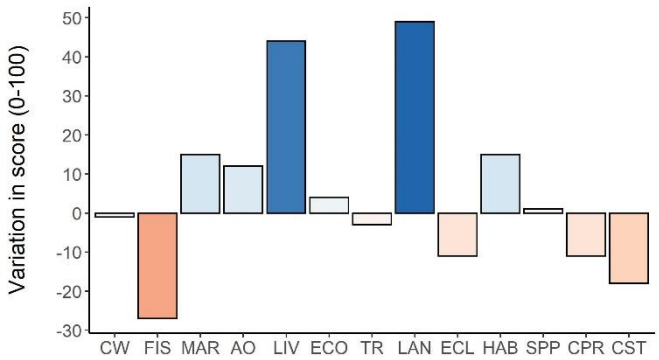


Figure 4. variation from the South West OHI+ central index score by goal. [†]CW (clean waters); FIS (fisheries), MAR (mariculture), AO (Artisanal Opportunities), ECO (Economy), LIV (Livelihoods), TR (Tourism), LAN (Landscapes), ECL (Ecological Features), HAB (Habitats), SPP (Species), CPR (Coastal Protection), CST (Carbon Storage).

Livelihoods. North Devon is one of two regions in the South West estimated to have achieved a net increase in marine-related jobs (i.e. boat building, fish processing) by 2018, and the only region with wages increases that keep pace with the Consumer Price Index (CPI). This resulted in a maximum score of 100 for the Livelihoods sub-goal.

Low scoring goals and datasets

Fisheries: North Devon received the lowest OHI+ score for the Fisheries sub-goal (35). The region's

landings were mostly limited to three stocks, with 81% of the 789 mt landed in 2018 dominated by whelks (*Buccinidae*), dogfish (*Squalidae*) or skate and ray species (*Rajiformes*). All three stocks are considered vulnerable to fishing pressure, either due to life-history traits (i.e. low reproductive rates) making them sensitive to overfishing or historical population declines, and therefore received a low sustainability ranking in the OHI+.

Carbon Storage: The Carbon Storage sub-goal scored (49) poorly for the region. No seagrass or maerl sites occur within the region's boundaries, making the sub-goal a direct measure of saltmarsh and mudflats. The region had four sites with littoral sediment as the main habitat type covering 11 km^2, with three in 'Favourable' condition and the remaining site categorised as 'Unfavourable, no change', although it was the smallest site by area (0.61 km^2). Only one of the region's Sites of Special Scientific Interest (SSSI) sites was recently surveyed (2015) to confirm these condition rankings, with the second largest by site by area, the Braunton Burrows SSSI, unassessed since 2006 (as of 2018).

Ecological Features: North Devon scored highly (98) for spatial designation of culturally important areas but was the worst-performing region for ecological designations, with just 7% coverage of the inshore zone (1 km inland and 12 nm) as of 2018. The region would benefit from the identification and designation of new ecologically important sites if appropriate.

Recommendations and limitation

Fisheries: The OHI+ would greatly benefit from an increase in B/BMSY (Biomass Maximum Sustainable Yield) assessments for commonly landed species. Over 90% of North Devon's 789 landed tonnes in 2018 had no BBMSY assessment available, making it heavily reliant on Marine Conservation Society Good Fish Guide recommendations. Although most regions had greater BBMSY coverage of stocks, the availability and standardisation of BBMSY metrics for all stocks would improve confidence and comparability in the Fisheries goal score.

Coastal Systems: North Devon's neighbouring region, the Severn Estuary and Bristol Channel (SEB-1), scored similarly (48 and 43) for the Coastal Systems goal. Both regions had some of the lowest monitoring rates in the assessment. The South West's north coast should be considered a priority area for future survey efforts of important coastal habitats.

Table 2. North Devon best (green) and worst (red) performing goals compared to the OHI+ central index score.

GOAL	STATUS	TREND	PRESS.	RES.	FUTURE	SCORE	SW SCORE	DIFF.
Landscapes	96	0	59	92	100	98	49	**49**
Livelihoods	100	0.3	54	42	100	100	56	**44**
Habitats	85	0.5	33	75	100	92	77	**15**
Ecological Feat.	7	1	48	92	13	10	21	**-11**
Carbon Storage	55	-0.4	46	75	45	49	67	**-18**
Fisheries	35	-0.2	24	71	36	35	62	**-27**

OHI+ South West England: Cornwall

Summary

Cornwall was the joint third highest performing region in the OHI+ assessment (66; Fig. 5). Nine of fourteen assessed goals for Cornwall scored above the OHI+ South West central index score (Figure 6). Cornwall has relatively healthy fisheries (63) and artisanal fishing opportunities (82), and intact coastal habitats (83). Cornwall was one of the only regions supporting coastal habitats providing carbon sequestration ecosystem services that scored above the assessment average and were subject to monitoring above the regional average frequency (75% sites monitored between 2013 and 2018). Cornwall scored poorly for the Landscapes sub-goal (36; Table 3), which measured total area designated to protect valued aesthetic, cultural and recreational landscapes. The stability and growth of the region's marine-related jobs and wages were below the South West assessment index score.

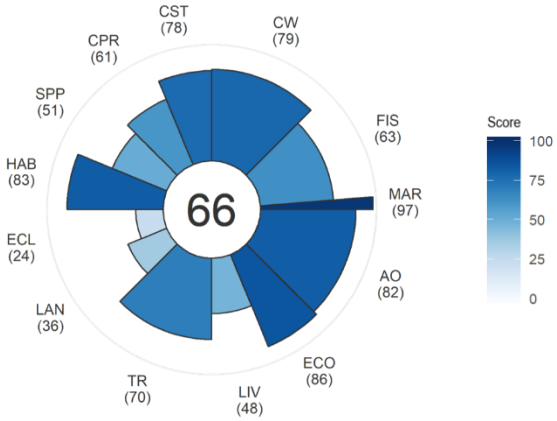


Figure 5. Cornwall goal † and central

High scoring goals and datasets

Carbon Storage (CST). This sub-goal, measuring the condition, extent and monitoring of coastal habitats such as saltmarsh and mudflats that provide carbon sequestration services, was scored highly (78) for the region. Over 90% of assessed saltmarsh and mudflat habitats were considered to be in 'Favourable' status. Unlike most regions in the OHI+ assessment, 75% of these sites were surveyed at least once in the past six years (2013 - 2018).

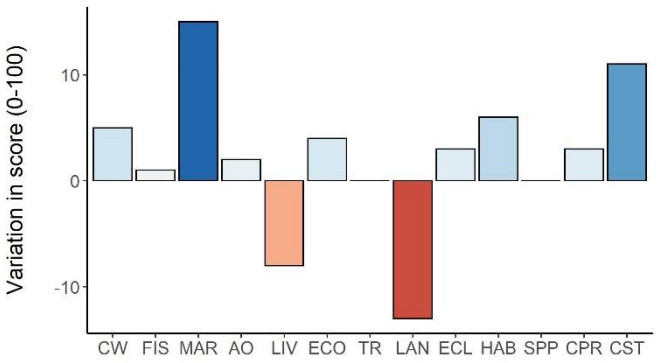


Figure 6. variation from the South West OHI+ central index score by goal. †CW (clean waters); FIS (fisheries), MAR (mariculture), AO (Artisanal Opportunities), ECO (Economy), LIV (Livelihoods), TR (Tourism), LAN (Landscapes), ECL (Ecological Features), HAB (Habitats), SPP (Species), CPR (Coastal Protection), CST (Carbon Storage).

Fisheries (FIS). The Fisheries sub-goal score for Cornwall (63) was above the South West average score (62). Landings in Cornwall (2018) were by far the largest of any of the assessment regions (>18,600 tonnes), making it a key region of interest for the sub-goal. While the score reveals scope for improvement, it shows Cornwall's

landings were mostly comprised of stocks fished within (or at least close to) biological limits or were 'recommended' species by the Marine Conservation Society.

Low scoring goals and datasets

Landscapes (LAN Designated Areas). The lowest score for Cornwall relative to the South West average was the Designated Areas: Landscapes sub-goal (Figure 6; 36). The region has approximately 35% of its inshore area (1 km inshore to 3 nm offshore) designated for the purpose of protecting areas valued for aesthetic, cultural and recreational reasons. This is the third lowest proportion of total area of any OHI+ region. Cornwall is however the largest region in the assessment, with a coastal area of 2584 km^2 and the longest coastline (1082 km using mean high water), so its total designated area of 898 km^2 represents the largest actual area in the South West.

Livelihoods (LIV). Cornwall performed poorly compared to the South West average for the Livelihoods sub-goal (Table 3). Cornwall's marine-related jobs (e.g. boat building and repair, fish processing) are estimated to have peaked in 2015 (for years 2014 – 2018) and subsequently contracted by 4.4% as of 2018. This recent decline, coupled with the region's per capita mean annual wage increases in 2018 falling below the yearly mean Consumer Price Index (CPI) of 2.5%, resulted in the low score for the sub-goal.

Recommendations and limitation

Designated Areas. Cornwall scores below the South West average for designating culturally important sites (*LAN*), and above average (21) but below accepted policy targets (30% coverage) for areas protecting ecological features (*ECL).* The expansion of Cornwall's marine protected area network should therefore be considered.

Livelihoods. Despite recent (2015 – 2018) declines in marine-related jobs, the long term trend reveals Cornwall's marine-related jobs remain 6% higher than 2010 levels. This decline should therefore be closely monitored but may not be an immediate cause for concern.

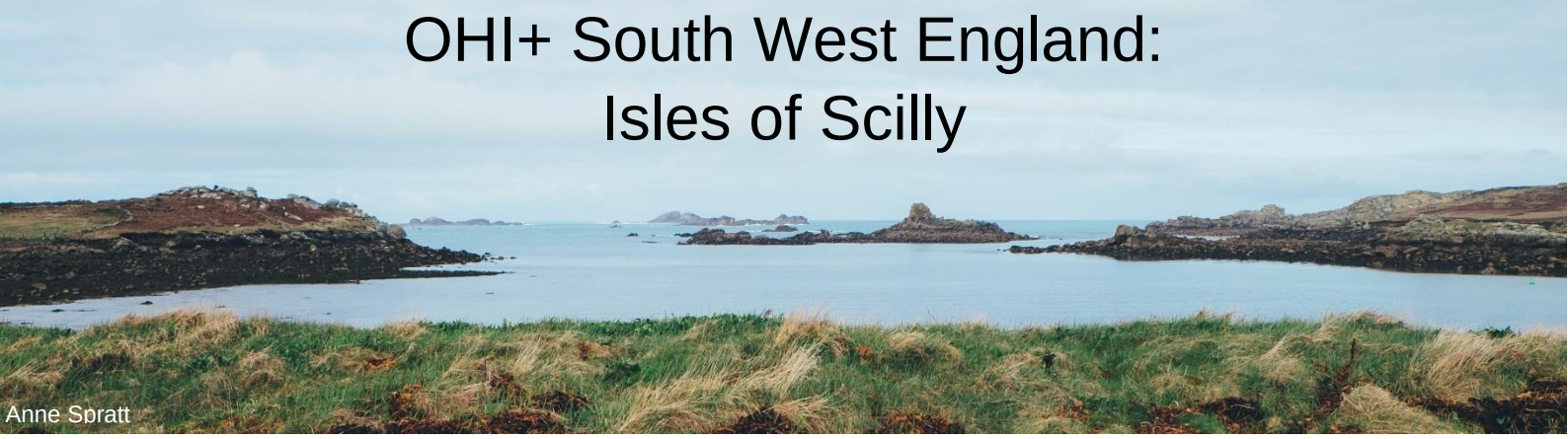
Habitats. Given the general favourable condition and recent surveying (2013 - 2018) of Cornwall's saltmarsh and mudflat habitats, a shift in monitoring and restoration efforts to other habitat types may help to improve outcomes. Of the total coastal sand dune sites under SSSI designation in the region, only 24% are assessed as being in 'Favourable' condition and 29% monitored in the six year prior to the OHI+ assessment year (2018). Regular, standardised monitoring of marine habitats (i.e. seagrass, maerl and kelp) would also be beneficial for building a more comprehensive picture of the state of Cornwall's sub-tidal habitats of key biodiversity importance.

Mariculture (MAR). The Mariculture sub-goal was hindered by a lack of data and the scores were considered a weak indicator of the state of the industry. Cornwall has the largest total area licensed for mariculture in the South West (>100 km^2 in 2019). As the industry develops and open-source production data become available, the OHI+ could be adapted to better understand the industry.

Table 3. Cornwall's best (green) and worst (red) performing goals compared to the OHI+ central index score.

GOAL	STATUS	TREND	PRESS.	RES.	FUTURE	SCORE	SW SCORE	DIFF.
Mariculture	94	1	83	81	100	97	82	15
Carbon Storage	79	-0.1	60	76	77	78	67	11
Habitats	83	0	69	76	83	83	77	6
Species	57	-0.3	82	77	44	51	51	0
Livelihoods	50	0	72	44	45	48	56	-8
Landscapes	35	0	68	92	37	36	49	-13

OHI+ South West England: Isles of Scilly



Summary

The Isles of Scilly (IOS-4) scored in 57 in in OHI+ assessment using data for the period 2014 - 2018 (Figure 7). The Isles of Scilly achieved low scores for Mariculture, Artisanal Opportunities and Economies when compared to the South West average (Figure 8). Three goals scored above the South West average (Figure 8), including fisheries, coastal protection and coastal systems. The region experienced a decline in status for many datasets used during the assessment period, resulting in a low overall score. These low scores were in part driven by the within-region benchmarking approach adopted by the assessment.

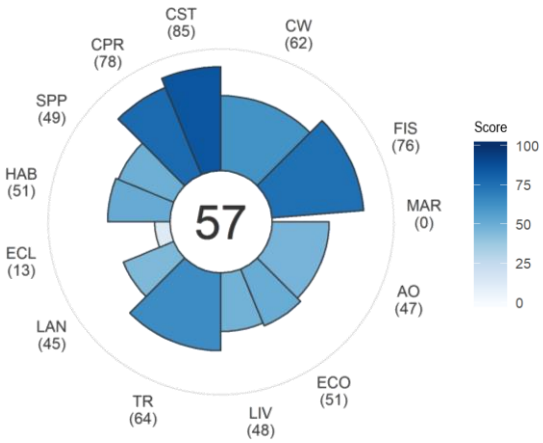


Figure 7. Isles of Scilly goal† and central score.

High scoring goals and datasets

Coastal Systems. The Isles of Scilly scored highly for both Coastal Systems sub-goals, which include habitats providing natural Coastal Protection (78) and Carbon Storage (85; Table 4). The Coastal Protection goal relies on habitat condition data relating to seagrass, sand dune and saltmarsh/mudflats, and implements a metric to penalise regions that fail to conduct regular (surveyed at least once every six years) monitoring of these habitats. The Isles of Scilly have a limited number of SSSI sites and small total area for sand dune and saltmarsh and mudflat habitat types. Despite their limited area, both dunes and littoral sediment habitats were assessed to be in favourable condition, although they have not been surveyed since 2012 or 2009 respectively. Seagrass in the Isles of Scilly is assessed as being in declining condition (increased levels of leaf infection), but when combined with the monitoring metric achieves relatively high OHI+ status scores as they are one of the few sites across the South West to have interannual surveys.

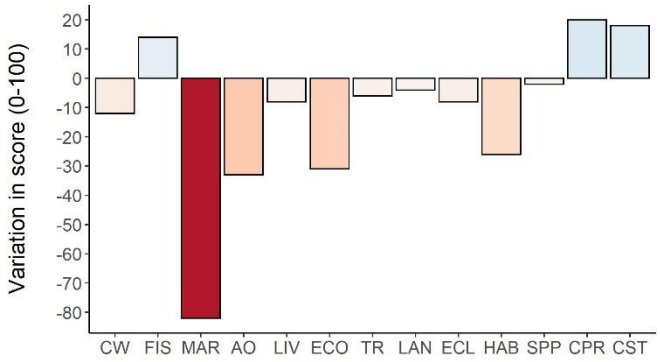


Figure 8. variation from the South West OHI+ central index score by goal. †CW (clean waters); FIS (fisheries), MAR (mariculture), AO (Artisanal Opportunities), ECO (Economy), LIV (Livelihoods), TR (Tourism), LAN (Landscapes), ECL (Ecological Features), HAB (Habitats), SPP (Species), CPR (Coastal Protection), CST (Carbon Storage).

Fisheries. The region was also the highest scoring (Table 4) for the Fisheries sub-goal (excluding the

Severn Estuary region which recorded low or zero landings each year). The high score is attributed to the majority (97 of 107 tonnes) of landings in 2018 arising from lobster and crab stocks that are considered close to BBMSY or have Marine Conservation Society 'recommended' stock status. The region was also the only one to have a positive trend for fisheries, indicating landings were sustainable during the assessment period.

Low scoring goals and datasets

Mariculture. The lack of mariculture sites reflects the exposed and isolated nature of the islands, with no sheltered estuaries, which are often preferred for benthic shellfish aquaculture.

Economies and *Artisanal Opportunities*. Data informing the Economies sub-goal revealed a 37% decrease in per capita Gross Value Added (the value generated by any unit engaged in the production of goods and services) since 2012 and the Artisanal Opportunities 'landings to port' dataset a 60% decrease in the proportion of landings from under ten-metre vessels recorded as since 2014. The region experiences the largest share of its' landing from the under ten-metre fleet and the equal highest GVA per capita for marine related industries when compared to all other OHI+ regions. However, as the OHI+ currently measures a regions current status against its recent past to determine scores for these goals, declines during the reporting period result in low scores compared to regions that see stability or increases over time.

Recommendations and limitation

The Isles of Scilly was one of the top performing regions when interrogating source data on water clarity (suspended detrital matter), proportion of landings by under ten-metre vessels and trawl intensity over soft-bottom benthic habitats. However, these datasets experienced declines over the five years assessment period and as such the region scored poorly. Early iterations of the OHI+ explored using reference points that compared all regions' status against each other, with the best performing region becoming the benchmark (score of 100). Using this approach would result in the Isles of Scilly becoming the 3rd highest scoring region, with notable increases to certain goals (i.e. the Clean Waters increased from 62 to 88).

These 'across region' reference points however have limitations (limited model sensitivity and potentially unconstructive comparisons across regions with distinct biogeography and socioeconomic characteristics). Tracking each region's performance over time was therefore considered preferable. The influence of benchmark reference points on OHI+ scores reveals the need for more defined management targets in the South West. This would aid clarity when designing effective management strategies and allow direct comparison between geographically distinct areas, likely resulting in higher OHI+ scores for the Isles of Scilly.

Table 4. Isles of Scilly best (green) and worst (red) performing goals compared to the OHI+ central index score.

GOAL	STATUS	TREND	PRESS.	RES.	FUTURE	SCORE	SW SCORE	DIFF.
Coastal Protection	79	-0.2	54	77	76	78	58	**20**
Carbon Storage	84	-0.1	47	77	86	85	67	**18**
Fisheries	72	0.1	53	73	79	76	62	**14**
Economies	64	-0.5	81	58	38	51	82	**-31**
Artisanal Opp.	56	-0.5	76	71	38	47	80	**-33**
Mariculture	0	0	62	81	0	0	82	**-82**

OHI+ South West: South West Devon

Summary

South West Devon was the best performing region in the OHI+ assessment (69; Figure 9). The region received high scores for Economies, Designated Areas: Ecological Features, Mariculture, Tourism & Recreation and Artisanal Opportunities. The region's coastal habitats providing carbon storage benefits (56) were the only area to fall noticeably below the South West average (67), however the other habitats based sub-goals also scored slightly below average.

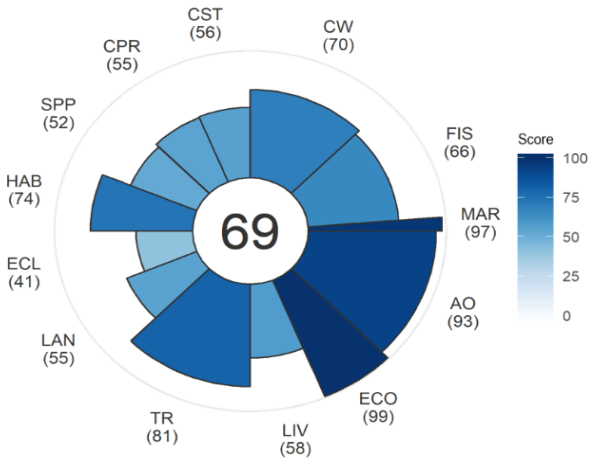


Figure 9. South West Devon goal † and central score.

High scoring goals and datasets

Ecological Features (ECL). A high proportion of coastal waters in South West Devon are designated for both cultural management and ecological conservation. With over 30% of the region's coastal area (1 km inshore to 12 nm offshore) within some form of relevant spatial designation, the *Ecological Features* sub-goal scored highly (41) compared to South West average (21) (Figure 10). The score was influenced by two large sites; Start Point to Plymouth Sound and Eddystone SAC (249 km^2) and Skerries Bank and Surrounds MCZ (341 km^2). Further, a large proportion (53%) of the nearshore area (1 km inshore to 3 nm offshore) was also classified in this assessment as being designated for management for human enjoyment or cultural value.

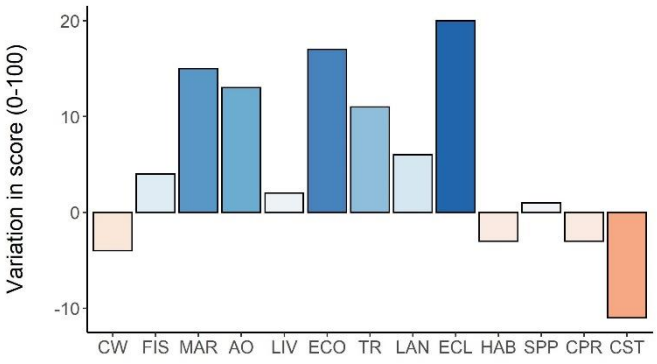


Figure 10. variation from the South West OHI+ central index score by goal. †CW (clean waters); FIS (fisheries), MAR (mariculture), AO (Artisanal Opportunities), ECO (Economy), LIV (Livelihoods), TR (Tourism), LAN (Landscapes), ECL (Ecological Features), HAB (Habitats), SPP (Species), CPR (Coastal Protection), CST (Carbon Storage).

Artisanal Opportunities (AO). This goal captured the opportunities for small-scale fisheries, including the proportion of landings by under ten-metre vessels. The reference point for this dataset compares the region's current status against its recent (5 year) past due to a lack of suitable policy targets. The region experienced a consistent increase in the proportional of fisheries catch from under-ten metre vessels since 2015, and as such

scored highly. The region has the second lowest raw proportional catch attributed to the under ten fleet (2018; 19.1% of landings).

Economies (ECO). South West Devon was the only region to record stable Gross Value Added (GVA) per capita for marine-related industries (2011–2015). As such, economic productivity did not appear to follow the general negative trend for the South West (mean -6.7% decrease per year for other regions).

Low scoring goals and datasets

Carbon Storage. This sub-goal scored poorly for the region as less than half of SSSI sites identifying saltmarsh and mudflats as a designated feature were monitored within the last six years (as of 2018). Saltmarsh and mudflats within the Yealm Estuary SSSI were reported as being in particularly poor condition. Sites within the Tamar-Tavy and Salcombe to Kingsbridge Estuaries were assessed as more 'Favourable'.

Clean Water. This goal score was negatively impacted by an increase in water pollution associated with high vessel density. The region experienced the highest density of vessels (tracked by the global AIS system) of any South West UK region for four of five years of the assessment period (2014 -2018), with a peak weekly mean 1500 vessels per 4 km^2 in 2018. Most other regions in the assessment experienced approximately 500 per 4 km^2 per week.

Recommendations and limitation

Ecological Features. At present the OHI+ doesn't measure effectiveness or monitoring of marine protected areas due to a lack of data. There is a pressing need to develop a standardised and repeatable monitoring framework to measure the effectiveness of marine protected areas in the South West. This would provide future OHI+ assessments with a more robust measure of how regions utilise spatial management for marine conservation.

Habitats. A proxy of bottom towed fishing pressure was applied for the Habitats sub-goal due to the lack of survey data on benthic habitat condition. Without survey data to assess condition status (i.e. Favourable, Unfavourable), benthic condition was assessed relative to a region's past performance, with regions recording declines in trawl intensity receiving higher scores that those with increases. This method benefited South West Devon due to a decline in trawling over soft benthos between a maximum observed in 2016 and 2018. This metric however fails to account for South West Devon having some of the highest trawl intensity over its soft benthic habitats, with 10 hours effort per km^2 in 2018. Comparatively, the Isles of Scilly, with an average of 3 hours per km^2, recorded increases in trawling and was the lowest scoring region for soft benthic habitats. Collection of survey data at index or reference sites should be prioritised to provide a more detailed understanding of the condition of important benthic habitats and would improve certainty in the OHI+ scores for the *Biodiversity: Habitats* goal.

Table 5. South West Devon best (green) and worst (red) performing goals compared to the OHI+ central index score.

GOAL	STATUS	TREND	PRESS.	RES.	FUTURE	SCORE	SW SCORE	DIFF.
Ecological Feat.	30	1	79	92	52	41	21	**20**
Economies	98	0	41	58	100	99	82	**17**
Mariculture	94	1	81	81	100	97	82	**15**
Coastal Protection	64	-0.5	65	78	46	55	58	**-3**
Clean Waters	73	-0.1	100	92	66	70	74	**-4**
Carbon Storage	64	-0.5	54	78	48	56	67	**-11**

OHI+ South West: South East Devon


Sarah Doffman

Summary

South East Devon was the lowest scoring mainland region in the OHI+ assessment (60; Figure 11). The region scored below the South West main index for seven of 13 goals/sub-goals, notably Designated Areas, Biodiversity: Habitats, Carbon Storage and Coastal Protection. Aside from the Mariculture sub-goal, which was limited by data availability and has a minimal contribution the central score, the region scored marginally above the South West average for Economies, Clean Waters, Tourism and Recreation and Artisanal Opportunities a (Figure 12).

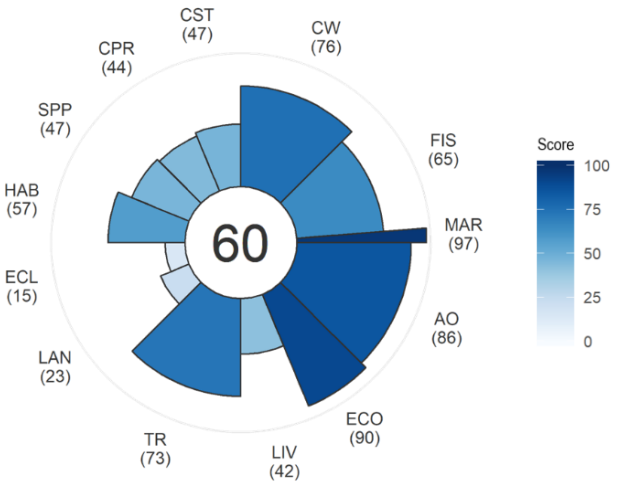


Figure 11. South East Devon goal † and central score.

High scoring goals and datasets

Artisanal Opportunities (AO). This goal (86) scored above the South West average (Figure 12), due to increases in the Catch Per Unit Effort (CPUE) of under ten-meter vessels between 2012 and 2016. The AO goal uses a 'within-region' benchmark; assessing the region's current status against its recent past performance. While improvements have occurred within the region, CPUE (0.07 tonnes per kilowatt day fished ('days at sea multiplied by engine power to give a total of kilowatt (KW) days of effort')) was the lowest across the assessment area and the region reported the lowest proportion of landings from the under ten vessels (8.9% of total catch) in 2018 when compared to other regions.

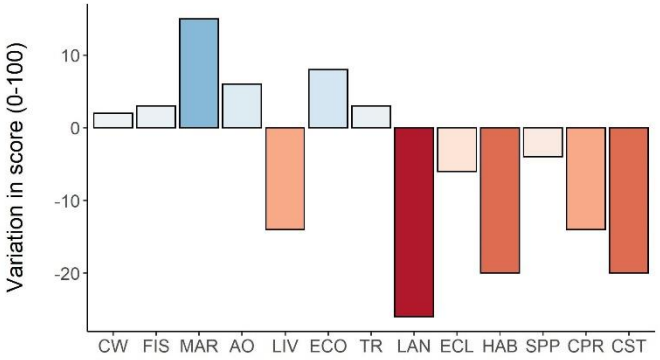


Figure 12. variation from the South West OHI+ central index score by goal. †CW (clean waters); FIS (fisheries), MAR (mariculture), AO (Artisanal Opportunities), ECO (Economy), LIV (Livelihoods), TR (Tourism), LAN (Landscapes), ECL (Ecological Features), HAB (Habitats), SPP (Species), CPR (Coastal Protection), CST (Carbon Storage).

Tourism (TR). South East Devon experienced the highest visitor density of any region, resulting in an above average Tourism & Recreation goal score. This goal was, however, reliant on data from 2014 due to limited data availability. The calculated score may not represent more recent patterns.

Mariculture (MAR). South East Devon's Mariculture sub-goal score was greater than the assessment average for south west England. The

region has the third largest total area (34 km^2) licensed for mariculture production as of 2018. However, this goal experienced problems of limited data availability due to the small number of producers that means production data are not disaggregated by region.

Low scoring goals and datasets

Designated Areas (Landscapes). South East Devon received particularly low scores for this goal, with only 11% of its inshore area designated for ecological protection and 22% for cultural, aesthetic or recreational purposes. Comparatively, neighbouring South West Devon is one of the better performing regions for these sub-goals, with 30% and 53% respectively.

Biodiversity: Habitats (HAB). Whilst the region's mudflats and saltmarsh are all considered to be in favourable or recovering condition, it has the poorest monitoring rates in the OHI+ assessment. As of 2018, none of the region's littoral or supralittoral sediment SSSI units had been assessed within six years, with several surveys 10 years old. Lack of timely monitoring reduces the certainty in the favourable condition assessments and the region consequently received reduced scores. South East Devon's soft benthic habitats also received low scores as the region is estimated to experience some of the highest levels of disturbance from bottom towed fishing gears in the assessment area. Trawl intensity, calculated from Global Fishing Watch data, increased from an average of 3 fishing hours per day per km^2 in 2014 rising to 8.9 hours per km^2 in 2018.

Recommendations and limitation

Fisheries. The OHI+ would greatly benefit from an increase in maximum sustainable yield (BBMSY) assessments for commonly landed species. Over 60% of South East Devon's 14,000 landed tonnes of seafood in 2018 came from species that had no BBMSY assessment available, making assessment of landings more reliant on sustainability criteria from the Marine Conservation Society. Although landings for most regions were comprised of a greater proportion of fish species with BBMSY assessments, the availability and standardisation of BBMSY metrics for an increasing number of stocks would improve confidence and comparability in the Fisheries goal score. These assessments could better assist management of Devon's biological stocks, including scallop species (king scallop (*Pecten maximus),* queen scallop *(Aequipecten opercularis)*) and common cuttlefish (*Sepia officinalis*), which represented 32% of the region's landings in 2018.

Designated Areas. South East Devon would benefit from the expansion of its network of protected areas to address the low coverage of 11%. The current extent of protected areas in South West Devon, which is greater (30%), may have been prioritised in Devon due to more conspicuous distribution of vulnerable habitats or species. However, improvements in coverage in SE Devon could help the management of seagrass sites, as well as saltmarsh and mudflats habitats that support rare wading and migratory birds and RAMSAR sites. These sites should be considered a priority for increased monitoring, with the region's SSSI littoral sediment sites not having been surveyed for over eight years (mean= 8.3 ±sd 0.92 years as of 2018).

Table 6. South East Devon best (green) and worst (red) performing goals compared to the OHI+ central index score.

GOAL	STATUS	TREND	PRESS.	RES.	FUTURE	SCORE	SW SCORE	DIFF.
Mariculture	94	1	81	81	100	97	82	15
Economies	92	-0.1	49	49	89	90	82	8
Artisanal Opp.	83	-0.1	39	70	88	86	80	6
Habitats	66	-0.4	68	75	49	57	77	-20
Carbon Storage	56	-0.5	61	75	39	47	67	-20
Landscapes	22	0	68	92	24	23	49	-26

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